

University of Belgrade
Faculty of Organizational Sciences

XIII INTERNATIONAL SYMPOSIUM



SYMPOSIUM PROCEEDINGS

Editors

Maja Levi Jakšić, PhD
Slađana Barjaktarović Rakočević, PhD

June 5 - 9, 2012
Congress center
Ratko Mitrović
ZLATIBOR
SERBIA



UNIVERSITY OF BELGRADE
FACULTY OF ORGANIZATIONAL SCIENCES

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XIII International Symposium SymOrg 2012

INNOVATIVE MANAGEMENT AND BUSINESS PERFORMANCE

June 5 - 9, 2012, ZLATIBOR, SERBIA

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Foreword

We are very pleased to present the Proceedings of the XIII International Symposium of Organizational Sciences, traditionally organized by Faculty of Organizational Sciences, University of Belgrade, and held at the beautiful mountain resort Zlatibor, located at the heart of Serbia. We have selected the general theme «INNOVATIVE MANAGEMENT AND BUSINESS PERFORMANCE» for this year's Symposium and with great satisfaction report high interest and response that we received to the call for papers. More than 250 papers and about 500 authors and co-authors, scholars and practitioners, are represented with their contributions in the Proceedings.

The authors have contributed, from multitude of perspectives based on – or cutting across - many disciplines and specializations, to the ongoing and rapidly increasing discussions and research in the subjects of management and innovation leading to business performance improvement. Presenters and participants are discussing the latest research and applications in innovative management and its relations to business performance, wealth creation and improving the quality of life. The broad scope of the thematic issues covered in the contributions presented in the Proceedings confirm that Innovative management and business performance is a multifaceted phenomenon that cannot be easily squeezed into a particular branch of technical, social sciences or the humanities.

The purpose of the Symposium in providing a unique international forum to facilitate interdisciplinary discussion of current issues and exchange of cutting-edge information, ideas and innovative solutions is clearly achieved and represented by the papers that cross the boundaries between different fields and disciplines and report collaborative research. It also shows that the current turbulent and very often unpredictable environments in which firms operate create pressures on academics and practitioners to better understand and respond in creative and innovative ways by searching innovative solutions for continuous business performance success. Crucial responsibility and starting point for sustainable development, competitiveness and high business operations performance lies within the creative, open, innovative and collaborative management. Innovative management leads to exceptional business performance at the core of economic and social development. We are grateful to the many authors and co-authors that contributed their thoughts and talents to enrich the state of knowledge in this field.

The broad themes of the Symposium have allowed for exploration of different aspects of these areas:

- Innovative organization and management
- Performance Management
- Business Intelligence and Decision Making in Management
- Business Psychology
- Communication Management and Social Networking
- Corporate Social Responsibility
- Education Management
- Entrepreneurship and Management of Small and Medium Enterprises
- Financial Management
- Health Care Management
- Human Resource Management
- Information Technologies in Management
- International Management
- Knowledge Management
- Marketing Management
- Operational Research and Quantitative Methods in Management
- Operations Management
- Organization of Business Systems
- Project Management
- Public Administration Management
- Quality Management
- Strategic Management
- Sustainable Development and Environmental Management
- Technology and Innovation Management
- Case Studies

Proceedings contain full papers accepted for presentation at the Symposium. Also, it includes papers of invited keynote speakers, to whom we express appreciation for taking part in this year's SymOrg.

Belgrade, May 25th, 2012.

Editors:

Maja Levi Jakšić

Slađana Barjaktarović Rakočević

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INNOVATION, ORGANIZATIONAL FLEXIBILITY AND PERFORMANCE

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Abstract: *The paper reviews the literature and shows the main results of empirical studies about the relationship between human resource flexibility and innovation. This relationship is not linear and straightforward but depends of each specific dimension of human resource flexibility, and at the same time it is moderated by different variables.*

Keywords: *flexibility, human resources, innovation, moderator effects, industry.*

1. INTRODUCTION

In the past several years, the European Commission has opened up a dialogue and made recommendations concerning the requirements of flexibility in the labour markets of European countries with the aim of shaping new human resource management practices compatible with new forms of work organization (an initiative referred to as “flexicurity strategy”). The ultimate goals of this dialogue and the research tied to it are, by improving firms’ innovation capacities, both to promote their competitiveness in a globalized world and to maintain the European social model. At the centre of this drive is the “insider-outsider” model of the labour market, according to which the work force is divided between incumbent employees whose positions are protected by labour turnover costs (the insiders) and entrants (with low turnover cost) and unemployed workers. The flexicurity strategy is aimed at reducing the divide between insiders and outsiders in the labour market so as to improve firms’ use of human capital.

At the same time that European countries debate about the important changes in labour relations promoting flexibility, new challenges arise regarding the factors directly related to increase innovation capabilities. Innovation contributes to the firm’s competitive advantage, and therefore country’s competitiveness. Among the factors influencing innovation, the relationship between human resource flexibility and innovation has received little attention. Human resource flexibility focuses on adapting employee attributes (such as skills or behaviours) as well as on modifying the number of working hours to changing environmental conditions. These flexibility abilities are important not only because they contribute to cost reduction but also because they may influence innovation. For instance, skill polyvalence enables employees to respond better to stimuli which have appeared previously by thinking of new ideas and introducing more products, more quickly than competitors.

However, prior research has not established consistent relationships between human resource flexibility and innovation. Some theoretical perspectives and empirical research seem to view the model of flexibility provided by the institutional framework as neutral because its aim is simply to provide the flexibility firms need. However others argue that labour market institutions can affect the innovative activity of firms. To the extent that their argument is correct, the model of flexibility dictated by the institutional framework is not neutral. For instance, excessive resort to outsiders gives employers little incentive to invest in human capital initiatives such as training and, as a result, restrains the implementation of forms of work organization that lead to greater innovative activity. The aim of the strategy proposed by the European Commission, nevertheless, is not to eliminate the numerical flexibility provided by temporary workers (outsiders); rather, it is to look for a balance between this flexibility and the functional flexibility associated with new forms of work organization. Flexibility allows firms to match employment with output levels more closely.... However, flexibility may discourage long-term investment in transferable skills by the employer, since the worker may not stay with the firm. It also discourages investment in firm-specific skills by the worker, since there may not be an adequate return on that investment in the absence of job security.

The purpose of this paper is to contribute to the analysis of the relationship between human resource flexibility and innovation by discussing theoretical arguments and exploring some latest empirical evidences from studies that focus on different dimensions of human resource flexibility. We show specially data from Spanish manufacturing firms because with the highest proportion of fixed-term employees in the

European Union, the Spanish labour market is an exceptionally good test case for investigating whether and to what extent heavy reliance on temporary workers and other flexible dimensions constrains innovation. Adding interest to the case is that the predominant collective bargaining model in Spain has been –just until this same year- quite far from the coordinated bargaining models that characterize the most innovative EU countries.

2. THEORY

2.1. Measures of human resource flexibility and innovation

Flexibility options have the potential to broaden the range of capabilities necessary to innovate. Some scholars (e.g., Karuppan, 2004; Upton, 1995) argue that human resource flexibility constitutes a platform to build other levels of flexibility and explain the variations of innovativeness. Milliman et al. (1991) define human resource flexibility as “the capacity of human resource management to facilitate the organisation’s ability to adapt effectively and in a timely manner to changing or diverse demands from either its environment or from within the firm itself” (p. 325).

Human resource flexibility can be classified in internal and external. Internal human resource flexibility (functional and internal numerical) involves efforts to increase the firm’s ability to adjust to changing circumstances through modifications of the internal labour market or work organisation. External human resource flexibility uses changes in the external labour market through short-term hires, temporary help agencies, or consulting/contracting firms and R&D centres. Each human resource flexibility category may contribute differently to deploy employees’ embedded knowledge and to broaden the access to knowledge-based resources that support innovativeness.

Given the variety of human resource flexibility dimensions, many scholars recognise that firms rely upon different modes of employment. For instance, Matusik and Hill (1998) and Tsui et al. (1995) have studied differences in employment relationships that range from long-term relationships with core employees to short-term exchanges with external workers. In the core-periphery model of the flexible firm, Atkinson (1984) differentiates between: (a) the core employees who are most vital to the firm because they are involved in activities that generate core competences like innovation; and (b) the periphery of external employees who are less important because they perform activities that generate non-core competences. However, not all the external work arrangements have the same implications for innovativeness, and therefore this model has been criticised.

Lepak and Snell (2002) have overcome the limitations of the core-periphery model by examining human resource configurations in a two-by-two typology according to the dimensions of strategic value (contribution to the firm’s core competences) and uniqueness (extent to which they are rare in the external market) of employees. They argue that besides a core of knowledge employees and a periphery of short-term contractual employees, firms may establish partnerships or hire highly qualified individuals whose skills and knowledge-intensive services are more transferable than that of core employees. Other scholars also argue that a firm’s innovation increasingly relies on external knowledge sources (Quinn, 2000). Looser employment relationships may enable firms to gain access to an array of diverse specialists, filling identified knowledge gaps which firms may not afford to engage internally on a full-time, permanent basis (Matusik and Hill, 1998; Nesheim, 2003).

Internal human resource flexibility includes functional flexibility and internal numerical flexibility. First, functional flexibility means a process through which firms adjust to changes in the demand for their output by an internal reorganisation of workplaces based on multiskilling, multitasking, teamwork and the involvement of employees in job design and the organisation of work. Two causal links can explain the relationship between functional flexibility and innovation at the firm level.

On the one hand, functional flexibility practices like multiskilled teams may contribute to a wider dispersion of skills and knowledge that make the deployment of individual workers to particular tasks more adaptable and, as a consequence, may positively influence innovation (Arvanitis, 2005; Kelliher and Riley, 2003). The speed with which individuals learn to perform new tasks is becoming increasingly important in today’s environment of rapid technological change. Firms with larger percentages of employees involved in functional flexibility practices are more able to innovate activities because: (a) functional flexible practices require employees to be trained in order to enhance their individual skills; and (b) the process of

innovation in the firm needs the cooperation between different departments. Both inputs create opportunities for the adoption of multifunctional teams that need employees with skill polyvalence and a wider dispersion of knowledge which leads to greater innovation at the firm level.

On the other hand, functional flexibility can improve the quality of working life by reducing monotonous, repetitive work. Flexible practices are supported by human resource policies like on-the-job training that contribute to develop employees who generate core-competences like innovation (Kelliher and Riley, 2003). Ehrlich (1994) states that the new psychological contract that offers 'employability' through developmental experience creates more productive employer-employee relationships at the firm level. Improving labour relations facilitates the performance of multifunctional teams that develop new product and process innovations. As a consequence, the ability to be functionally flexible may enhance innovation through commitment and development of core employees.

Second, internal numerical flexibility is related to adjusting the employment volume to changes in demand through part-time contracts and the annual, monthly or weekly distribution of working-time. Flexible practices like flexitime contribute to job satisfaction (Konrad and Mangel, 2000), which in turn may enhance innovation at the firm level. The concepts of psychological contract, organisational commitment and psychological safety offer causal explanations. First, psychological contract and organisational commitment are two related concepts: psychological contract consists of employees' beliefs regarding what employers owe them and what they owe their employers in turn; organisational commitment is a stabilizing force that binds individuals to organisations (Ng and Feldman, 2008). Employees who perceive that they are valued by their organisations are likely to reciprocate with greater discretionary effort to ensure organisational goals are met (Wayne et al., 1997). For instance, employees covered by practices like flexitime and supported by their supervisors to balance work and family, feel more psychological contract and organisational commitment (Veiga et al., 2004). These employees which in turn may be more willing to increase efforts in innovation activities like extra time in new product development teams that enhance innovation at the firm level.

Second, psychological safety –the degree of support for interpersonal risk taking- reinforces the link between flexibility and innovation. The implementation of practices like flexitime requires the support of supervisors and top managers (Eaton, 2003). Without this support, employees are reluctant to adopt these practices because managers might perceive them as little compromised to their jobs. However, a supportive job environment created by internal numerical flexibility enhances the employee's psychological safety, and this may lead to greater innovation at the firm level. These learning processes contribute to the deployment of knowledge and the performance of multi-functional teams in activities like new product development which leads to greater innovation at the firm level.

Regarding external human resource numerical flexibility, it adjusts the firm's output by contracting and firing temporary employees: short-term hires, temporary help agencies and consulting/contracting firms. Firms use these non-standard work arrangements in their innovation activities for different reasons. On the one hand, firms may emphasize numerical flexibility: the use of 'more or less input of similar knowledge'. Training, recruitment, and hiring costs are lower for temporary than for permanent employees, and firms can manage capacity more efficiently (Kalleberg and Mardsen, 2005). On the other hand, firms may also develop flexibility capabilities by assessing, creating, and implementing 'new knowledge'. Both needs of knowledge should have different theoretical implications to use each type of external work arrangement.

First, short-term hires may contribute to reduce labour costs but they may also have negative outcomes. Innovation requires organisational commitment that it is less frequently found among short-term hires (Michie and Sheehan, 2003, 2005; Posthuma et al., 2005). For instance, the performance of new product development teams may be less productive whenever there are poor labour relations within the team and with supervisors.

Second, firms can lease employees from temporary help agencies for the same reasons than short-term hires. These employees may also represent a threat to job security, indicating firm can easily get someone else to do the same job which can affect the stigmatisation of temporary employees. External workers are more difficult to organise and often have different objectives from those of the permanent workers, making collective bargaining difficult which may negatively influence labour relations and discretionary efforts (Pfeffer and Baron, 1988). These employees are also normally excluded from in-house training programs

which make them less productive for new product development teams which negatively influences innovation at the firm level.

Third, firms may use consulting/contracting firms or universities/R&D centres to provide numerical flexibility and obtain knowledge. When properly planned and executed, firms that hire knowledge-intensive activities reduce innovation process obstacles (Gupta et al., 2009). Similarly, firms that conduct their own R&D and seek external knowledge related to their core competences can more effectively incorporate this external knowledge and use it to enhance innovation. Thus, firms concerned with developing innovations may acquire the services of consulting/contracting firms or universities/R&D centres. These external employees bring knowledge of occupational and industry best practices into the firm, and may stimulate exploration of ideas outside the firm's knowledge stock (Nesheim, 2003). This flexibility offers increased opportunities for much faster and lower-cost innovation to firms that develop their core competences and integrate outside knowledge properly.

Then the literature reveals disagreements about the association between human resource flexibility and innovativeness. Whereas some scholars suggest the need to build and sustain committed human resources with full-time and permanent contracts, others argue that different types of looser employment relationships may contribute to innovation. Serrano and Altuzarra (2010) even propose a two-part hypothesis to test that the relationship between flexibility and innovation is not a linear one: innovation is not incompatible with the numerical flexibility provided by the insider-outsider model; but excessive resort to temporary workers can hamper firms' innovative activity. The threshold at which innovation activity begins to decrease could be different for different countries, depending on their respective labour market institutional frameworks and productive structures.

The non-conclusive findings can be partly explained because the absence of moderators in these studies and because prior research is mostly focused on the influence of single flexible practices on limited measures of innovation output. We have carried out several empirical studies which include moderator effects in order to test the influence of some moderators on the relationship between flexibility and innovation. These moderators could contribute to reconcile the differences in theoretical discussions and empirical results found so far.

2.2. Moderator effects between human resource flexibility and innovation

There has been very little discussion in the literature about the moderator effects that could explain differences in results on the relationship between flexibility and innovation. Nevertheless there are at least three moderators that could be introduced to analyse this relationship: inter-organizational cooperation, environmental dynamism, and the level of flexible technology in operations.

First, the role of inter-organizational cooperation is important because as a firm increases interactions with other members in the supply chain, it may experience changes in its organizational flexibility. External cooperation may modify (increase or decrease) the need to be flexible internally and this could have implications for the firm's innovation performance. Firms that cooperate in new product development within the supply chain can broaden their knowledge base and contribute to diffuse innovative work practices along the supply chain. High-cooperation firms can access a broader knowledge base than low-cooperation firms, and therefore they may be more able to deploy a wider dispersion of knowledge through human resource flexibility that contributes to greater innovation performance.

Firms that combine resources can gain a competitive advantage over firms that are unable to do so, and this is viewed as one of the key benefits of inter-organizational cooperation. For instance, Gupta et al. (2000) found that involvement of suppliers and participation in joint-venture/strategic alliances in the R&D process is greater in high-R&D effective organizations than in low R&D-effective. Thus, previous experiences of inter-organizational cooperation in the supply chain forge close bonds over time and increase confidence that exchange partners will pursue mutually compatible interests thereby facilitating the exchange of knowledge crucial for innovation performance. Accordingly, cooperation experience may foster supports adaptability, and deters opportunism that can positively contribute to innovation performance. Besides, inter-organizational cooperation will require the use of inter-organizational systems which other studies have demonstrated that provide flexibility in relationships with connected trading partners, improving responsiveness and other flexibility dimensions relevant to innovation.

Thus, inter-organizational cooperation may positively moderate the relationship between external human resource flexibility and innovation, which enables high-cooperation firms to benefit from external flexibility. This moderator effect could reconcile competitive results from the literature about the relationship between external flexibility and innovation. Employing contingent workers in combination with internal employees might be advantageous to upgrade the firm's knowledge stock. External knowledge from inter-organizational cooperation activities may also bring knowledge of occupational and industry best practices into a firm, and stimulate exploration of new processes and ideas outside the firm's knowledge stock.

Second, environmental dynamism, which describes the rate and unpredictability of change in a firm's external environment, may also be very important. Dynamic environments are characterized by changes in technologies, and variations in customer preferences and product demand. In low-dynamic environments, firms might efficiently fit their human resources with the demands of the competitive environment, by developing a human capital pool with a narrow range of skills. However, when the firm's operating environment is highly dynamic, previously developed capabilities may not be able to keep up with the frequent changes in technological conditions. The misfit between a firm's existing capabilities and the firm's operational environment may be mitigated if the firm can explore new areas and build new capabilities. Firms engaging in continuous exploration of knowledge are likely to have technical groups with varied perspectives and are then better able to reframe problems and overcome competitive traps when the environment demands organizational change.

Firms in highly dynamic environments may also need more access to relevant external knowledge than firms in more stable environments. These externals may bring knowledge of occupational and industry best practices into the firm. External knowledge may leverage the internal stock of knowledge to develop innovations in order to overcome greater environmental uncertainty. At the same time, firms in highly dynamic environments may need to enhance the in-house dispersion of knowledge and the deployment of employees' skills through core innovation activities. Firms in highly dynamic environments may also need more adjustments than firms in low-dynamic environments. If environmental dynamism raises the rotation of temporary employees, then the negative influence of short-term hires and temporary help agencies would be enhanced in terms of lower organizational commitment which in turn would negatively affect innovativeness.

And third, the level of flexible technology has been almost ignored as moderator effect in the flexibility-innovation relationship. However, flexible production environments need more deployment and access to knowledge than traditional production environments in order to accommodate changes in the business environment and the increasingly demanding needs of well-informed customers. Flexible production technologies also require the use of flexible employment to accommodate changes in production and market demand enabled by increasing levels of flexibility in production technology. The development and implementation of flexible production technologies may need as well the access to external experts and consultants on the technological activities required to carry out such projects.

3. EMPIRICAL STUDIES

There are very few empirical studies that have analysed the relationship between innovation and flexibility. The following paragraphs briefly describe the results and conclusions from these studies.

Michie and Sheehan's (2003) study illustrates this complex relation between innovation and flexibility. They studied innovation and human resources flexibility in a survey of 242 UK manufacturing organisations. First, they found that the use of innovative work practices (functional flexibility) was significantly positively correlated with all categories of innovation, especially process innovation. On the contrary, the use of short-term and temporary contracts was negatively correlated with all categories of innovation combined, although not significantly so with product innovation taken alone. And thirdly, the use of part-time employees was negatively correlated with all categories of innovation, significantly so for process innovation. The authors concluded that the more innovative firms had been those that had passed up the use of numerical flexibility and external work practices, and instead have pursued the sort of functional flexibility associated not with short-term and temporary contracts but, on the contrary, with employment security. These results would support the Atkinson's model of the flexible firm since innovation activities are performed in core value-creation areas and require multi-skilled employees with employment security.

Storey et al. (2002) also found that employers were rarely using flexible working as a strategic lever to achieve innovation in a large-scale survey of 2,700 UK companies and more detailed case studies. On the contrary, not only was flexibility in the main pursued for other reasons (cost minimization or labour shortfalls), but the potential impact (negative or positive) on innovative capacity was usually not taken into account. The authors even suggest that flexible working was a consequence rather than a driver of innovation. For example, flexible support was required in some cases to release the time and resources of those core employees who became actively engaged in innovative projects. Likewise, flexible contracts may be needed to enable the firm to move into uncertain new business areas without contractual commitments to full-time employees. Thus, what the authors suggest is not that flexible employment per se contributes directly to innovation but that the rise in flexible employment practices reflects the degree of innovative activity. This result is quite interesting because indicates that firms in dynamic and high-technology environments might be in need of flexible arrangements (numerical flexibility or outsourcing) to keep up with technology development in non-core value-creation areas or access relevant capabilities with less risk.

This late empirical evidence would support the proposition that companies might use flexible practices to complement innovation activities in core value-creation areas, according to the theoretical framework developed under the relational view of the firm and the resource-based view of the firm. There are even some studies that challenge the assumption that the use of flexible employment (e.g., fixed term or temporary contracts) will have negative consequences for innovation. For example, Guest et al. (1999)'s report that, overall, contingent workers displayed no differences in levels of motivation, organizational commitment or innovative behaviour compared with permanent employees. Indeed, the authors suggest that those on fixed term and temporary contracts, especially where they have chosen this form of employment, sometimes actually report a more positive 'psychological contract' and a potential higher propensity for innovation¹. Furthermore, Nesheim (2003) found in a sample of 26 Norwegian firms in the information technologies industry that firms in dynamic environments often use external personnel deliberately in core value-creation areas; the use of external arrangements in the core value-creation areas was positively related to innovation strategy.

It is interesting the findings of Serrano and Altuzarra (2010) who investigated the relationship between manufacturing firms' innovation activity (measured by product innovation, process innovation, and R&D activities) and their numerical flexibility (proxied by the rate of fixed-term contracts). Estimates using data from Spain's Survey on Firms' Strategies for the years 2000–2002 revealed a non-monotonic relationship: a firm's probability of innovating and carrying out R&D increased as the rate of use of temporary and other non-core workers increased, but only up to a threshold, beyond which this probability decreased. This result means that external flexibility may not be incompatible per se with innovation at a firm level but empirical analysis should pay more attention to the type and level of external flexibility. Other studies only find linear negative relationships. For instance, Beugelsdijk (2008) finds a negative relationship between the use of short-term employment contracts and the firm's ability to generate product innovations.

This double-side impact on innovation can also be found between innovation and outsourcing. Thus, Mol (2005) found that R&D intensive industries in the Netherlands initially displayed a lower level of outsourcing, but that R&D intensity became a positive predictor for changes in outsourcing levels over the 1990s. These findings suggest that firms in R&D intensive industries have increasingly started to rely on partnership relations with outside suppliers, which corroborates the propositions outlined by the relational view of the firm that outsourcing levels of R&D intensive industries should have risen to access other firm's innovation resources.

Other studies have been carried out at a more strategic level. The purpose of these studies is to examine the effects flexibility has on firms' innovative capacity. According to the resource-based view of the firm, dynamic capabilities that enable firms to fit the environment become a source of sustainable competitive advantage. Following this line of research, Verdú-Jover et al. (2005) examined the impact of different flexibility levels –strategic, structural and operational- on a sample of 417 European firms' innovation capabilities. The results indicated that strategic flexibility was the only flexibility level impacting on the organisation's response capacity through innovation. Neither structural nor operational flexibility explained the company's innovative capacity or innovativeness. This type of studies highlights the importance of top management to develop capabilities to be flexible and help firms manage environmental uncertainty.

¹ The argument ultimately is that the type of employment contract (whether permanent or fixed term) matters to the individual rather less than other factors, such as job design or the existence of supportive and progressive human resource policies.

Firms that are strategically flexible are usually well situated to anticipate market demands and respond to them by developing innovative products and services.

We have carried out two more comprehensive empirical studies about flexibility and innovation. Our first study analysed the moderator effect of environmental dynamism in a sample of 123 Spanish automotive suppliers (Martinez et al., 2011). Following this analysis, we have explored in a recent study more moderator effects in a larger sample of Spanish manufacturing firms.

Our first study (figure 1 & table 1) indicated that internal (functional and numerical) flexibility and the external flexibility of R&D consulting/contracting firms are positively related to innovativeness². Regarding the other two dimensions of external flexibility, the percentage of short-term hires is negatively related to innovativeness whereas the percentage of employees from temporary help agencies is not significantly related to innovativeness. Environmental dynamism positively moderates the relationship between two human resource flexibility dimensions and innovativeness: functional flexibility and R&D consulting/contracting firms. Other human resource flexibility dimensions are not significantly moderated by environmental dynamism. Employees directly involved in innovation activities are far less subject to external flexibility. Although the use of flexible practices has increased over the analysed period, staff in general is approximately twice as likely to be the target of flexible contracts than the staff involved in innovation. Besides, consulting/contracting firms are more used to innovate, whereas short-term hires and temporary help agencies contribute less to innovation.

Our second study is more comprehensive in terms of sample size and moderator effects. We use the Survey of Business Strategies (SBS) questionnaire which contains a set of statements that permit the study of human resources and innovation for a great number of Spanish industrial firms. The SBS is an annual survey conducted by the SEPI Foundation³ in collaboration with the Spanish Ministry of Industry with the objective of knowing the evolution of the characteristics and strategies of Spanish industrial firms. This survey contains information about markets, customers, products, employment, technological activities and economic-financial data of the firms. The reference population comprises industrial firms operating in Spain and with more than 10 employees, with representativeness being one of its characteristics. We develop a database with panel data from 1,626 industrial firms in the period 2003-2006.

The dependent variable in the study is innovation performance at the firm level. We use three variables to run two logistic regressions and one linear regression: product innovation (dummy), process innovation (dummy), and number of patents granted. The independent variables are three measures of external flexibility: the percentage of temporary employees in the workforce, the use of R&D external employees from technology centers/contracting firms (dummy), and the outsourcing of R&D activities (dummy).

The three moderator variables are: inter-organizational cooperation in technological activities with customers, competitors, suppliers and R&D centers (categorical variable from 0 to 4), market dynamism (index of change in the marketplace), and flexible production technology (use of flexible production technologies – categorical variable from 0 to 6 that takes into account the number of flexible technologies implemented in the production process: robots, flexible manufacturing systems,...).

Table 2 shows the results from the three regressions. They indicate that we have to differentiate between the influence of external flexibility on the decision to innovate (dummy variables of product and process innovation), and on the intensity of innovation measured by a variable like the number of patents. Thus, firms with greater percentages of temporary employment have less probability to obtain product and process innovation. On the contrary, the access to external knowledge through R&D individual experts or outsourcing activities may positively contribute to a successful product or process innovation. However, the analysis of patenting indicates that external workplace flexibility is not beneficial to a higher intensity of innovation: firms with fewer patents have more access to R&D outsourcing and R&D external experts than firms that generate more patents as innovation output.

It is interesting to analyze and discuss the moderator effects found in the results. First, the influence of inter-organizational technological cooperation compensates the influence, either positive or negative, of external workplace flexibility on the three studied measures of innovation output. Thus, there is a less

² We measured innovativeness as a construct of different items that measure the newness of the product and process innovation developed by the firm, and the improvement in the innovation process of the firm (such as time, cost and quality).

³ The SEPI Foundation is responsible for the survey design and control through the Economic Research programme.

positive effect of R&D external experts and R&D outsourcing on innovation in highly cooperative firms than in less cooperative firms. Inter-organizational cooperation in technological activities can be interpreted as a substitute for contractual access to external technological knowledge through R&D outsourcing and consultants. At the same time, the negative impact on patenting of R&D consultants and outsourcing is less important in highly cooperative firms than in low-cooperative firms. Inter-organizational cooperation may leverage the use of external work arrangements and R&D outsourcing to facilitate the creation and dissemination of knowledge that contributes to patenting. To benefit from external relations, cooperative rather than adversarial relations in external transactions should be sought when the level of core-related change is high. As the cooperative relationship develops, the persons brought in may be given more vital tasks closer to the core of the firm. In combination with employees and internal competence, the firm's innovative capabilities may be strengthened. Thus, high-cooperation firms that use more external flexibility practices could develop more innovations faster and cheaper.

The second moderator effect of market dynamism positively moderates the relationship between R&D consultants/outsourcing and patenting. Firms in highly dynamic environments may benefit more from this external flexibility than firms in low-dynamic environments. Environmental dynamism may enhance the need to access relevant external knowledge, as well as the internal dispersion and deployment of knowledge through employees' skills and abilities. This external flexibility may contribute to the firm's patenting by enhancing the stock of knowledge and its flow through core employees towards innovation. However, the positive contribution of R&D outsourcing to a successful product or process innovation is less important in highly dynamic environments than in low-dynamic environments. This result indicates that low-dynamic environments are less uncertain to develop innovations with the support of external sources of technology, whereas firms in highly dynamic environments may be less reluctant to outsource R&D activities.

Finally, the third moderator effect is the level of flexible technology in the firm's production process. Flexible production technology moderates positively the relationship between temporary employment and product and process innovation. There is less probability to innovate in firms with larger percentages of temporary employment than in firms with lower temporary employment. However, when there is a greater use of flexible technologies in the production process, firms may benefit more from temporary employment than in more rigid production environments.

However, flexible production technology negatively moderates the relationship between outsourcing R&D activities and product and process innovation. This means that firms with less flexible production systems can benefit more from R&D outsourcing than firms with highly flexible production processes. This external workplace flexibility may help compensate the less dynamic internal environment that contributes to the deployment of knowledge through flexible processes. On the contrary, flexible production technology positively moderates the relationship between R&D consultants/outsourcing and patenting. Firms in highly flexible production environments may patent more intensively when outsource technological activities and have access to the best industrial practices through external experts. Flexible production technologies may enhance the need to access relevant external knowledge, as well as the internal dispersion and deployment of knowledge through employees' skills and abilities. This external flexibility may contribute to the firm's patenting by enhancing the stock of knowledge and its flow through core employees towards innovation.

4. CONCLUDING REMARKS

The results reported and commented so far indicate that it is important to differentiate even further the implications of moderator effects on the impact of external human resource flexibility dimensions on firm performance. Our latest research suggests that future studies should separately formulate hypotheses for each dimension of external flexibility. It should also be necessary to differentiate among several dimensions of innovation performance, at least for dimensions focused on the decision to innovate and for dimensions that measure quantitative outputs of innovation.

The association between external flexibility and innovation depends on the type of contingent employee. Whereas the use of short-term hires is negatively associated to innovation, the contracting of employees from consulting firms or R&D centres is positively associated to innovation; the influence of employees hired via temporary help agencies is not significant. This result contributes to clarify prior research on external flexibility and innovation. We have developed our arguments in terms of the contribution of

external flexibility to the process of knowledge access and deployment within the firm. Then, it is possible to reconcile prior research by using common arguments to analyse the influence of several flexibility dimensions. The potential of employment intermediaries to contribute to innovation will in most instances be larger when personnel from consulting/contracting firms are involved, as compared to personnel from short-term hires and temporary help agencies. The first group is more likely to possess competencies that are useful in assessing industry best practices and creating an innovation-stimulating competence mix with the employees of the focal firm.

We have demonstrated the importance of moderator effects to explain the influence of human resource flexibility on innovation. For instance, firms in highly dynamic environments may benefit more from functional flexibility and consulting firms/R&D centres than firms in low-dynamic environments. Environmental dynamism may enhance the need to access relevant external knowledge, as well as the internal dispersion and deployment of knowledge through employees' skills and abilities. Both flexibility dimensions may contribute to the firm's innovation by enhancing the stock of knowledge and its flow through core employees towards innovation.

Future studies could also extend the group of moderator effects that may influence the relationship between external human resource flexibility and firm performance. For instance, the level of product innovativeness may also be relevant. When an innovation is less familiar, a project team may require more face-to-face communication as opposed to that involved in more familiar tasks and smaller changes which would reinforce the positive impact of functional flexibility on innovation performance but it would reinforce the negative impact of external flexibility as well. Another extension could be to enlarge the moderator dimension of inter-organizational cooperation activities to include network measures like the intensity or formalization of the firm's relations with the other organizations in the supply chain.

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THE CHANGING FACE OF AGILITY: THE CHALLENGE AND OPPORTUNITY OF SOCIAL MEDIA

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Organizations, especially organizations that are engaged in knowledge work—whose value added depends heavily on information—are facing 4 challenges. In this presentation, I want to illustrate why these challenges exist, what the consequences are of the trends that we see in today's economic and business environment, and how organizations can meet these challenges.

We are in a revolution, a period of profound change. Organizations and institutions must transform themselves if they are to survive and remain relevant; and we as researchers must critically examine our organizational models and assumptions.

The revolution is due to the confluence and interactions of 3 streams of change:

- Technology [Internet and connectivity, social media platforms]
- Demographics
- Values and social norms—societal and community behavior

The next few paragraphs review these three trends and describe how they affect how we work and live together, how they affect the process of innovation, and how we may need to revise our approaches to leadership and research on organizations. Whether we are practitioners or researchers, we have to take a critical approach to our past experiences and knowledge and our past assumptions about how we organize for knowledge work.

TECHNOLOGY AND INFORMATION FLOW

The first trend is the wave of social media platforms and services that have emerged and are attracting huge numbers of users (and investors: as I write this, Facebook's initial public offering valued the company at over \$100B, the largest ever IPO). The ubiquity of social media changes how people behave and changes societal norms. Some examples of what is "normal" with today's set of information and communications technologies

- Books delivered in seconds to hand-held tablets, which can hold trunk-loads of books
- Access to information is assumed; discussions of facts can be settled quickly; Wikipedia has consolidated the world of facts into a set of accessible resources—in multiple languages
- The old-fashioned 'sneaker-net' used to communicate by word of mouth among friends and colleagues is complemented by Internet platforms that enable information sharing with unprecedented speed and reach; an information event can go viral in days or even hours
- Personal information sharing continues to expand through an increasing number of social media platforms. While Facebook perhaps is the best known, with over 900 million active users (Anon, 2012a), there are dozens of other platforms: Youtube, Twitter, Pinterest, ..., and new ones are being offered every day. It's unclear how many blogs exist, but the Technorati directory list over 1.3 million (Anon, 2012b) The result is an information ecosystem in which different platforms evolve and change and become differentiated over time.
- Information sharing has become big business. With a price of \$38/share, Facebook's initial public offering (IPO), which valued the company at over \$100 billion, which was the largest ever initial valuation for a public company (Raice, 2012). Even with the recent fluctuations in share price, the high valuation of the firm shows how much business interest exists in social media companies.

DEMOGRAPHICS

If the technological changes taking place were not enough, we're seeing a major shift in the demographics of the world's population. The "Net Generation"—the generation that has grown up with the Internet—is entering the workplace as the "Baby Boomers" are entering retirement age. As shown in Table 1 (which shows U.S. figures, although the relative sizes of the generations for the world are comparable), the generation is the largest post World War II generation.

Table 1. Population Estimates of Three Generations of Workers

Generation	Birth Year	Age in 2000 Census	Current Age in 2012	Population Estimates *
Baby Boomers	1946-1964	36-54	48-66	82.8 million
Generation X	1965-1977	20-35	35-47	50.9 million
Digital Natives	1978-1994	6-22	18-34	69.1 million

* Population estimates based on 2000 U.S. Census

The demographic shift is not just about numbers, however. Members of this generation bring into the workplace an ease with the new technologies of information and communication. Members of this generation have never known a world that does not have the Internet, mobile phones, laptop computers, and ready access to information. This generation has a different attitude about information and work. They have different expectations about their relationship to organizations for which they work and what they expect their efforts to produce. They do not see employers as safe economic havens and thus do not exhibit firm loyalty. They may choose companies based on the values of the company and the opportunity to have an impact on society; they want their work to “change the world.” While not universal, there is a high percentage in this generation that has a heightened sense of social justice. They are concerned with the asymmetries in the world, both economic and information. Their sense of information differs from the older generation. As one NetGener expressed it in a symposium on innovation (as she was tweeting about what was being discussed), “An idea isn’t real until I’ve shared it.” Table 2 summarizes some of the distinctions between the Baby Boomers and Net Generation.

For the most part, members of the Net Generation have been told by their parents that anything is possible, resulting in self-confidence and optimism in their capability to make a difference. [It is too early to tell if a protracted recession and economic downturn will affect this confidence.] Many in this generation start businesses or anticipate starting businesses, and many of the new businesses are related to information technology, information sharing, and social networking. The NetGener see not only opportunities in the emergence of new technologies; they see opportunities with combining technologies (mashups).

Many NetGener, even if they become entrepreneurs later, first go into established companies. When they do, the combination of their confidence with new forms of communication with their comfort with technologies often creates tensions with workers used to more established routines. These younger workers—and others who have embraced the newer technologies and work practices—seem to stand apart with their approach to work. They exhibit behaviors that often are inconsistent with the practices and expectations of their colleagues who prefer a different approach to information and work. As a consequence, leaders of organizations with a mix of ages and experience in their workforce face challenges that go beyond the expected challenges of organizations that have a more homogeneous workforce (Barzilai-Nahon and Mason, 2010).

Table 2. Comparison of Working Styles of Digital Natives and Baby Boomers

Values, Attitudes, and Styles	Digital Natives	Baby Boomers
Work style	Multitasking	Time management
Learning style	Learn from experience	Learn from instruction
Collaboration	Collaborative	Independent
Motivations	Positive reinforcement; competition for fun	Competition typically is zero-sum game
View on authority	Respect for others is earned	Respect for authority
Structure	Decentralized, nonhierarchical, inclusive	Centralized, hierarchical, exclusive
Information access	Access for all	Access to those in power

[Adapted from (Barzilai-Nahon and Mason, 2010) ; See also(Tapscott, 2009a)]

VALUES AND SOCIAL NORMS

Technology, social norms of behavior, and enacted values coevolve (Barzilai-Nahon and Mason, 2010). Community and societal values are expressed in social norms; a community's behavioral norms reflect the underlying values of that community. Technology does not cause changes but does facilitate the exploration of behavioral options, which may lead to changes in how fundamental values are manifest.

Consider, as an example, the concept of privacy. As software platforms enable merchants to offer benefits to buyers who share more information, people may decide the benefits outweigh the "cost" of giving up what can be private information. Similarly, users typically find that Facebook and Google provide sufficient benefits that they are willing to tolerate the collection of personal information in return for the convenience of use. As a consequence, previously accepted norms of privacy have been, in many observers' eyes, eroded. The result is that the very notion of privacy in today's world is undergoing change.

Other changes in behavioral norms are observed to varying degrees in different communities and corporate cultures:

- The availability of smartphones means that one may always be available, changing the expectations of responsiveness to questions and issues arising from coworkers
- The availability of location-based services, leading to a sense of "persistent presence" for one's friends, family, and coworkers
- As a consequence of the affordances of the technologies, knowledge workers experience less separation of "home life" and "work life." Social life, personal life, and work life become intermingled more than ever before
- Telecommuting is more accepted. Working from home is the norm for many workers whose jobs are based on coding and systems work. Many people can (and do) work without "an office" at the firm. Others may share workplaces at a central location.
- In most cases, teamwork is the norm. Work is accomplished by communities of practice where individuals are working interdependently to produce output more often than working independently on a Taylor-like decomposition of separable tasks (Wenger, 1998).

CONSEQUENCES

The coevolution of information technology (particularly social media) with social norms and values as the demographics of knowledge workers are shifting provides the fuel for this revolutionary period. This results in significant shifts and disruptions, and consequential challenges for practitioners and researchers.

However, in any revolution, some things remain unchanged, and we should examine what is unchanged in this period. We should examine what continues to be foundational whenever we face what appears to be a dynamic and rapidly changing environment. In today's setting, I would posit that one principle remains constant. This principle is that primary driver of economic growth and development continues to be innovation, particularly technical innovation.

However, even as innovation remains a key to economic growth, the processes by which innovation occurs are changing. Innovation itself is affected by the confluence of technology, social norms, and demographics. A major shift in thinking has been the idea of crowdsourcing innovation.

The idea has been around for a decade (Quinn, 2000), and the experience of major firms such as Procter & Gamble (Rao and Sakkab, 2006) has shown the value of using networks of resources outside the firm to resolve issues associated with product and process innovation. What seems to be different is the rate of new venture formation by NetGeners (and others) based on the affordances of social media.

It should not be a surprise that Facebook was started by a NetGener, for example. Other examples may not be so obvious, but let's look at another entrepreneurial case, that of Quirky.

Quirky was formed in 2009 by Ben Kaufman when he was 23. Quirky illustrates the power of crowdsourcing, building on social media technologies, which provide the basis for many of the NetGeners' entrepreneurial efforts.

Quirky

Quirky is a company formed in 2009 that resulted from the vision of Ben Kaufman. As a self-identified poster child of young serial entrepreneurs, Kaufman (age 23) illustrates many of the characteristics we identify with NetGeners. His story demonstrates the creativity, desire, drive, and approach NetGeners take to having fun with innovation.

Quirky is Kaufman's third major launch. His first venture was mophie, began when he was in high school. Mophie was formed to manufacture and sell retractable lanyard ear buds for the iPod Shuffle. The product succeeded, and mophie followed the lanyard with more add-ons for the iPod and Apple products. In 2006, two years after its formation, mophie's "Relo" product was another hit at the MacWorld expo. The next year at MacWorld, having succeeded in raising venture capital that enabled him to have a professionally designed booth, Kaufman threw it out—noting that he did not want to be 'just another successful company'—and used 2x4s to build a framed-in, wall-less room that metaphorically stated the unfinished nature of his business. He handed out 30,000 pads to MacWorld attendees with the message, "help us decide on and design our next product line." He discovered tens of thousands of people were willing to offer ideas, and he took on the challenge of doing a complete design within 72 hours. By the end of the show, mophie had prototyped and introduced three new products (Anon, 2009). The extraordinary success of this process of "crowdsourcing" new product development got Kaufman thinking about the process, not just the products.

Despite, or perhaps because of, the success of mophie, Kaufman realized he was bored. Three months after MacWorld 2006, he sold mophie (which he described as "making iPod condoms"). As he put it, "I sold the product but kept the process." He then devoted time to refining the idea of kluster, a collaborative decision making platform that would streamline the "crowdsourcing" of innovation that was done at MacWorld 2007. Kluster tracks the contributions each person makes to the design (e.g., color, name, or other characteristic that contributes to the product's success) and uses collaborative decision making on major design decisions. Kluster soon spun off namethis, a crowd-based approach to selecting names for products and product lines.

With kluster as the platform and an appreciation of the power of the crowdsourcing process, Kaufman's begin assembling a team that would form Quirky (Rao and Sakkab, 2006). After two years of research, team-building, and testing, Quirky emerged in June 2009.

Quirky provides a combination of platform and process (based on kluster) that streamlines the collaborative (crowdsourcing) approach to innovation and new product development. Quirky enables anyone to suggest a product idea, which is then submitted to the Quirky community for comments and feedback (including the demographics on those providing feedback). Each idea is considered for the next Quirky product, which means that the Quirky community focuses on evaluating and polishing an idea and turning it into a product. The Quirky process and platform enables anyone in the extensive network (the Quirky community) to submit ideas, contribute at each stage of the innovation process, and be rewarded for their contribution.

Other Examples

The idea of crowdsourcing and open innovation has become so popular that there is a website devoted to sharing information about the opportunities—a list of "open innovators" (De Ridder). The list of almost 100 sites is wide-ranging—from early "peer production" represented by Linux, Yahoo Answers, Wikipedia—to 'freelance' platforms that match independent contractors with specific needs [e.g., Amazon Mechanical Turk; Human Grid]—to those more focused on creating new products [e.g., Quirky, Threadless and Spreadshirt (T-shirts and "hoodies"); Dream Heels (custom shoes)]. Not all are startups by NetGeners—established firms are represented in the list (e.g., Dell, Kraft, Sara Lee, Nokia, Starbucks, ...), showing that they are aware of the opportunities—but founders from the Net Generation are well represented in the list.

IMPLICATIONS FOR PRACTICE

The convergence of the above trends, and the crowdsourcing approaches to the innovation process, present organizational leaders with four challenges if their organizations are to remain agile.

Challenge 1: The Talent Life Cycle (or, the Five Forces Revisited)

In the past, competition and dynamism have been seen primarily as market and industry sector characteristics: competition for the customer and market share and defending against new entrants into the marketplace. In the 1990s, the competition was seen as the race ("war") to acquire and manage talent, and organizational agility was a key to attracting talent. In today's hypercompetitive economic environment, both dynamism in downstream (customer) and upstream (supplier) dimensions remain, but

the competition for attracting talent per se is only the beginning step in a competition to effectively utilize this talent in an expanded talent cycle that extends beyond employment.

Young knowledge workers entering the workplace bring with them a new dimension of dynamics: they demand personal development through challenging tasks, job flexibility that is higher than what baby boomers would have preferred (and have accepted), participation in development towards objectives that matter to them, and flexibility in connecting and developing their own networks. Such preferences pose challenges to organizations to which our respondents provide different responses.

In a study of firms in Switzerland, which has one of the highest innovation scores in Europe (Anon. 2011), we interviewed C-level executives and asked how their firms were handling the changes in demographics (younger knowledge workers) and the prevalence of social media (Katzy et al., 2012). The executives recognized that changes are needed in their approach to organizational structures and leadership. For example:

- *...young people who've grown up with games, these computer games, they don't do things the same way as we have done it...*
- *... young people take over more responsibility [for] themselves and give less to an employer, which is certainly having advantages and disadvantages ...*

These observations affirm that the resource-based view of the firm⁴ remains dominant. In the eyes of the executives, creative knowledge workers determine the competitive advantage of the firm and represent the capabilities for continued learning. The executives recognize that knowledge and learning are not simply an individual capability but one that is manifest through work teams and the organization as a whole.

New Motivations and Values

As implied in Table 2, NetGeners do not adapt easily to the industrial ways of working, hierarchical organizations, and bureaucratic decision making—organizational models that have been accepted by baby boomers. NetGeners seek to make a difference; they like challenges. They want to continue to improve their skills and capabilities. These motivators, more than job stability and routine, stimulate this generation of workers. Our respondents recognize these values:

- *... there are more people who are looking to do something they like. And what they like is not only the career, like having a lot of money and the title and all that, that they start a career. They also want to do something which they have a passion for. And people who are driven also by passion not only by titles and by salary ...*
- *... people have become more flexible because of the young people nowadays ... who, not all of them, but a lot of them, ... have [their] own ideas of what they want ...*

Our research and other studies of this generation (Tapscott 2009b) show that NetGeners have high expectations about their career development. They frequently assume personal responsibility to make the best out of every job. They expect to continue professional development and want to see themselves progressing; they are dissatisfied with remaining in the same position for long. As a consequence, “career paths” for the new generation of knowledge workers are more dynamic and less predictable than they once were. The job stability preferred by the baby boomers is slowly being replaced by a desire for vigorous professional development. Executives recognize this:

- *... those newcomers really take more responsibility for themselves and for their career...*
- *... these people are engaged and they do a job that want to do ...*

Solution: Re-think the Management of Knowledge Workers

NetGeners require different leadership approaches, and the pioneering organizations recognize this. Executives who had been successful in attracting the brightest new workers acknowledged and promoted work practices such as the following in their organizations.

Engage the workers early. Many of the leading firms have expanded their internship, part-time, and summer employment possibilities for college students. This enables them to establish a relationship with potential employees early and provides a low-risk and relatively low-cost opportunity for both employee

and firm to get acquainted. Each can learn from the other, and there is a greater likelihood of a good match in roles if the engagement turns into regular employment.

Search for challenging projects. For NetGeners, having fun while working and being a part of what 'changes the world' plays a crucial role in the work they do. Consulting and tourism firms have opened the social network sites for employees. Many said that an attitude of "work-life balance" is being replaced by an attitude of "work-life integration" for those who choose this approach. If employees work during their "non-working" hours, they can do private networking during their workday. The firms provided opportunities for flexible working environment (people can work from anywhere they want); home office opportunities (this is especially crucial for women with children); and interesting jobs that bring self-realization and self-satisfaction. Those firms emphasize that challenging projects in which employees can develop their own ideas and be creative provided more incentives to the digital natives than a higher salary.

Opportunities for development rather than promotion. People like to succeed, and the NetGeners are no exception. They demand more personal responsibility for what they do, but they want to be rewarded for their contributions and performance. Therefore, progressive companies encourage employees' learning and development as well as provide alternative reward paths. They organize seminars and conferences where employees can share their success stories and give advice to those who is still looking for new opportunities.

More personal responsibility. Telecommunication firms and attorneys long ago began building the relationships with their workers on results orientation and trust rather than on directing and controlling time spent in the office. These firms trust the workers to be capable and do the work needed in the time framework required. To accomplish this, they ensure a dense communication pattern: they discuss with the employees what they expect and communicate the realistic goals to which they have agreed. These firms have concluded that it is not about controlling what employees do, but rather about prospering from the good results they achieve.

Reverse mentor programs and supervision modes. For the advanced firms, hierarchical structures and top-down control and supervision modes for knowledge workers were judged to be outmoded and ineffective. Employees were an essential component and contributor to a dynamic corporate strategy. Dynamic governance and flexible roles are replacing static reporting structures, enabling an integration of strategy formulation and execution. For example, tourism firms base their governance and decision structures on knowledge authority, such as processes of peer reviews, revisions, and collaborative strategy rather than following a top-down strategy. They engage knowledge workers in the decision making processes. For these firms, fewer rules, mutual learning and continuing dialogues are effective practices. If we pictured these organizations as hierarchical, we would say that the top-down supervision has been replaced by vertical (up and down) collaboration and more intense horizontal communications.

Solution: Resolving the Issue of Short Tenure

Executives have recognized the mobility and increased dynamism of the human resource. As long-life employment becomes rare, fewer young employees stay at the same work place for several years. They become nomadic workers not only in terms of work space flexibility and work from anywhere, but they desire flexibility in where they choose to work.

Executives in our study acknowledged that NetGeners felt they easily could move from company to company; they observed that there seemed to be little stress associated with losing one's job. Typical comments were:

- ... when I started to work 25 years ago, it looked like a lot of people chose an employer and they were loyal to their employer. That has changed ... Now young people choose something they like to do. They do something and if it's not what they like, they just move on and go somewhere else. And I think that has also forced us to think differently...
- ... most of them, they do not think that this is a problem. If they lose their job, they will go for the next one...

Approach: Create and invest in alumni networks. Several of the firms acknowledged that they never try to keep employees as long as possible. It simply does not work for the firm or the employee. What these firms do is accept when employees choose to leave, recognize their valued service, but engage them in alumni networks so they remain connected. These firms keep track of what their former employees do and where they work. They invite them to the annual Christmas dinners and keep them in their network of knowledge assets. This not only widens the company's network but gives young people the chance to come back to the firm when the good opportunity arises. This approach serves as a powerful resource for identifying new talent and maintaining an engaged network as a source of new ideas and learning.

Challenge 2: Core Resources—they're not just inside the organization

Our executives acknowledge their firms are part of a broader network built around individuals' social networks:

- *...it goes in this direction; above all, we will also have to look at these social networking sites, like Facebook or even in such a business network like XING, what is being talked about there. I think, this cannot be prevented, or how can one prevent that anyhow?*
- *... the use of all of these new forms is important and I should say people establish their own networks out of the company, within the company, but this is not basically organized. That is done on individual ways. I mean people have this urge and this need to network and to stay on top of the development in their fields...*

While we have known about this effect for a long time, it now becomes increasingly clear that firms acknowledge the importance of the networks and develop ways of building trust in them. The networks are about interactions that maintain the ties between individuals, but they also are about getting access to new knowledge and information embedded in these networks.

- *... I think the way people need to interact with each other, the way people start to work in groups, the way people interact has a different work style. There is something in it, there is a call in it which I would say is relevant probably trained, it's a relevant development that I'm also seeing out there...*
- *... it depends on how you can link your private friends and working friends together. I think that one of the topic in the future that what the young people like to have. Then of course, the newest technology you should apply in your office. Social network for me is the topic, I think that's also for the working area important even it's now restricted. But we would like to motivate young people to use that...*

The use of social media has made it possible for professionals around the globe to get advice from their colleagues and share experiences with a mouse click. Utilizing the vast amount of resources that are available online available tends to make access more valued than *self-creation*. As the technology makes this easier, the focus shifts from simple factual knowledge exchanges to enabling tacit exchanges and collaboration among trusted members of the network:

- *...it is less about just having access to study results and getting numbers. It is more and more also having access to the people who have experienced something similar and so on and so forth and having these types of networks in this dimension where the human interaction earns a great value...*

Communities of practice (CoPs), as part of the knowledge management practices of the firm, are also undergoing significant changes due to the social media influence. The academic literature typically views CoPs as effective tools for tacit knowledge transfer within an organizations(Wenger 1998); the presumption is that they are contained within the corporate borders. Our studies show they increasingly bridge organizational boundaries and may be formalized as independent entities.

Professional communities have long taken this approach to formal independent associations. Journalists, doctors, teachers, and lawyers extend linkages beyond organizational boundaries to preserve their professional ethics and enhance their learning in collaboration with other professionals. Prior studies have shown that members of the professional communities often feel a stronger identity with their profession than with the companies that employ them.

FLOSS (Free/Libre Open Source Software) and other open source software communities are examples of successful open knowledge creation communities in a free knowledge ecosystem. Many of them are operated by independent knowledge workers, but many larger firms explicitly or tacitly encourage their employees to support these FLOSS developments, as IBM and Oracle have done for the Linux and the OpenOffice software package.

Question of Control

The cross-boundary nature of the individual networks raises the question of how an organization can control the flow of information in these networks and what should be the role of management in this more open information environment. If individuals' loyalties shift away from their employer toward their personal network, how should executives approach this new environment? Although many organizations express concern over the risk of potential loss of proprietary knowledge, some executives in our study express optimism that the benefits outweigh the risks:

- *... we have a strong development to the new communication channels like instant messaging, Facebook, and LinkedIn, and we are also offering these products certain services to our customers ...*
- *I am absolutely convinced that if companies make use of those features like Facebook or XING, they will gain a competitive advantage and if they don't do it at some point in time, they will actually lose people and they will lose the chance to realize on ideas that are in their company but they are not being found because they don't use these new tools ...*

The key seems to be an organizational agility to embrace openness and the opportunities for learning through the individual networks. Corporations have used similar approaches before to building strategic partnerships between and among firms with whom they could cooperate. The difference now is that the networks are individual and potentially more collaborative.

Challenge 3: A New Communication Network Ecology

The early emphasis on the use of social media for marketing and HR purposes is diminishing as firms recognized the limitations of treating social media like other marketing channels. Collaboration platforms and shared workspaces enable more community-based communication and collective actions. Some firms have made a shift from physical meetings to virtual working environments, enabling project and human resource management, technical support, training, and networking to be accomplished from anywhere. The so-called *Enterprise Microblogging* (Twitter-like messaging on a firm's intranet) improves employees' visibility and provides new opportunities for knowledge management.

The variety of communication channels (SMS, twitter, email, phone, video-conference, shared workspace etc.) also increases contact with those outside the firm and blurs boundaries between customers and employees. Not all channels are the same, however, our respondents recognized that they need to make careful choices among communication channels to avoid loss of productivity.

The capabilities for virtual collaboration are enhanced with the wider range of opportunities for shared storage and even processing capacity in "the cloud," enabling greater organizational agility for knowledge work across boundaries. GoogleDocs and shared storage platforms such as Dropbox are just the beginning, and firms can expect to see additional cloud service options.

Solution: Getting Engaged

The more possibilities the firms provide to the employees to stay connected, the greater access they will have for new knowledge and ideas. Collaboration platforms, shared data storage, wikis, blogs, and forums—both inside and outside the firm—enlarge the range of resources available to the firm and leverage existing investments. The emerging network environment does preclude the loss of control but does require executives to rethink the means by which risk is managed. Only by remaining engaged with the emerging information ecology can firms maintain an awareness of the expanded opportunities for learning and creating value. Managing risks through limited experimentation and bounded engagement with the wider networks will be a better choice than staying on the sidelines. Engagement is a better choice than the certain risk of being left behind by the competition.

Challenge 4: Still no Consensus on a Single Model for New Ways of Work

The executives in our studies, even those that recognize the opportunities of this still emerging environment, still have widely divergent views on the most effective management models for realizing these opportunities. The differences can be attributed largely to the business sector (dynamism of the sector, characteristics of the customers and competition) and management philosophy. There is no single “right” way to engage the technologies.

- *...we have different systems, like iChat, Skype ...and, as we try to work together very quickly we are using these. This is a development which we have made by ourselves. We look what is completed or whether it is stuck...we are organized very well at this point...*
- *...we don't even know how to competently decide whether we use iPhone, Smartphone, Blackberry or HTC. It's just a centralized competence which defines the standard. That's probably the reason why we are not proactive looking for different ways. We are quite limited in that...*

What we see is that some companies have no restrictions on employee use of the Internet during working hours, allowing them to surf the Internet in search of new ideas and customers as well as linking to other individuals on social networks. Others are absolutely convinced that there is no direct linkage between social media and the work their employees are doing and consequently close all the social websites in an attempt to force their employees to “think only about work” in the working hours.

While we judge that the pioneering companies that are experimenting with, or even embracing, the affordances of social media will ultimately come out ahead, our studies can't say that the companies that take a more reactive tactic are misguided. Our studies do suggest that trying to change employee behavior and establish norms through only technical or policy barriers is limiting. As noted earlier, employee behavior, technology, and social norms (within the firm and in the larger community) are linked and coevolve. An organization that attempts to change one without being aware of this coevolution process is likely to fail.

For most firms the experimentation will continue, with new work practices and organizational forms being tried, evaluated, and subsequently either adopted or discarded. These experiments are seen as part of the firms' overall adaptive and agile strategy.

- *... the evolution is still going on, so that the young generation entering the company has no trouble and we don't have trouble with them. So we try to evolve, be up-to-date with the technology, no need to make a special job for adaptation. It's an ongoing process...*

IMPLICATIONS FOR RESEARCH

The confluence of the three trends (demographics, social media technologies, and behavioral norms and values) provides a strong incentive for scholars to re-examine our models of organization and management. Perhaps what is in order is a critical review of the models that have become accepted as the norm, that are accepted as the bases for what we teach in management courses and what we accept as conventional wisdom. As noted above, it may be that some principles don't change, but how we articulate these principles in practice may need to be modified. Two examples of these include the following:

- Coase's concept of the nature of the firm (Coase, 1937), which argues that firms exist to reduce coordination costs, needs a close look in today's information ecosystem. Information exchange costs, necessary for coordination, have dropped to near zero with the Internet. The necessity to collocate work resources has been addressed with a flood of studies of “virtual organizations.” However, at some point, the cost of sorting through the options for coordination channels may itself constrain the ideal of a totally distributed organization, but as a minimum scholars should critically examine the underlying assumptions in our management courses to detect the hidden assumptions based on Coase's nature of the firm.
- The Resource-based/Knowledge-based views of firm (Barney, 1996; Barney, 2001; Kogut, 1996), which argue that firms are organized to take exploit specialized knowledge, may still be valid. In today's information ecosystem, what is the resource? For firms that consider knowledge as the key resource (and it's hard to identify exceptions), the information ecosystem means that knowledge is less sticky and more leaky. The firm has less control over the critical knowledge (whether that knowledge is in tangible form or more tacit). Early critical reviews of organizational

and knowledge management models appeared earlier this year (Katzy et al., 2012; Hemsley and Mason, 2012); more work is warranted.

CONCLUSION

It has always been the case that technology presents society with challenges for which there are no templates, no precedents, and no guidelines for making decisions. Today, this remains true, only the technological changes are happening more rapidly, coevolving with society changes and even changes in community values—and these trends in many ways have become mutually reinforcing. Organizations confront significant challenges as they seek strategies that will enable them to take advantage of the opportunities inherent in this dynamic and emerging information ecosystem.

There is some evidence that the Net Generation, having grown up surrounded by these coevolving forces, see the opportunities more clearly than their counterparts who have been successful in earlier times. Established organizations that pursue agility and innovation will do well to engage this new generation; such engagement is both a serious challenge and the critical opportunity.

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DIGITAL CULTURE AND INNOVATION: IS THE INTERNET REVERSING THE RENAISSANCE?

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Abstract: *Human creativity and its outcomes are partly stable over the ages, and partly influenced by their techno-historical contexts. In this paper we examine the features of creative effort in two historical periods separated by five hundred years: the early Italian Renaissance and the contemporary Internet age with the production of art for digital products such as video games and animation. We examine how human creative processes can be conceptualised as a general nature within a complex framework of evolving practices (techniques), technologies, and society; addressed to the development of an art form. Certain commonalities emerge by comparing these two ages. In particular, creativity can be thought of as being based on imagination, bounded by the set of possible motifs and their social acceptance. Second, creativity involves recombining, firstly of motifs, and secondly of techniques, expanding the frontier of creative output. Thirdly, creativity involves iteration in work - this may be constrained by the media and techniques or technologies, or facilitated by advances in them. Finally, at larger scales of complexity, creativity involves production processes and productivity - both enabled by technology. Finally, we outline contemporary trends in the digital age and the dramatic impact of these on culture, industry and creativity.*

Key words: *Creative process, artistic innovation, Renaissance, digital art, video games*

1. INTRODUCTION

Art and technology are generally considered two vital indicators of civilisation, yet their advances are typically considered separately. Technology and Innovation studies research has generally turned its attention away from culture and the arts. In spite of the recognised need for creativity in the initial stages, research has focused on the outcomes of innovation as observed in products, patents, and publications. Creativity itself has been mystified as a 'fuzzy front end' and has been left to the psychologists and organisational behaviour fields, which often adopt an experimental approach. Aesthetics, symbolism and cultural meanings have not been treated as part of the innovation system.

The indifference appears to be mutual. Warren Steinkraus in a 1982 article entitled 'Artistic Innovation' in the *British Journal of Aesthetics* concluded "...the idea of innovation is inadequate as a fundamental aesthetic category...It may be a demeaning term when applied to those regarded as artistic geniuses." (Steinkraus, 1982) (p.260). Artistic greatness was believed to transcend the observable patterns of introducing mere novelty, possessing more rare and mysterious qualities.

In more recent years however, this distance reduced as the relationship between innovation and aesthetic culture has attracted research interest. Scholars have begun to suggest definitions and measurement of 'artistic innovation' (Castaner and Campos., 2002), 'stylistic innovation' (Cappetta et al., 2006) and 'soft innovation' (Stoneman, 2010). All these are attempts to demystify the artistic creative process and reconcile it with knowledge largely derived from studies of science and technology. This growing interest is partly inspired by government agendas to stimulate and promote cultural industries (Lampel et al., 2006;

Hesmondhalgh, 2007) and 'creative industries' (DCMS, 1998; Caves, 2000), in which value is understood to reside fundamentally in symbolism (Jones et al., 2012).

This paper expresses the argument that through study of the artistic process, and the influence of technology on it in different periods of development, we may better understand the creative process: we may begin to differentiate its stable characteristics and those specific to techno-historical moments. We may better understand what propels creativity, and what constrains it, in particular, its social and cultural environment. To do this we investigate two quite different eras of artistic expressions, both widely perceived to be revolutions and periods of explosive creativity, separated by over 500 years. The first is the Italian Renaissance, in particular the early period where the practice of drawing became important. The second is the current digital age, in which art is practiced through digital tools and the Internet. We focus on digital art as practiced in a corporate professional context in entertainment industries like video games (and to a lesser degree, animation), contrasting with the patronage of the Renaissance (Williams, 1981).

Through comparison of these historical episodes in creativity we develop a framework with the following interrelated themes: (1) Imagination, Motifs and Content, as the envelope of creativity (2) Combination and Iteration, as the core forces of the creative process, and (3) Production and Organisation, as the means by which creativity is accomplished and diffused. We discuss these in relation to the two epochs and show how there are some quite fundamental shifts occurring in the creative process due to digital technology, even while the core categories and impulses of human creativity remain stable.

1.1. Approach

We sought to compare and contrast the practices in the recently emerged and burgeoning field of digital art production against those of the Italian Renaissance in Art (particularly that which was largely centred on Florence), itself located in a distinguished period of artistic and intellectual history. This paper pays especial attention to the Renaissance case, drawing out the necessary details needed to discuss the comparison. Both authors have conducted numerous studies of the video game production process in US and UK studios, involving observation, participation and over 150 interviews with developers and industry representatives.

Our view of how the practice of artistic creativity is shaped by the employment of practices is neatly summarized by Bambach: "it has become apparent that the issue of artistic practice is central to any discussion of the broad stylistic and theoretical developments of art in these periods." (Bambach, 1999). We have performed our assessment of the Renaissance's artistic practices in three ways. The first was to examine museum catalogues of special exhibitions, thereby treating paintings and other artefacts as the unit of analysis. Typically, along with the painting's background, the curators will supply a brief sketch of the artist's details and thought process. In particular, a major recent exhibition of Renaissance drawings provide a hitherto little seen perspective into the "minds" of artists, by interpolating between the drawings and what the eventual canvasses looked like (Chapman and Faietti, 2010).⁴ It should be noted that art historians have invested considerable time not only in learning about the life, times and work of the Renaissance artists, but increasingly, to learning about the techniques used. "To see revealed the intricate techniques and devices actuating the design processes of the great Italian Renaissance masters is not to deny their genius, but rather to understand how fundamental a tool drawing was to their vision." Bambach, 1999) (p.11).

Second, we have buttressed this reading on drawings (as well as the corresponding views of the artists' thinking where possible) with a variety of catalogues of other special exhibits and historical sources on

⁴ We recognize the biases placed by the available stock of drawings (sifted from the combined holdings of the British Museum and the Uffizi in Firenze or Florence (acknowledged to have two of the worlds' three largest collections of drawings - the third being the Louvre's), by the manner in which the drawings are selected to provide a narrative in time, and by the accumulated but particular knowledge of the curators of this exhibit (from the British Museum and the Uffizi).

Renaissance drawings, selected references from the art historian Vasari's work *Lives of Artists*, and sources on other individual painters and Italian Renaissance cities (in particular, the period surrounding Titian's life in Venetian art). This is in order to ensure that the relevant phenomena are appropriately captured and contextualized.

Third, we have examined historical works on additional major figures of the Italian Renaissance (in particular, Brunelleschi, Da Vinci, and those involved in major civil works). Through these, we have identified major trends that occurred in the Renaissance, where the major trend is identified from the literature, and further confirmation or disconfirmation is sought from other studies.

We identified four themes that occupied art historians' interests (also found to a lesser degree in other historians' studies of technology): (1) the sources of the artists' creativity (including the motifs they derive from the social period), (2) the artistic and design process (involving amongst other things, the placement of objects in designs), (3) the social situation that artists inhabit (which provides funding and social and political acceptance, and hence, acts as an envelope on creativity), and, (4) technological change, including tools and practices used in the production process (which involves apprenticeships and workshops, considered as hierarchical teams).

To validate and iterate with the analytical frames used in this paper, we performed a partial coding of themes arising from selected works, in particular, the BMU catalogue by Chapman and Faietti (2010), which contains about 100 drawings (and in cases, their corresponding finished works), and in other books such as one by Van Cleave (2007).

In the following sections, we introspect patterns within each of the two periods (the Renaissance and contemporary digital arts industry as represented by videogames) over various aspects of creativity, through the following themes: (1) sources of knowledge and creative landscape, in particular, the nature of imagination and the role of motifs (section 2), (2), the nature of the creative process (i.e., the combinative and iterative nature of creative work (section 3), and (3) the nature of technology and work practices in the production of art (section 4).

2. CULTURE AND CREATIVITY: THE IMAGINATION AND MOTIFS AS CONSTRAINING ENVELOPE FOR CREATIVITY

Our interest here is in determining what has infused artists' imaginations and what sources have fed their creativity. The primary elements that combinative creativity operates on are the motifs, or recurring cultural elements and symbols that seed and influence the creative arts. Motifs may be seen as 'the stuff of imagination'. Artists' creativity was slowly unlocked as new images made their way past religious and institutional barriers and were combined in new forms.

In the sphere of cultural products, artistic output can be said to be bounded by the artists' imagination, but this imagination itself is in large part bounded by the motifs that are generally used and socially permitted. These motifs are in turn shaped by the creative contributions of artists. The wider population of artists are limited by the sensibilities of societal norms and to a degree the willingness to pay of consumers of the art or other cultural goods. Motifs form an envelope or constraint on what is permissible. Motifs paradoxically provide heuristics and impulsion while also retarding artistic development.

The Renaissance: From Religion as Motif to the Imagined

Renaissance art made several turns over the vast, two to three hundred year period that Giorgio Vasari outlined in his monumental *Lives of the Artists*, mostly written as a contemporary biography of artists during the period of his own life. These consisted of a combination of technical achievements (such as the development of linear perspective), a movement to realism via the depiction of natural forms, and the

development of complex scenes and environments, including landscapes. The introduction of new measurement and display techniques such as perspective and foreshortening were key.

Selected Shifts in Artistic Styles

To highlight some of the phases that Italian Renaissance art went through, we will summarise three commonly identified shifts in the artistic styles of that period: the emergence of a naturalism undergirded by science, the emergence of new motifs, and the increasing complexity of the art.

First stylistic shift – Science and Naturalism (late 1300s/1400-): The first turn was an expansion in the “set” of permissible images, or manners of their depiction. First was the movement from the prior byzantine form of more “static” and iconic religious images to the more interpretive form of religious images. This allowed some artistic creativity to come in, e.g. in the portrayal of biblical scenes, as opposed to the typical Byzantine portrayal of figures in a diptych or triptych of panels. In particular, in his history of the period, Vasari singled out Giotto in the 1300s as the one who “revitalized” art and helped lead the beginnings of Renaissance art by breaking away from the Byzantine style (Vasari, 1998). Giotto was followed by others such as Masaccio di Bondone, who “In 1426... was hired by the monastery of Santa Maria del Carmine... one of the first to discover a new lifelike method of painting.” Masaccio discovered Fra Lippi, who came to the attention of the new force in patronage, Cosimo de’ Medici (Strathern, 2007) (p.138). This period saw a slow percolation of concepts and their eventual diffusion, both within artistic circles as well as across cities. Even within this limited repertoire of motifs, advances could be seen, ranging from the rediscovery of perspective drawing by Brunelleschi, to Da Vinci’s naturalistic forms, and even to the increasing depiction of the passage of time and narratives in works (Chapman and Fiaetti, 2010).

Secondly, science moved concurrently with Renaissance depiction, especially of the human form. The Renaissance artists became intensely interested in the naturalistic representation of life subjects through close observation. Artists believed that the emotional effect of a viewing a human figure in a painting depended on the truth and accuracy conveyed in the image. Da Vinci’s studies of human anatomy are famous examples, but many artists studied real models in order to capture the sense of life and presence, and extended this practice to animals, organic objects like plants and foodstuffs and artificial objects such as furniture. In fact, the normal practice became that of life observation for a commission, rather than relying on the tried and tested, but overly familiar model books.

This trend throughout the early Renaissance towards life observation was an important aspect of the new naturalism. Artists became obsessed with expressing lifelike figurative representations using models for reference, as well as still lives and later on, landscapes. Prior to the Renaissance and in its early phase model books were used for reference, containing images often by prior masters. The shift from simply copying these images in favour of life observation was a major stimulus of creative interpretation, and was a core component of the new design thinking. Drawing from life was a step introduced to the painting process, partly enabled by the greater availability of paper and drawing materials. Life observation became a core skill in the arts until contemporary times. For instance, the life drawing of nude or nearly nude models had been a core convention in art schools. In the late twentieth century until today however this practice has come to be seen as an anachronism with the rise of conceptual art and the postmodern.

The third innovation was the development of linear perspective (Kubovy, 1986). These techniques were formalized if not systematically developed by Brunelleschi. By setting out the composition of a picture through geometric principles the human artist was able to locate himself or herself in space, exerting control over it using tools of abstraction. Once developed, perspective increasingly appears in paintings as we march down the Renaissance period, and by Jacopo Bellini’s time, fully developed use of the

techniques could be seen (Chapman and Fiaetti, 2010) (p.53). We can classify perspective as a part of the move towards scientifically-based naturalism, in that the natural optical perspective was becoming the norm, rather than the former means of artificially placing objects in ways that did not capture the sense of distance within a painting.

The social setting and its expectations influenced painting. The vast majority if not entirety of the works produced during this period had religious motifs. They were largely commissioned by the churches and patrons (such as Florence's Medici family). This suggests how the cultural period "constrained" the creativity and channelled it towards certain forms and output. Given the shortage of space in this paper, we have elected to focus on the creative process, and are keeping patronage (for Renaissance art) and publishers (in videogames) as a background factor.

Second stylistic shift –Mythology and other new motifs (1450-): Beyond more accurate depiction, second shift was to expand the set of motifs. Towards the third centenary described by Vasari, that he dubbed the "High Renaissance", mythological motifs was increasingly evident in artistic tradition, particularly in the work of new artists, such as those who worked in Venice. A new sensuality became part of the tradition, brought on by Venice's notoriety: "prostitutes and courtesans were only one of many manifestations of....Renaissance Venice. It is, therefore, no surprise that highly sophisticated depictions of sensuality were developed in Venice." (Cole, 1999) (p.56). Breakthroughs followed as artists followed a new type of patron interested in these new themes. Giovanni Bellini helped found a more sensuous, coloured style of Venetian painting (with "excursions into the realm of mythological subjects, a type of painting that was then just gaining favor" (Cole, 1999) (p.54), but it was his students like Giorgione and Titian who matured this form by the weaving of Roman and Greek mythologies into their art, recapturing lost cultural aspect of Europe's (Roman) past. Moves such as this were to dramatically change the set of motifs available to other artists. It is this evolution in imagination, largely started during the Renaissance that created an ever expanding canvas for artistic rendering, to culminate in the ultimate forms of self-expression: the modern periods of art.

Another set of motifs came from the emphasis of landscapes as a form of painting in itself. While landscapes increasingly figured as backgrounds in the early Italian Renaissance, it took much longer for landscapes to become a genre in their own right. A window into this process is provided by a number of exhibitions and studies of the Renaissance, for instance, a recent major international exhibition titled "Nature and the Ideal: Landscape Painting in Rome, 1600-1650" at the Grand Palais and the Prado. In this, it was shown that by the 1600s, European landscape painting was well underway, and figures, even religious icons, had been reduced to the role of objects providing a human dimension to the much larger scale of the natural environment. Writing about the exhibition, an observer noted one "possible reason" for why landscapes only took off this late, despite having surfaced over a century before: "The 17th century is a period when religious meditation receded in the living culture of Europe." For instance, in Il Domenichino's "The Flight to Egypt" for instance, "A tiny Mary riding a donkey, followed by Joseph, appears in a corner... Religion is the excuse in this picture that really deals with the world." In addition to the demand and the natural tendencies of the painters, "(having been) practiced long before by painters when sketching," there was the external influence of Northern European painters over their Italian brethren.⁵ This corresponds with the Swiss historian Jacob Burckhardt's view of the Renaissance's main feature being that of a gradual embracement of artists' individuality (Burckhardt, 1990).

Third stylistic shift: Narrative and other complex meanings: A third shift occurred when, in addition to the more technical aspect of perspective and the naturalistic focus embodied in figure composition, more complex, layered meanings started to be incorporated into works of art. For example, narratives also started to figure strongly as a means to conveying the emotive elements of a scene. The use of narratives predated Florentine and Venetian painting – complexity figured in the work of early painters, such as those

⁵ S. Melikian, "The Landscape Comes of Age", New York Times, June 4-5, 2011.

of Altichiero of Padua (c. 1325-1395) (Cole, 1999) (p.8). This narrative aspect was displayed in the BMU's exhibition as well as in other studies of art history. For instance, in Giovanni Bellini's work *Agony in the Garden* (c. 1460): "by far the most important and prophetic one (modification) – is the introduction of time and atmosphere into the narrative" (Cole, 1999) (p.12). In fact, the elder Jacopo Bellini's model book is a prime example of the use of paper to experiment with compositional drawing, partly to convey narratives (Chapman and Fiaetti, 2010) (p.52). Reinforcing this, Leon Battista Alberti's 1435 treatise on painting *Della Pittura* (On Painting), (which is believed by experts to have been widely read and distributed), discussed the importance of conveying a complex narrative, amongst other things (Chapman and Fiaetti, 2010) (p.54).

Other Cultural Shifts: The Role of the "Market"

The ever expanding or cumulative stock of knowledge of possible (and once tested, "proven") motifs suggests that the capacity for combinative creativity will increase, and that the number of combination should increase at an even higher rate. Thus, the limited number of "combined" motifs during the Renaissance period can be seen to be directly limited by the total number of "meta" level motifs that were socially acceptable. A crucial limitation comes from the gatekeepers. In the case of the Renaissance, this consisted of two very narrow sets of patrons: the church, and wealthy individuals (often honouring god or thinking of the church). Not surprisingly, most of the art then tended to depict religious imagery, though eventually, portraiture became popular as individual patrons also turned to means of ennobling themselves.

2.2. The Comparison with Digital Art

We start this section by considering what we just learnt: that Renaissance Art began to incorporate not only more sophisticated religious motifs, but the notion of realism as well as imagined motifs; additionally, the Renaissance thematically and technically set the groundwork for other movements as landscape painting and Impressionism. All of this took on the order of 500 years (if we begin the period with Giotto in the 1300s and end it with the Impressionists in the late 1800s). This point is important when we contrast it with the period in which the video game industry and the other digital arts performs: a mere three or so decades.

Motifs in a Digital Age: Deconstructed and Ever Expanding: In videogames, the regular reuse of motifs from various other media and popular culture are common, either as sources of inspirations or as direct content (intellectual property) to create games around new themes, for instance, science fiction and fantasy books and movies, electronic toys, and historical events (Tschang and Szczypula, 2006). In this way, the combinations are based on far more varied sources. Given the number of game genres that have come out in the short three decades that electronic games have been in existence, these are even more accelerated than the Renaissance. While a controlled comparison between the two ages is impossible, the common understanding of industrialization points to some mixture of technological and organizational change as some of the main factors underlying accelerated development in the modern age. As the mix of technologies increases, so does the number of possible combinations, and the exercise of these combinations. Our comparison implies a similar mechanism for cultural production: it would stand to reason that the nature and prevalence of motifs and their possible combinations increases with increasing societal complexity (such as channels and means of consuming and producing media). Certainly, a similar phenomenon was seen during the Impressionist period, when artists turned to daily life and social themes as subjects.

Shifts in games have occurred that are analogous to the thematic shifts seen in the Renaissance period. The games industry saw the rise of many single player genres between the 1980s and late 1990s. In the last decade, this has been followed by social gaming (e.g. massively multiplayer games, largely based on role-playing games or RPGs), casual games (games that are simple and require short periods of play), and emergent game-like virtual worlds (which are more social and involving of non game-like activities like

“creating”, “transacting” and “socializing”). More recently, serious games and games have been introduced into other aspects of life like advertising (a process termed ‘gamification’). This new range of innovations has been enabled by technological changes, as well as changes in the way consumers play or want to play.

While game genres are typically said considered to be the epochal forms of new games (Tschang, 2007), more than what is encapsulated in genres (and the specific combinations of features they embody), it can also be said that “artistic complexity” involves shifts in how we relate to narratives, in our manner of gaming (e.g. the shift to casual games), and so on. As with Renaissance art, the advent of innovation in games suggested that external influences such as other media like film, TV, music and books, significantly shaped the field of games (Tschang and Szczypula, 2006). The imagination of game developers is only limited by the number of other media and cultural references tapped into by game designers, aided by the propensity of people to try or play almost anything. Genres that are familiar from fiction, comics, films and television can be found, such as science-fiction, horror, military combat, Wild Westerns, super heroes, music, and aspects of urban culture like skateboarding and street dance, in addition to the game-specific genres.

3. THE NATURE OF THE CREATIVE PROCESS

Our second construct in the ‘landscape’ of artistic creativity is that of the creative process itself. This describes the basic cognitive mechanism by which art evolves – the cognitive action of combining (and recombining) new and old knowledge. In this, we are adopting a classical approach to the study of creativity, by trying to understand it as an individualistic process (especially as it is seen in the eyes of observers of the Renaissance). Certainly, the social view of this process will be obscured to the extent that the unit of analysis is the painting (and the painter’s efforts). We say presumably since it is only possible to infer this in retrospect. It is however well known in artistic endeavours that much of what is described as artistic creativity involves experimentation as much as insight.

The nature of creativity can be said to involve the exercise of the imagination, with a willingness to experiment with new forms. This is accompanied by the vagaries of socially (or societal) permissible genres, e.g. in art, these are the human form, portraiture, landscape, etc. However, what we turn attention to here is the examination of how both renaissance and digital art have advanced through the continual combination of received content and culture, as well as through the iterative nature of combinatorial experimentation.

Note that we are emphasizing more the social sources of knowledge behind this creativity. In section 4, a fuller treatment of the social and organizational nature of creativity is given.

3.1. Creativity in the Renaissance

One formative view of Renaissance artists considers the distinction between the artists as being either experimentalists; partial to inductive methods, proceeding by trial and error, or conceptualists, who work deductively, make detailed preparatory drawings or studies, and tend towards step changes in their progress (and hence, are prone to making more radical leaps). While this distinction encompasses only a part of artistic activity, we will show that it also highlights the combinative nature of much of the artistic work. Galenson and Jensen in particular consider Masaccio and Raphael to be conceptual artists, and Michelangelo and Titian to be experimentalists (Galenson and Jensen, 2001). As we will point out, even the great experimentalists could be said to necessitate acts of combination, and experimenting can be considered a much broader term.

Combinative Creativity as Mechanism in Artistic Activity

A window into the act of thinking through combinations was depicted by the illustration of great and minor works of the Renaissance side by side with the drawings representing the artists' earliest envisioning of what became the final form (Chapman and Fiaetti, 2010). Time and time again, objects, backgrounds, figures and poses were altered by artists seeking an optimal view of the scene. In character, this predilection of artists to adjust their art is no different from the modern digital artists' need to conceptualize, prototype and otherwise iterate their creations towards their best "tuned" forms.

One question raised by our analysis is that of the particular nature of creativity driving the evolution of art over time. While it is certainly true that new art involves revolutionary creative insights, once a genre or period of art is established, much 'new' art will tend to encompass changes in content, or stylistic approaches, often mixed with more familiar motifs or techniques. For instance, it has been noted that that one of the first great artists in the Renaissance period, Masaccio, blended the shading and form techniques of his predecessor Giotto with that of his friend, Brunelleschi's, linear perspective, and his own great innovation of a single consistent source of light to bring depth to light in his work (Galenson and Jensen, 2001). His techniques spread to others who witnessed his work, as attested to by Vasari. Galenson and Jensen (Galenson and Jensen, 2001) point out that Vasari's description of a second conceptual Renaissance artist, Raphael, points out that his team of draftsmen provided Raphael with "good designs which he could use in his work", in effect, giving him access to material for combinative use. Even an artist acknowledged to be a great experimentalist like Titian also relied on the past, "combining what had previously been the two great independent stylistic tendencies of Renaissance painting" (Galenson and Jensen, 2001). Our reflections later on model books also highlight their role in a codified manner for imitation and reuse, even as the motifs themselves are adapted and evolved.

Combinative mechanisms are at the core of artistic practices such as composition. Innovation may result from the replacement of objects within a given painting as a result of iteration, and in the transfer of motif between works or art or even across categories of art (e.g. an image from a painting to a medallion). Many of the paintings made during the High Renaissance exhibit both an attention to the landscape as well as to the figures and foreground scenes. In this way and others, they betray an increasing complexity which is combinative of the themes already mentioned. For example, Giovanni Bellini's Pietà depicting Christ's sacrifice and his 1514 major mythological work Feast of the Gods both contain minute background details such as clouds and distant buildings (Cole, 1999) (p.34). This led to an increasing complexity of painting, so much so the opportunity for combinations helped masters to distinguish themselves and to push the boundaries.

While combination itself is a powerful mechanism, its deployment as an explanatory mechanism of change requires **motifs** – both original and old - and techniques. The sources of motifs (effectively social in nature) were discussed in section 2. While some motifs evolved over time through their invention and introduction by individual artists (Da Vinci for instance was a great experimenter, and other artists also adopted a scientific approach, as with Brunelleschi's 'invention' of perspective), other motifs came from religious themes and classical ones:

"A potent source of inspiration for figural ideas for all fifteenth century artists, was...ancient (Greek and Roman) cameos, coins...and sculptures" (Chapman and Fiaetti, 2010) (p.57)

It is because of this process of adapting and evolving motifs that the earliest Renaissance art like Giotto's could be considered as inspired "first of its kind" prototypes, while the artists immediately succeeding him primarily adopted his practices. It is only with the steady accumulation of new techniques that complex combinations and increased individual variation could occur, via learning and experimentation.

Iteration and Experimentation

Thus far, what we have highlighted is that combinative creativity in Renaissance art is based on the access to motifs, and the ability to recombine these motifs into different products or product categories. However, combination is only half of what goes on in the shaping of a piece of art. This raises the question of how combinative processes work in practice. Clues to an answer can be found in the actual practices observed in our Renaissance data. Recent scholarship in this line of thinking has focused on the analysis of the drawings of painters, which betray the artists' thoughts and trials. The evidence is quite clear that artists consistently iterate in their work. Analysis of Renaissance drawings suggests that the drawings were an integral part of experimental and diffusive processes of knowledge creation:

"By the close of the fifteenth century, the practice of drawing was established as a vital constituent of artistic education and the means by which painters developed compositions and figural ideas before beginning work." (Chapman and Fiaetti, 2010) (p. 72)

A range of practices and techniques were used in the Italian Renaissance as aids for iterating, including composition, ideation, and the general practice of drawing. There are for instance a host of drawing mediums that were experimented with (e.g. chalks, types of shading, like cross-hatching marks) and different artists use of these mediums gave the artists' and their work a distinctive reputation. Artistic practices like composition or ideation allow creative experimentation of object placement in drawings and are iteration at the design stage. While this is quite different to technical production practices like pouncing, which involves the transfer of images from one medium of paper to another (possibly the mural or painting itself).

The Need for Iteration

As we noted earlier, increasing complexity with sustained attention to detail was an ever more significant issue in the realm of Renaissance art. Not only did themes broaden through the 'shifts' in motif described earlier, canvasses also got bigger, as religious figures became embedded in scenes which became dioramas on which narratives were played out. In fact, it is not in the isolation of any one of the themes, but in their constantly roiling recombination and experimentation throughout the period, that we can comprehend the true nature of the advance that Renaissance art represented.

Drawings can be viewed as windows into practice. A central theme in the BMU exhibition and other studies of Renaissance drawings is that of how drawings occupied a central role in the artistic process:

"the refinements worked out in individual studies (i.e. drawings) of figure and costume might be distilled at the next stage into a finished design that could serve as a template for the painter's composition..." (Chapman and Fiaetti, 2010) (p.32)

This was necessary because the materials of the final product, such as canvas and plaster, were costly and unforgiving of errors - allowing little time for experimentation.

In the case of murals and reliefs, the finished drawing led further to a 1:1 scale under drawing, or to a drawing of greater precision, a cartone (or cartoon), whose contours were transferred to the wall by pricking with a sharp instrument (Chapman and Fiaetti, 2010) (p.33). Renaissance artists would work on these cartons or drawings on paper and other lighter materials for many months testing out concepts and form before committing the final product to canvas.

Representation of prototypical forms: The continual invention and adaptation of new drawing (or prototyping) media, the actual means of drawing, occurred alongside the techniques. Over the centuries, a bewildering array of materials were brought into use for not only production, but also pre-production – e.g. stylus, metal point, lead point, chalk, red chalk, and so on. Invention of technique followed this development of media, and artists would take painstaking care to experiment with representations and

styles with their drawings. The result was that the drawings, which were subordinate to the final work, were meticulous and lavish in detail. Today they are exhibited in the world's great museums as masterpieces in themselves. Yet in Renaissance times these drawings were considered a mere process step before embarking on the main work. With the new ways of displaying drawings, artists were able to further invent new ways of displaying perspectives, e.g. the use of cross-hatching to display the volumetric nature of figures, and hence, ultimately a form of realism (Chapman and Fiaetti, 2010). These various techniques for refining and shading contributions helped artists to manage complex works of art. These initially aided artists in differentiating their contributions from one another, but eventually became a part of standard practice.

Compositional drawings: Artists responded to the increasing complexity of canvasses by modifying their use of drawings and their connected practices. These can be analyzed in separation. **Composition** or the **placement (and substitution) of objects**, as well as the attention paid to their foregrounds or backgrounds, became important, in part addressed by drawings. Many of the drawings of the time show how early artists handled this. For instance, in *The Vision of St Augustine* (c. 1460-1526), Vittore Carpaccio makes several adjustments before his finished work, including the substitution of a dog for an ermine (in so doing, substituting an animal symbolizing fidelity for one representing purity) (Chapman and Fiaetti, 2010) (p.266). In Filippino Lippi's *Triumph of St Thomas Aquinas* (c. 1457-1504), a comparison of the artist's drawing with the eventual painting shows "*an alternative design of the foreground*", possibly to allow the artist to discuss the composition with the patron (Chapman and Fiaetti, 2010) (p.238).

This placement of objects or rearrangement of designs in particular paintings, suggests a desire to experiment and try out new designs. For instance, in Da Vinci's *Adoration of the Magi*, a "*sequence of around 15 studies for the altarpiece suggests that Leonardo may have had some flexibility in the subject, as some show the Adoration of the Shepherds rather than the Magi.*" (Chapman and Fiaetti, 2010) (p.210).

Sketching as rapid ideation: As paper became more and more affordable, certain artists started to employ **rapid sketching** as a means of experimenting with different poses and forms for objects. No one exhibited more of a stylized form of such iteration than Da Vinci: "*In the quest to keep pace with the flow of ideas, he adopted in such drawings a notational manner to capture the essentials of a pose of an expression*" (Chapman and Fiaetti, 2010) (p.206). Da Vinci's and del Verrocchio's sketches of relatively mundane topics such as babies and cats are widely recognized as one of the finest examples of early experimentation on paper.

In summary, these three examples of forms of drawing iteration are part of an evolving set of practices utilising new technologies in the form of materials and media, but all in the service of the fundamental creative impulse of revision and rework. In the transference of image from mind to paper and subsequently to plaster, artists are able to conceive of and iterate on larger-sized and more complex pictures, more complex themes and means of carrying the themes.

3.2. The Creative Process in the Digital Age

Our study illustrates that combinative mechanisms have been at work in the period of Renaissance art and the digital age alike. This suggests that the raw essence of human combinative creativity is as unchanged between the period of the Renaissance with its 'opening of eyes' and the current modern age of digital media. The creative process is ultimately composed of the processes of inventing new forms, combining them with one another (as well as with artists' personal expressions of views, painting styles and design approaches), and of experimenting with these via iterative means.

The impulse to combine to generate novelty is recognised not only in the artistic field, but forms the basis of creativity in social network views of entrepreneurship and innovation as well as representations of the creative process in scientific discovery (Simonton, 2004) and engineering and technology (Arthur, 2009). The realisation of 'new combinations' also forms the basis for Schumpeterian economics of innovation (Schumpeter, 1942; Freeman and Soete, 1997; Nelson and Winter, 1982; Fagerberg et al., 2004). Combination and recombination is broadly believed to be pivotal to creativity and innovation.

We have seen combination played a key role in the advances of Renaissance creativity enabled by the application of new techniques and materials. Similarly now in the digital age we can observe changes that are still more dramatic. If we consider the distinctive properties of digital technologies, as outlined by Castells (2004) (p.9), we can see that all these have ramifications for the possibilities for combination:

- (a) their self-expanding processing and communicating capacity in terms of volume, complexity, and speed;
- (b) their ability to recombine on the basis of digitization and recurrent communication;
- (c) their distributing flexibility through interactive, digitized networking.

The processing power of ICTs means that combination may be achieved faster and at greater scale, but this capacity is increased exponentially by the shared digital format of information, and its mobility. Digitally recorded ideas and cultural artefacts may be 'pinged' across continents in seconds, to be received and integrated in the creative outputs of large numbers of networked individuals. There is a recursive effect where further innovations are always generated because of the communicative ability of digital technologies and their global reach. Castells puts it succinctly, "One of the key contributions of the Internet is its potential ability to link up everything digital from everywhere and to recombine it." (Castells, 2004) (p.10). Jenkins notes how the Internet has only served to accelerate and otherwise further the mixing of media (Jenkins, 2006). All of this allows for easily manipulated experimentation involving scope, speed and scale.

Combinative Mechanisms in Videogames

Games are developed in part by their developers' exposure to other creative media such as film and books (Tschang and Szczypula, 2006). Combination is common because the product is considered to be 'plastic', i.e., easily reconfigurable, and admitting of new content into the existing product. One increasingly important component of games that came from prior arts is the narrative tradition. Top selling games (such as in the first person genre) have narrative qualities that are highly reflexive, involving professional script writers. In order to provide a playable user experience, games combine varied components, including logical components such as rules and mechanics, content such as the narratives, tokens and other onscreen objects (that represent "playable" content, i.e., content that the players can manipulate), as well as parts of the "system" that players interact with such as user interfaces, artificial intelligence, and so on. These combinations are possible because of the plastic nature of games and the code that drives them; that is, code can be used in many different ways to represent different outcomes. Consider the conceptualization of a classic video game, *Civilization*, by its designer Sid Meier, which illustrates how prior games by himself and others influenced its making:

"Civilization had many influences. SimCity in its turning the world away from destruction toward construction, the idea that it's just as much fun to build something as to destroy it. Empire, which had that "uncover the map" quality. Railroad Tycoon with the idea of economics and building and all it had." (DeMaria and Wilson, 2002) (p.190)

Another area of cross-media combination is games that tie-in with movies, comics, novels and toys. Characters, brands and other forms of motifs are taken from these other media in which they are more familiarly known and combined with the elements of interactivity and structured play mechanics of games. In some cases multiple combinations are created, such as the Lego series of video games featuring superhero comic content like Batman or sci-fi film content such as Star Wars. Developers of these games report that the complexities involved in such combinations are not technical, but concerned with co-ordinating and negotiating the brand management interests of the various parties. In the digital age the drive for combination is often more explicitly economic than in the pre-industrial Renaissance. The choice of elements to combine is as much a matter of financial risk reduction than artistic experimentation. Yet there is no doubt that the digital format enables rapid combination, as for example, importing a Batman character image into an animation software tool such as Maya or 3DS Max and setting this character in any number of pre-coded worlds. It is worth pointing out that combination in this new age is largely driven by a new (i.e. more extreme form of) capitalist commercialism at work, driven by the desire to acquire and reuse intellectual property (for profitability reasons) to the greatest extent possible (Tschang, 2007). While certain Renaissance painters (and indeed, select painters in all ages) were acknowledged to have business acumen as well, it is the existence of large, profit-making institutions that has driven the games industry to be the mega industry that it is today.

Ultimately however, games have to be playable and learnable, in order to become successes in the market. The latter dictates that new games have to possess some familiarity. While the visual content of

modern games is already commonly combinative (since like movies, games are based on popular culture), the combinative aspects that are most unique to games is that of the game mechanics (or means of user-interaction with the game) and the resulting game play. It is in the connecting of variants of core mechanics that combinative and even revolutionary types of game play can be created. Mechanics can be recombined with one another because of the modular manner in which they occur in different parts of a game, and how they fit together like logical components.

Ultimately, past games are seen in the new forms of gaming and other entertainment – that is, the historical predecessors are present. For example, massively multiplayer games like *Everquest* and more recently, *World of Warcraft*, rose out of single player role playing games. Developers of virtual worlds (like Linden Labs and its *Second Life*) were driven in part by visions of cyberspace laid out by science fiction writers, but were also enabled by real time and three dimensional graphics software from the MMO games tradition.

It is worth noting that complexity arises in technological innovations, as technologies are said to be “deepening” over time that is, getting more complex (Arthur, 2009). In video games, the product is already the embodiment of complexity. While early games were based more on reflex type action than anything else, the design of modern games, especially first person shooters, by now embodies an intricate mix of narrative, game play elements tied to motifs, systems within which objectives exist, and more intricate actions embodying analogies to real world or other worldly situations. A good example is the creation of the first person shooter, *Half-Life*, where the development of a compelling narrative closely tied to the game play and employment of game mechanics (means of interactivity) ensured that the design (and in fact, the second major iteration) of the game was successful. Further complexity comes about from technological change, since technology enables more complex and sophisticated functionality. For example, increasing complexity can be observed in the development of game controllers. Early controllers in the 1980s had one joystick and one button, while modern controllers have over 10 buttons and 2 joysticks, with combinations necessary for many commands.

Prototyping and Iteration Practices in Games

Taken together, all of the iterative and experimental practices we identified in the Renaissance suggest attempts to iterate on the form or to experiment prior to a full production. The many instances of artists trying out different types of objects and their placements, as noted earlier, can be said to be an iterative process. The drawing itself became a prototype as it were, subject to modification. To generalize what we are seeing in the different forms of iteration identified for the Renaissance: ideation is a vital part of the personal creative process in the Renaissance age; and the composition process involves the more rational rearrangement and placement of objects, which reflects a design type of process.

Game development is a series of ideation processes, starting from conceptualization, and running through to the development of systems, and even the debugging of code and “broken” bits of gameplay (e.g. parts of the game that are not playable or not effectively so). Iteration has a broader meaning in game development, since all aspects of a game’s development are iterative. Most games are iterated (i.e. tuned) at the conceptualization (design) phase, at the detailed design phase, and even at the full development phase (Tschang, 2005).

To some degree, much of the inefficiency in and obstacles to good game development comes from the interactive and experiential quality of games, and the inability to “play” the product till at least a partial system is done. Sometimes, developers are unable to play it till a complete system (through to the final stages of production) is defined. This requires games to be “tuned”, that is redesigned (and continually at that), for just about all of their development period: that is, from initial conceptualization, through full production. Sometimes, dramatic changes in the design are needed midway through the development cycle (essentially lengthening the total cycle by half or more) in order to perfect the design and its implementation. Consider the retrospective on *Half-Life*, a game that won over 50 game of the year awards:

“nearing the end of our original schedule, a whole lot of work had been done, but there was one major problem — the game wasn’t any fun...There were some really wonderful individual pieces, but as a whole the game just wasn’t working...At this point we had to make a very painful decision — we decided to start over and rework every stage of the game.” (Birdwell, 1999)

Production: A common feature of post-mortems on gaming suggests that prototyping has been vital to a given team's success. This prototyping is far more intense than what we saw in art. Prototyping is defined as the process of arriving at a playable version of a game, even a part of it. This is often in the form of a 'vertical slice' - a fully working and playable chunk of the game, representing only a portion of its whole narrative but demonstrating its look and feel. Vertical slices are an economic way for developers to test concepts and show these to commissioning publishers. They are aids to further iteration as feedback is elicited and technical difficulties are discovered.

Vertical slices and other forms of game prototyping are iteration aids that correspond to the drawings of the Renaissance. However there is an important sense in which they differ. Because the final medium of the work is the same as that of the prototype i.e. digital code, the work of iteration loses its sense of being a discrete preparatory step, as it was with drawings on paper as preparation before applying the images to plaster, wood or canvas. The implication is that with the high degree of manipulability of digital code the creative process is more continuous, and less stage-based as it was in Renaissance times. This means that the creative process is intensified and accelerated as well as open to the combinative capacity that the Internet offers. There are significant ramifications of this for the organisation of production, discussed in the next section.

Pre-production work or prototyping could fulfil the testing of the core mechanics (or core elements of the game play), but has is only one aspect of testing. Because games are getting complex and to some degree have to appeal to a diversity of players and player styles (of gaming or play), they have to be tested in multiple ways in order to optimize the enjoyment of play across the population of players. In the game development process, testing is continually undertaken by developers, by specialized testers, and finally and often, by consumers allowed to "try out" the game as "beta testers". This illustrates how the sequencing of stages in digital iteration is compressed, rather than strictly stage-based as in Renaissance artistic processes (see Castells, 1996; Castells, 1997; Castells, 2004).

In much the same way as we have seen with Renaissance art, digital content creation has a need for prototyping and iteration on the work's design and its production as a whole. Games are known for their pre-production and iterative processes, largely because designers simply cannot pre-visualize with any certainty whether the implementation of a mentally visualized concept "will work", i.e. be playable, let alone enjoyable (Sapsed et al., 2010). Typically, all stages of production, ranging from conceptualization to the preproduction stage and finally, the full production stage, involve iteration, with preproduction being the stage where prototyping is most actively done.

This raises one last important parallel between the practices of Renaissance art and videogames is that of the production process usually being a heavy and relatively irreversible commitment of resources, in part due to the product's heavy requirements for content and coding. This is in fact the first parallel, as it is because of this that iteration and prototyping are necessary to both artistic periods.

Iteration as Means of Dealing with Complexity or as 'Cognitive Support'

The question of *why all this iteration is necessary* is another related subject. An introspective look at what this comparison may actually be reveals is the fact that prototyping exists for these two forms of visual arts and visual-interactive entertainment – separated by 500 years – suggesting the idea that one need for iterating and prototyping is perhaps because the initial creativity that occurs in the mind's eye or imagination is lacking the full picture (literally), and one needs to craft the fuller experience visually and interactively in order to appreciate the experience of it. This suggests a thermostatic approach to creativity, where the imaginative output has to be "regulated" by impressions, which in turn feed back to our abilities to validate and iteratively improve.

Our proposition, partly based on these observations, but also informed by a growing intellectual sense that knowledge is complex, socially-located (in similar veneer to the idea of distributed cognition), is that iteration is necessary for the shaping of these incomplete forms – partially complete in individual visions. From this, we suggest a revisit of the of the classical notion of imagination by David Hume (1939). Rather than treat imagination as being incomplete and degraded in comparison with other faculties like memory, we suggest that it is not necessarily degraded, but rather, is an intermediate stage to a future state of "complete knowledge". As is well represented in organizational and philosophical thought on thinking, humans know more than they can articulate, but even more importantly, with iteration, learning and combinations (somewhat akin to constructivism, e.g. Bruner (1986)), we can eventually articulate more

than we currently know. This is what we termed at the beginning of this section the “implemented vision”. Certainly, in the digital age, we are no better off than early Renaissance artists –hence the need for cognitive supports as increased frequencies and differently sized cycles of iteration. In the next section, we will address another source of cognitive support: that of the social and organizational nature of knowledge creation.

4. ARTISTIC PRODUCTION AS SOCIAL AND ORGANIZATIONAL PROCESSES: FROM THE INDIVIDUAL TO THE ORGANIZATION

We ended the last section having developed an individualized notion of creativity based on the individuals combination of (largely existing) motifs. Now, we will look at what happened as a complexity in artefacts as well as a “social complexity” (containing embedded knowledge) occurred over time. We will argue that this complexity was directly associated with an increase in “organized production”. Even as the Renaissance progressed, as witnessed by Vasari’s history, painters were each influenced by other painters, and by patrons. It is clear that art has a collective feel not entirely captured by the individualized, combinative view of creativity we described earlier. We will now turn to a broader view of how the organization of effort and production took place in the Renaissance and the digital age alike, as well as the socially-located nature of the sources of knowledge. It is perhaps more evident nowadays that art, at least from the impressionist period onwards, is as much a social phenomenon as an individual one. Csikszentmihalyi et al’s studies of successful art students also being business minded ones (Csikszentmihalyi et al., 1984), Becker’s notion of “art worlds” and the notion of peers (Becker, 1982) and intermediaries as “selection systems” (Wijnberg and Gemser, 2000) are just three views in radically different literatures that have come to similar conclusions.

Yet, in addition to this notion of a production system being regulated by peers and intermediaries, our view of art innovation is informed by a more dramatic turn partly performed by the cognitive sciences (or a part of it) towards an understanding of cognition as culturally situated. This is represented by constructivists as Bruner (1986), and (socially and materially) distributed cognition scholars as Hutchins (1995).

4.1. Production Processes in the Renaissance

To begin our tour then, we start with the relatively more easily (and increasingly) recognized view that production by many masters in the Renaissance, especially in Venice, was not just about the feats of single individuals as it were also of entire teams or workshops that surrounded and enabled the individual artists’ feats (Bambach, 1999). Certainly, different types of artists were at work in these workshops – some as apprentices, some as more valued assistants and others as workmen.

Enhancing Productivity and Tackling Complexity

While the recesses of time make the techniques of the workshop elusive to scholars, observations such as those of Da Vinci’s are suggestive of a *“workshop tradition with its inheritance of cultivated design habits, technical short cuts, props, gadgets, and its view of drawing primarily as a functional tool rather than as an expressive masterpiece”* (Bambach, 1999). In a similar way, drawing became a fundamental tool to their vision. How the artist took initial visions and ideas to a fuller version involved not only the encapsulation of complexity, but also specific techniques that allowed for modularization and augmented the artist’s capabilities.

The iterative techniques examined earlier facilitate creativity (and eventually, individual creative expression). Renaissance artists employed a second category of drawing techniques as aids to production, particularly for complex projects (Bambach, 1999). These were also hard won by experimentation. Bambach specifically refers in her study to the use of techniques such as pouncing or *spolvero* as major steps in the artistic production process, especially for murals. Pouncing referred to the transfer of images from “cartoons” (outlined images on paper) or other drawings, to the final surface or media, via indelible marks made by sharp tools. *Spolvero* was imported into Italy around 1340, but around 1460 or 1470, artists begun to combine *Spolvero* with another technique, *calco*, another transfer technique. Artists later also used this as aideation technique or compositional tool. As noted earlier, artists also used

cartones or underdrawings as part of the pouncing process. These were eventually applied to different applications such as easel paintings and frescoes.

These techniques were used as much for iteration as they were for guiding labor. We want to focus attention on the former purpose now, as it is related to the increasing complexity in works of art, especially murals. As such, these methods were the natural extension of the iterative drawing processes seen with individual creativity.

Machines for Masterpieces

A different example of productivity enhancement was displayed by Brunelleschi, famed for the dome of the Santa Maria del Fiore Cathedral in Florence. Under the category of tools can also be placed the machines that Brunelleschi was famed for creating to help enact the Dome— at the time one of the largest vaulted domed structures in the world. These machines included machines for lifting masonry as well as for transporting stone down rivers. Interestingly enough, the actual dimensions, and thus, vision, for the “Duomo” was laid down years earlier, before a competition was raised in order to choose the Dome’s eventual builder. Brunelleschi also built scaled down prototype models of the dome (‘prototyping’), employed assistants (‘organized production’), and even tried to profit from side enterprises (e.g. the building of a water borne transportation ‘system’) (thus displaying all the trademark “commercial interests” associated with modern day productive organizations), all in order to further this enterprise and his agendas (Prager and Scaglia, 2004).

4.2. Knowledge as Being Socially-Located

We now turn to another perspective of creativity in the Renaissance: that of the conception that knowledge was located in the artefacts and minds of society, or what we term socially located knowledge. We note this primarily because of Vasari’s accounts of how artists knew of each others’ work, tutored star apprentices and the like. In addition, expert understanding since then confirms that artists also access the accumulated knowledge via a variety of knowledge transfer mechanisms, including apprenticeship with master teachers, and increasingly, books and model books. In the earlier part of the Renaissance, artists’ personal collections of drawings (known as model books) became a means of not only preserving representations of motifs for their use in further experimentation, but also allowing for compositions: “*(Jacobo Bellini’s) large drawings... seem to have been used by the artist and members of his shop as models for a myriad of painting types: religious subjects, mythological scenes, and architectural fantasies, among others*” (Cole, 1999) (p.8).

In sum, we can say that **the ‘model book culture’ facilitated copying and hence, substitution and combinations at a wider social level**, since students could copy out of other established artists models’ which were privately available (to students of those teachers). Eventually however, the increasing availability of the once-expensive paper led to the decline of model books, and a greater individuality and experimentalism (Chapman and Faietti, 2010) (p.49).

Thus, alongside the well understood apprenticeship format, model books formed the equivalent of a social means of knowledge transmission and diffusion. This could be seen as further forms of “cognitive supports”, that is, means to aid the mind in creating.

Perhaps as important as their role as preserver of knowledge are the idea of model books as the first instance of a technology modularizing for “productivity enhancement”. As with the “precision” techniques of pouncing (putting outlines on surfaces where the art is to be laid down) and drawing (for envisioning and dealing with the need to recombine), pre-Renaissance artists typically used model books and received images in their work that contained hundreds of ‘readymade’ sketches and images that were passed on from artist to artist – such as from master to students. These sources of ideas and images saved time and effort at the expense of originality.

The Implications for Innovation and Diffusion: Art as Distributed Cognition

Even as we acknowledged the sources of creativity as being the very artefacts themselves as well as the common forms of inter-personal knowledge transfer, we have also laid down the groundwork for an even more speculative proposition. Essentially, model books could be said to be acting as a common (and sometimes semi-private network) repository or storehouse for knowledge. In a way, these acted as **a form of distributed cognition** (or the pieces of the cognitive system embedded in artefacts).

To this degree, in an “innovation system” perspective of art, categories such as the sources of innovation, diffusion and evolutionary notions (of incremental and cumulative innovations) suggests a perspective to art that complements the ‘art as Taylorist production process’ that the art histories suggest, or that of the traditional view of creativity (being that of art being based on individual creativity, or on the creative individuals being contrarian to the field).

Something that is less obvious in productivity studies is the actual mechanism by which the stock of knowledge (including forms such as designs) accumulate. Model books and drawings more generally have been a part of this process. In general, *“An artist’s stock of drawings was a form of intellectual capital...useful in the production of future paintings.”* Drawings helped promulgate a masters’ influence in three important ways. Firstly, it reinforced the relationship between master and student: *“For the most part, drawing was related to workshop training and the preparation of finished work.”* Secondly, *“the dynastic nature of many Renaissance workshops meant that drawings constituted an important part of an artist’s legacy”*. As an example, the artist *“Squarcione promised to teach the boy his method of perspective ... and to provide drawings to copy”*. Third, drawings also served *“as a means of informal communication between artist and patron”*.

The following makes clear what the diffusion and innovation pattern looked like for drawing:

While individual styles naturally evolved over the centuries...the function and mode of drawing style broadly followed the pattern established during the swift development of the medium established ... (that) century” (Chapman and Faeti, 2010) (p.72).

The upshot of all this is that knowledge was circulated in both general form as a broad body of techniques as well as in forms specific to particular “circles” formed around leading artists. This in turn created the conditions for an ever increasing spread of knowledge radiating along particular lines and potential for their further combination with other new knowledge that minds would bring into play. While this point has been shown for the area of technical progress (Arora and Gambardella, 1994), it has been less evident for the cultural and artistic forms of innovation.

4.3. Production and Loci of Knowledge in the Digital Era: The New Renaissance?

Production Complexity Arising from the Complexity of Games

Like Renaissance art, the production of games has more or less evolved to involve a “workshop” environment of sorts. This is in part due to the complexity of the artefact, but is also in fact part of a general trend towards increasing complexity shared by both art forms.

The differences between the art forms are worth elaborating, as they have implications for their development. Unlike paintings, games have many intricate “working pieces”, and the modern craftsmen need to be as good in their own areas as the lead designer. Perhaps the key issue that differentiates games from art, especially Renaissance art is the complexity of games. This comes from their interactivity and sequentially experienced (e.g. visual narrative) nature. Rather than a single medium like art that embeds other layers of complexity, games are made up of multiple equally important layers, each of which interacts with the others. A simple narrative for instance helps to locate game play that should occur at each instance of time, and will branch in different ways depending on the decisions taken by the player. Through this complexity, games can be said to require additional practices and means of organizing in order to manage the complex flow of work. Individuals suffer more and more disadvantages in relation the big projects.

The need to weld together multiple non-related media such as visual media, text (and the narratives that run through them), as well as gameplay (e.g. reflexive gameplay or gameplay involving logical-deduction) together makes not only game design but game production (of all components involved) complicated as whole. Dependencies are caused when certain components are dependent on others (e.g. the design and some of the programming needs to occur before the art), and consequently, the “pipeline” or flow of these components in production becomes sensitive to one another. While there is no direct equivalent of this in the Renaissance, a degree of interdependence and division of labour between artists and carpenters was critical in the production of altarpieces (Northesole, 2011).

We cannot overemphasize how much software changes the productivity of not only development, but also the manner by which the products are engaged with (what we term “game operation”). This can be seen clearly in the translation of board or “pen and paper” games to digital versions. While rule making and application for a pen and paper game like Dungeons and Dragons used to be meticulously handled by human game coordinators (called dungeon masters), during game operation, the computer now effortlessly handles all rule application, as well as calculations and computation of “effects” on the players’ tokens. On the development side, mundane processes of keeping track of the “values” assigned to a given token in the context of play are now tracked (and allowed to be changed) via databases, in essence, treating content as virtual ‘objects’.

Game Production: From the Individual Developer to Being Team-Based

While in the early days, designers were all-in-one programmers and artists too, over time, games became increasingly complex, costly, and needing of team efforts. Modern video game production involves highly complex projects sometimes costing on the order of tens of millions of dollars and upwards of a hundred developers. In this sense, team management is an increasingly vital component. Most projects have multiple leads managing the creative divisions (be it programming, design or art) and producers handling scheduling and other resource coordinating tasks (other than the parts of the game that lead designers coordinate on). On the software side, a variety of advanced software process methodologies are increasingly employed in game development, such as Scrum, rapid prototyping, and Agile software development (all of which accelerated the iteration and rapid deployment of software). While there is no analogy in the Renaissance to many of the software practices, team management was apparently necessary for the larger Renaissance workshops, as with the larger game development project. As Vasari points out, Raphael had a extremely large team of draftsmen, and his practice largely involved his developing detailed designs and instructions that this “team” could then carry out under his supervision (Galenson and Jensen, 2001). Most attempts to characterize the team as being important also tries to incorporate the importance of a designer’s solitary vision, which is preserved in a complex counterbalance between the team and the individual.

Related to the prototyping seen in both periods is the idea of transference of imagery. Many Renaissance practices involved the transfer of images from one media (e.g. drawings) to the final media (painting). In a way, the Renaissance use of drawings to prototype the final art was a means of reducing the uncertainty of successfully carrying out complex art forms as envisioned. The equivalents of the painstaking transference techniques used in large-scale art production (e.g. pointing) are largely less evident in videogames as many processes has largely been automated, but prototyping of parts of a game clearly serve an equivalent purpose in addressing uncertainty. Content creation (e.g. definition of wire frames for 3D modelling or use of motion capture to capture human movement) is wholly automated by software. Also, content is created (e.g. drawn) in the manner of “what you do is what you will see”, that is, whatever is committed to screen is what players play. The digital age accelerates this trend through software. Life drawing has become a neglected elective course in many art schools as students prefer to learn digital tools such as Illustrator, Photoshop, Maya and 3DS Max.

In another way, the manner of art has become more expansive and subject to multiple interpretations. The imperative for naturalistic accuracy and vitality is not as critical in the digital age. Instead the preferences of the postmodern age are unusual or ironic combinations of images that may shock or amuse (Collings, 2000), comic forms and unusual visual styles may be adopted as much as realistic ones. The images need not be lifelike and produced by the artist, which would be seen as a waste of time, but increasingly, images and objects of art are drawn from the World Wide Web. The Internet is effectively a massive model book of the 21st century. Artists search using key words and visit sites known for images and simply download them. The search for new combinations has been extended to animations, video, photographs and audio, driving on the mash-up phenomenon.

User Creativity

One trend in modern game development has been the move towards user creativity. This in a sense started with the automation of game operation (e.g. computing the mindless calculations needed to assign outcomes after resolving players’ and their opponents’ moves). A natural outcome was the application of automation to enabling users to express themselves in more than strategic ways. Users were allowed to create user-defined objects (with unique properties), and developers found that games exhibited emergent properties. Certain designers found this to be particularly alluring, and created whole genres after this new

“paradigm” of empowering the users (e.g. Will Wright and his game *Spore*). This was in part due to the perceived need to personalize games, but is in fact a natural step in the evolution towards more user participation, at least in some games. More recently, user generated content has become a de facto manner of helping developers “create virtual worlds” (once developer created) by relying almost entirely on users’ creative efforts, virtual worlds such as *Second Life* displaying these hallmarks. Thus, in a way, games and the virtual worlds that have sprung from them have moved the media full circle from “developers (thinking as) as users” to “users as developers” (Au, 2008).

Game Development Tools as akin to Machines

Knowledge flowed less easily during the Renaissance, but the production technologies of the time meant that artistic work could be scaled-up to a degree, whether through the prototyping techniques like drawing or more complex machines for sculpture and other 3D products, or simply designs in the mind’s eye, as seen in Leonardo’s sketchbooks. The use of machines in the Renaissance has a more direct analogy in videogames, since the various tools (e.g. 3D Max, Maya, etc.) augment human potential in games as much as they did in architectural constructions like the Dome. In the production of digital art we see now methods that provide a dramatic improvement in the ability to implement what previously could only be conceptualized. Rem Koolhaas headquarters building for China’s CCTV is a good example of this, as without the advanced computers the architects used, it would not have been structurally possible to build. In games, the flexibility of digital tools allows artists and designers to create a ‘prototype’ image very quickly, and then iterate: playing with the parameters and proportions for the image, and adjusting colours and tone. These changes are effected in seconds with a few mouse clicks. Even with a more complex creation such as an animation or video game, the effort might include multiple designers and artists as well as programmers. The latter’s development processes are organised on principles of building an early prototype and then iterating. Software engineering methods such as Agile, Scrum, eXtreme Programming and Test-Driven Development consist of honest communication, regular monitoring and builds rather than sequential work packages aimed at achieving predetermined milestones. The production of the work has subsumed the design phase. Thus, in large part due to the nature of the product, but also due to tools, design is no longer a discrete and subservient preparatory activity (i.e. as in the pre-envisioning of art), but is integral and ongoing in the production of creative works.

Knowledge (for Combinations) as Socially-Located

We have now moved from a view of individual knowledge creation as being combinative, to one where we now suggest that we recognize the social complexity involved in knowledge production. In addition, we suggest that the complexity of art forms, especially in the digital age, reinforces the use of further “cognitive supports” – in this case, as embedded in production processes themselves.

5. Discussion: Constants and Change across the Ages

Our investigation of the relationships between creativity and technology (taken broadly to include practices and techniques) suggests several views of creativity – not all commonly discussed as such in the creativity literature, and certainly not all at once. We will now summarize these strands via a narrative of creative production that spans the two periods.

Creativity as Combinations and Constraints

We started with the question: What is creativity about and where does creativity stem from? While original knowledge, and hence, fundamental knowledge attained from scientific and other deeper inquests, as well as inspirations, are important forms of creativity, our argument has been about creativity as the combination of new as well as pre-existing forms. In the Renaissance, the various strands of technique and style were just taking shape, but it is really in the later works that the combinative nature of these trends, or to put it another way, the confluence of these trends in each artists’ work, took shape. This combining came through the convergence of concurrent stylistic trends, as well as in the artists’ usage of techniques to iterate on and vary their works from one another. The preponderance of techniques (and ways of using them) further contributed to the variation in stylistic output.

At the same time, in the Renaissance, the early stages of religious motifs and the limited (or early) state of technology constrained creativity considerably. That it may be the lack of technology that enhances creativity may complicate the original form of Burckhardt’s thesis – that the lack of creative output was simply due to early stage of the world and of artists’ intellectual development (Burckhardt, 1990).

Ironically, in games, it may be the opposite. While the early technology constrained creativity, the markets still bore the variety that early designers created. More recently, the more risk-averse and conservative nature of markets and publishers alike have constrained creativity – a changing “selection system” as it were.

Creativity as Complexity, and Iteration

As was seen in the Renaissance, over time, art forms and the motifs constituting them became more complex. The implication of course being that, the more complex the society and culture (as sources of knowledge for combination), the more complex the resulting art forms. Culture contributes in deep, expansive ways, especially in the modern day. At the same time, our economic machinery ensures that what is interesting is less important than what is saleable at scale economies. That complexity is ever increasing in digital products like video games is clear. This parallels the complexity seen in art, but great works of “digital art” have not always had critical success, as witnessed by the fate of “auteur led” games. This is in part due to the ability to envision and realize complex art forms, but is also due to a perceived need for the visual effects and video games industries to achieve what has come to be known as ‘photorealism’ (Sapsed et al., 2007). But the goal here is to make digital creations appear more sensory and impactful to view, for movement to be more fluid, for action to be more thrilling. In other words the goal is for digital creations to appear more video-like, rather than lifelike, framed within a screen and designed for consumption within that format. At the same time, the imagined settings may now come from anywhere in the “content universe”.

In art, even though detailed artistic methods help put form to idea (i.e. the implement), iteration was needed to help prove out these initial “forms”. In games, preproduction and conceptual art also help to put form to idea in “testing” processes. Thus, the complexity in artistic forms has led to the cognitive need to pre-envision and prototype. This much is common to both periods. What we argue however is that the character of this iteration and tuning process has also become dramatically greater in the modern age, partly due to technological change, but also due to the need to service the more complex art forms of the digital age. Whereas innovations in drawing media were simply innovations in how to depict the eventual form and style, innovations affecting game production, as with innovations in animation, *accelerate the process of production, including potentially, the iterative activities jointly determining (with the exercise of creativity) each stage of production.*

Creativity as Socially Distributed in ‘Artistic Innovation Systems’

We have advanced a socialized view of creativity that is generalized over these two periods, that is, of it being constituted from the broader society (as a repository of knowledge, and possible restraint). Along with the need for iteration, we illustrated how this suggests that creativity rests as much on the cognitive supports of practices like iteration as it does on the social support of knowledge as being distributed. We hope that this provides the components of a prospective view of artistic innovation as being a located within an artistic innovation system. While this seemingly weakens the individualized nature of creativity, it is important to recognize that we are still intent on keeping the value of the individual in bringing about “creativity”, even as that creativity is shown to be using (if not needing) supports and stimuli.

Creativity as Production

We have seen how early art was already subject to early forms of a division of labour. Again, this was partly due to the growing complexity of art forms. What we showed was how technology directly aids the production of work spawned by the initial conceptualization phase, as well as its diffusion (in the case of delivery). Increasingly complex combinations go along with an increasing complexity of forms and societal relationships. Artists and designers manage these forms by breaking down the work (e.g. by composition). A similar occurrence happened with videogames, and various means of game design (e.g. breaking games down into levels) occurs. However, it is in the means of team production that increasingly large game projects illustrated the true nature of organization that was emerging. More hierarchical or Taylorist forms of organizing production were common. The individual artist became the designer who was, in the early days of games, was a solitary developer, but who over time, again with increasing complexity of the art form, became an integral part of a team.

The new techniques of the Renaissance, such as perspective, were profound as forces of actualisation, giving human artists control over space and positioning in the scheme of things. Fundamentally they entailed a repositioning of humankind's relationship to God. The power of the tools and techniques

brought a new confidence and commitment to human progress (Welch, 1997). The beginnings of the superstar artist were seen with the likes of Michelangelo who likened the artist's work to divine creation (Johnson, 2005). Where the rules of perspective were inconvenient artists would simply bend the rules, as can be seen in Leonardo's *The Last Supper*, where proportions and vanishing points are inconsistent but the overall composition has a celebrated harmony and balance.

The superstar artist instilled a view of individual creativity in the Western mind in the Renaissance through to the digital age. Paradoxically the individual consumer has been afforded a greater creativity in the Internet age, even while innovations become ever more collective efforts. Even though the importance of the self is somewhat diminished by the Internet, the individual continues to assert him or herself in virtual communities, and the fact that the Internet amplifies combinative forces is undeniable. What was once creativity locked up in social structures and codified volumes (i.e., what we saw with model books) is now widely distributed, accessible throughout the planet. This is not to say that the Internet does not have a social or cultural structure – it is meta-social or meta-cultural in nature. Original creations are mashed-up and collectivised, and the protection of individual creations cannot be feasibly managed through the existing institutions of Intellectual Property law in the digital age. In this way, technological mediation – both as a part of the artefact as well as in its production - has been a far greater force in the modern age. This is perhaps the most dramatic difference between the ages.

6. Conclusions and Implications

The Renaissance and our own Internet age would appear to have some similarities in that they are both revolutions in the production of art and creative works. The Italian renaissance brought new paradigms in design thinking, and perspective, as well as the many associated tools, practices and forms of organisation that these entailed. Similarly, the digital age has brought new tools and methods of creative working that also appear to obliterate existing practice. However this surface similarity between the two ages actually hides a complex relationship, because it is precisely the paradigms inherited from the Renaissance that the digital age is overthrowing. These principles and practices, which have had a defining influence on Western culture for the last 500 years are on one hand being overturned by the digital age and the Internet, but on the other, are demonstrating fundamental properties of human creativity and the role of technology in mediating this. This paper has argued that two very different epochs, containing two crucibles for creativity, are in many ways only separated by the types of technologies, but not by the types of technological mediations, and needs of human creativity.

We have sought to highlight several distinct aspects of creativity across the two ages, as well as how technology and practices have generally mediated this creativity. The paper illustrated how the various technologies and practices related artistic creativity to larger scale social systems and over longer time scales. Through these, we can furnish a different perspective on creativity that is both evolutionary (in being knowledge-based) and more appropriately incorporative of the mechanisms of innovation and diffusion. Thus, comparing two very different epochs – joined by the fact that each was emergent in its own time – can help us to discern patterns, the generality of mechanisms, and the mediating role of technology and culture.

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Table 1. Linear regression of innovativeness (year 2006) with individual measures of human resources flexibility (year 2005)

	Model 1	Model 2	Model 3	Model 4
Firm size (log)	-0.254*** (3.807)	-0.040 (1.096)	-0.131*** (3.054)	-0.152*** (4.039)
Firm age (log)	-0.043 (0.652)	-0.163*** (4.311)	-0.237*** (6.597)	-0.249*** (7.405)
Export intensity	0.803*** (11.575)	0.209*** (4.172)	0.288*** (6.126)	0.225*** (4.350)
Ownership control	-0.082 (1.259)	-0.116** (3.013)	-0.088** (2.615)	-0.117** (3.155)
Innovation support	-	0.702*** (13.264)	0.370*** (4.924)	0.325*** (3.452)
R&D intensity		0.191*** (3.562)	0.297*** (5.139)	0.193** (2.915)
Functional flexibility	-	-	0.166*** (3.150)	0.251*** (4.425)
Internal numerical flexibility			0.180*** (3.720)	0.182*** (3.825)
Short-term hires			-0.300*** (5.657)	-0.744*** (5.419)
Temporary help agencies			-0.023 (0.695)	-0.180+ (1.899)
Consulting/contracting firms			0.148** (2.824)	0.192** (3.215)
Environmental dynamism (ED)	-	-	-	0.418** (2.955)

Functional flexibility x ED				0.405* (2.166)
Internal numerical flexibility x ED				0.093 (1.544)
Short-term hires x Ed				-0.075 (1.124)
Temporary help agencies x ED				-0.037 (0.563)
Consulting x ED				0.453** (2.932)
F (full model)	34.85***	77.57***	108.34***	141.26***
Adjusted R ²	0.210	0.478	0.623	0.715
Change in R ²		0.268	0.145	0.092

Standardized beta coefficients; t-values between parentheses.

Level of significance: *p<0.1 **p<0.05 ***p<0.001

Source: Martínez et al. (2011)

Table 2. Regression analysis of innovation performance in the period 2003-2006

	Logit regression		Linear regression
	Product Innovation	Process Innovation	Number of patents
<u>Control variables</u>			
Firm size	0.069* (3.858)	0.122** (15.090)	0.103** (5.612)
R&D effort (R&D employees/total employees)	2.834** (16.565)	-0.582 (0.739)	0.129** (9.577)
Exports/Sales	0.002 (2.496)	-0.001 (0.960)	-0.023+ (1.708)
% Foreign capital	-0.002 (2.413)	0.000 (0.126)	-0.074** (5.322)
Firm ownership-control identity	0.212* (6.192)	0.343** (21.245)	-0.022 (1.605)
Firm age	0.002 (1.150)	-0.002 (1.929)	-0.006 (0.455)
Industry	-0.022** (9.577)	-0.024** (15.141)	-0.006 (0.457)
% Temporary employment (TE)	-1.559** (7.252)	-0.878+ (3.624)	0.020 (0.770)
R&D external employment (RDEE)	1.515** (13.284)	1.145** (7.644)	-0.335** (8.283)
R&D outsourcing (RDO)	0.784** (99.977)	0.452** (36.791)	-0.122** (3.445)
Inter-organizational technology cooperation (TC)	0.798** (67.336)	0.590** (41.165)	-0.129** (3.016)
TE x TC	0.169 (0.596)	-0.179 (0.784)	-0.050** (2.686)
RDEE x TC	-0.335**	-0.065	0.032

	(8.851)	(0.333)	(1.262)
RDO x TC	-0.156** (27.631)	-0.093** (10.642)	0.142** (2.994)
Market dynamism (MD)	0.055+ (3.692)	0.010** (16.239)	-0.037 (1.520)
TE x MD	0.011 (2.129)	0.018** (8.662)	-0.004 (0.158)
RDEE x MD	0.006 (1.520)	0.002 (0.182)	0.225** (7.258)
RDO x MD	-0.002* (3.974)	-0.002** (7.578)	0.073* (2.120)
Flexible technology (FT)	0.124* (5.689)	0.212** (24.113)	-0.049+ (1.743)
TE x FT	0.349* (5.503)	0.235+ (3.611)	-0.041+ (1.909)
RDEE x FT	-0.116 (2.220)	-0.127 (2.692)	0.300** (10.563)
RDO x FT	-0.039* (5.255)	-0.011 (0.476)	0.135** (3.684)
Model statistics	R^2 Nagelkerke=0.307 R^2 Cox&Snell=0.198 Chi-square = 1433.96 p = 0.000 n = 1,626 firms	R^2 Nagelkerke=0.224 R^2 Cox&Snell=0.155 Chi-square = 1093.62 p = 0.000 n = 1,626 firms	Adjusted R^2 =0.111 F = 37.95 p = 0.000 n = 1,626 firms

Notes: +p<0.1 *p<0.05 **p<0.01

Logit regressions – Wald values between parentheses

Linear regression – t-values between parentheses

ENTREPRENEURIAL ORIENTATION, HUMAN CAPITAL, AND RELATIONAL CAPITAL EFFECTS ON THE INTERNATIONALIZATION OF EMERGING MARKET SMES IN THE PROFESSIONAL SERVICES SECTOR

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Abstract: Professional service SMEs in emerging markets are growing in importance. Prior research has provided limited insight into how SMEs from emerging markets internationalize at accelerated speeds with less resources than multinational firms. This empirical study of India's professional service SMEs found that an entrepreneurial orientation and relational capital are key contributors to SME internationalization. Specifically, the ability of human capital to build relationships with customers and channel partners determines the speed and degree of SME internationalization. The current research contributes to international entrepreneurship literature by confirming that entrepreneurial orientation, human capital, and relational capital resources contribute to professional service SME internationalization.

Keywords: Internationalization, Entrepreneurship, Human Capital, Relational Capital, Professional Services

1. INTRODUCTION

The tremendous growth of emerging markets has captured the attention of the world. Global trade in emerging economies continues to expand (UNCTAD, 2009a). For instance, when developed markets experienced negative GDP growth in 2009, India reported growth of 5% and China's GDP grew by 7.8%. Service trade, a dominant component of world trade (WTO, 2009), has increased on average 10% per year since 2000 with notable growth from the emerging market of India (UNCTAD, 2009a; WTO, 2009). India, where service contributions to GDP outpace manufacturing, has experienced service trade growth over the past decade exceeding the global average (UNCTAD, 2009a). In fact, India is said to possess a comparative advantage in services (UNCTAD, 2008c).

Emerging markets have become resilient players in world trade (UNCTAD, 2009a). The fastest growth among service sectors has been seen in professional services (e.g., financial, legal, management consulting, engineering, architectural, education, and information technology) (Styles, Patterson, and La, 2005). Information and communication technology (ICT) services, a sector where exports grew six times faster than total service exports, are increasingly delivered by developing countries where their share has grown from 4% to more than 28% (UNCTAD, 2008a).

With unequal growth evident across nations and service industries, research has yet to address the drivers of such disparate growth and success. Do some service sectors, such as professional services, possess characteristics that facilitate internationalization among small firms in emerging markets? Professional services, a services sector, use highly-skilled human assets which possess specialized knowledge (Hitt et al., 2006). Professional service firms that are intensive in technology and human capital inputs are known as knowledge-based firms (Javalgi et al., 2011; Styles et al., 2005). These knowledge-based firms derive value from intellectual capital, which is comprised of human capital, structural capital (internal organizational capital), and relational capital (Youndt et al., 2004). Since the professional service industry is uniquely characterized by expertise, human capital, relationships, and knowledge flow between the provider and customer, professional services warrant more research attention (Freeman et al., 2007; Lindsey et al., 2003). Given the considerable growth of professional service sectors in emerging markets, these remain important, under-researched markets (Javalgi et al., 2004). Consistent with this view, Freeman, et al., (2007) and Coviello and Martin (1999) highlighted the need to better understand the internationalization process of firms in the professional service sectors.

Entrepreneurial literature contends that an entrepreneurial orientation motivates SMEs to overcome deficiencies and leverage their intangible resources for internationalization in emerging markets (Yamakawa et al., 2008); yet, significant gaps remain in understanding the role of entrepreneurship and resources in the internationalization of firms from emerging markets (Luo and Tung, 2007; Yamakawa et al., 2008). A 2008 review of research on entrepreneurial firms in emerging markets revealed only 43 studies (Bruton et al., 2008). International entrepreneurship (IE) research, a relatively new and growing field positioned at the interface of international business and entrepreneurship research, includes examination of entrepreneurial internationalization (Oviatt and McDougall, 2005). In the IE field, research has largely focused on developed economies (McDougall and Oviatt, 2000; Oviatt and McDougall, 1994), small venture firms, and antecedents, with a focus on individual sociocognitive factors and their direct effects on outcomes (Keupp and Gassmann, 2009). In an effort to advance the field of IE, Keupp and Gassmann (2009) undertook an extensive literature review of 179 articles published over 14 years from the disciplines of strategic management, international business, entrepreneurship, and technology and innovation management. The review revealed knowledge gaps among the various approaches to understanding international entrepreneurship, the lack of a cohesive theoretical framework for SME internationalization, and the need for a strong theoretical foundation to align future studies with the international business or international entrepreneurship literature streams to integrate literature and advance the field of international entrepreneurship. The same investigators note that within entrepreneurship journals, research which addresses international entrepreneurship comprises only 4.6% of all articles. Even more striking is the significant research gap evident by the small amount of research which has utilized the entrepreneur orientation (EO) scale (Miller, 1983; Covin and Slevin, 1989) in an international context (Slevin and Terjesen, 2011).

In response to a growing interest among the research community for a clearer understanding of IE, several focused journal issues have recently provided reflections, constructive analysis of research to date, and recommendations to advance the field of IE research. A review of 323 articles on international entrepreneurship from 1989 to 2009 finds that human capital is a better predictor of internationalization than firm size or age (Jones et al., 2011; Westhead et al., 2001). These researchers also question the temporal effects of EO dimensions and suggest that an EO may be an outcome of internationalization for established firms. A need is evident for clarity of the effects of EO in international contexts (Jones et al., 2011). Recommended areas for research include the elements comprising an entrepreneurial orientation, access to resources, as well as knowledge and firm capabilities (Keupp and Gassmann, 2009). There has been limited empirical evidence that identifies the capabilities which help SMEs internationalize early (Knight and Cavusgil, 2004).

We contend that professional service firms possess knowledge resources that facilitate internationalization. We build upon the findings of Hitt et al (2006) and apply the resource-based view (RBV). The RBV is an appropriate approach when examining high-tech venturing, such as computer and communications technology SMEs, a sub-sector of professional services (Miller, 2011). We follow the approach of Keupp and Gassmann (2009) in extending the RBV by applying a knowledge-based perspective as the framework for examining knowledge-intensive services. As an extension of the RBV, the knowledge-based view (KBV) emphasizes intangible resources rather than physical assets, whereby knowledge is the most important resource. With regard to professional service SMEs, we contend that knowledge resources facilitate a SME's speed and scale of internationalization in that a complementary relationship exists between firm resources and decision-making processes (Miller, 2011). We concur with management research in that the primary asset base for professional service delivery is knowledge, and the development of human capital knowledge capabilities generates relationship capital and facilitates international expansion (Hitt et al., 2003). A focus on knowledge resources provides an appropriate lens to examine professional human capital as the key to developing relationship capital between professional service employees and their international market customers for global expansion (Hitt et al., 2003). Hence, research can provide insight into the effect of entrepreneurial activities and human capital on the internationalization efforts of SMEs (Todd and Javalgi, 2007).

To address the compelling need for international entrepreneurship research, we empirically test a model of the drivers of service SME internationalization by surveying professional service SMEs in India to examine how an entrepreneurial orientation, human capital, and relational capital resources contribute to the speed and scale of internationalization. In a focused journal article which reflects upon entrepreneurial orientation research to date, Miller (2011) notes the growing awareness of the importance of entrepreneurship in regions such as India and asserts that globalization is a form of "new entry." Areas of

great research promise include the study of entrepreneurship in planned economies that are transitioning to market economies (Dess et al., 2011), as well as research examining SMEs in an emerging market and their outward international expansion, a neglected research area (Bruton et al., 2008).

Given the pressing need for research, the intent of the current study is to integrate entrepreneurship and strategic management research, which examines an entrepreneurial orientation and human capital, with a subset of IE research that focuses on small firm internationalization. Extension of entrepreneurial orientation research into the field of international entrepreneurship is an area of meaningful research attention (Miller, 2011; Slevin and Terjesen, 2011). Findings of this study address a gap in international entrepreneurship research (Keupp and Gassmann, 2009; McDougall and Oviatt, 2000; Styles and Seymour, 2006) and answer the call for a multi-disciplinary approach to understanding small firm internationalization (Venkataramanaiah and Parashar, 2007). The study's unique contribution is the context of an emerging market where resources are thought to be constrained. Furthermore, entrepreneurship research has not fully addressed the gap in extending and linking entrepreneurship with internationalization in a variety of contexts, nor addressed accelerated speeds of growth from emerging markets, or even from an SME perspective. In summary, this study provides the following contributions:

1. An empirically tested multi-disciplinary framework that integrates and extends the fields of entrepreneurship, international entrepreneurship, strategic management, and management;
2. Empirical evidence that an entrepreneurial orientation, human capital, and relational capital contribute to professional service SME internationalization from an emerging market;
3. Empirical support for the resource-based view;
4. Firm-level empirical evidence of accelerated SME internationalization in a context where the process theory of internationalization (Johanson and Vahlne, 1977) does not fully reflect the SME internationalization process; and
5. Support for differences among service sector SME internationalization.

2. RESOURCES AS A BASIS FOR INTERNATIONALIZATION

Research on service internationalization indicates that service firms are typically first entrants into international markets as client followers (Calof and Beamish, 1995; Erramilli and Rao, 1993). Advances in technology, privatization, and opportunities in national markets resulted in tremendous growth of international business activity in the 1990s (Hitt et al., 2006). The interrelationship of national economies, international financial markets, and globalization of industries led to the need for global laws and the movement of professional law firms into international markets (Hitt et al., 2006). Foreign professionals often attended U.S. law schools then returned to their home countries. In this manner, knowledge, the basis of professional services, was acquired in a foreign market and transferred to the home country for global expansion. As a result, professional service firms that invest in human capital create highly valued, transferrable assets that facilitate international expansion. Resources, in part, explain internationalization of professional service SMEs.

While there are several theories that attempt to explain the internationalization process of the firm, traditional theories fail to consider entrepreneurial behavior or the resource needs of smaller firms (Knight and Cavusgil, 2004). As a result, the RBV (Barney, 1991) has emerged as a promising framework to explain SME internationalization. Moreover, the knowledge-based view (KBV), an extension of the RBV, is the dominant theory used to explain internationalization of knowledge-intensive firms in dynamic environments characterized by highly competitive knowledge-intensive industries (Saarenketo et al., 2004). The KBV asserts that knowledge is a key factor contributing to firm internationalization (Autio et al., 2000). The KBV agrees with traditional stage theory (Autio et al., 2000; Yli-Renko et al., 2001) in that knowledge and learning are key factors contributing to firm internationalization, and firms are repositories of knowledge (Saarenketo et al., 2004).

According to the RBV, firms possess unique resources and capabilities which explain rapid internationalization (Knight et al., 2004). The RBV explains differences among firms as being due to

varying tangible and intangible firm resources (e.g., physical, human, and organizational) or differing firm capabilities in leveraging resources. SMEs have resource deficiencies unlike large firms, such as limited financial capital and a smaller complement of human capital. However, SMEs have successfully internationalized at speeds faster than resource rich multi-national enterprises (Calof and Beamish, 1995). Observed accelerated internationalization among small computer software firms indicates that technology intensive firms have not followed a sequential progression through the stages of internationalization (Bell, 1995). Given accelerated patterns of internationalization, Bell et al. (2003) contend that early internationalizing firms are typically knowledge- or service-intensive, both of which rely upon a sophisticated knowledge base.

Researchers assert that one theoretical framework does not capture the complex SME internationalization process, and evidence of accelerated SME internationalization highlights the need for research into factors influencing the internationalization of small knowledge-intensive and service-intensive firms (Rialp et al., 2005). After a decade of inconsistent findings, researchers have concluded that additional research is needed (Hitt et al., 2006). Although prior studies suggest that internationalization varies across service categories (Javalgi et al., 2003; Styles et al., 2005), the lack of research on service internationalization is striking when considering the contribution of professional services to worldwide employment, production, and trade (UNCTAD, 2009a; WTO, 2009). Furthermore, findings from studies of large law firms (Brock et al., 2006; Hitt et al., 2003, 2006; Kor and Leblebici, 2005) cannot be generalized.

To advance this line of research, the current study focuses on professional services, a sub-sector within services encompassing law firms, accounting firms, engineering consulting firms, and management consulting firms (UNCTAD, 2005). Professional service firms rely heavily upon intellectual property, specialist expertise, and knowledge. Intellectual capital and knowledge-based assets are key resources of professional service firms. Research on intellectual capital and knowledge-based assets deconstructs intellectual capital into human capital, structural capital (internal organizational capital), and relational capital, also referred to as customer capital (Bontis, 1998; Youndt et al., 2004). This study examines human and relational capital, intangible resources of professional services. We now focus on the theoretical background and hypotheses development.

3. THEORY AND HYPOTHESES

3.1. *Entrepreneurial Orientation and the Degree of Internationalization*

A number of researchers contend that internationalization is an entrepreneurial strategic choice (Ibeh and Young, 2001; Sapienza et al., 2006; Autio et al., 2011). Firm level entrepreneurial orientation (EO) “is demonstrated by the extent to which the top managers are inclined to take business-related risks (risk-taking dimension), to favour change and innovation in order to obtain a competitive advantage for their firm (innovation dimension), and to compete aggressively with other firms (proactiveness dimension; Covin and Slevin, 1988, p. 218). An EO was originally conceived to describe entrepreneurial processes that manifest differently depending on the context. EO would be evident as risk taking in small firms, innovation in high-tech companies, and proactiveness in large firms (Miller, 2011). Lumpkin and Dess (1996) describe EO as “the processes, practices, and decision-making activities that lead to new entry” (p. 136). International entrepreneurship, “the discovery, enactment, evaluation, and exploitation of opportunities across national borders to create future goods and services” (Oviatt and McDougall, 2005, p. 540), extends entrepreneurial new entry to a global level. In short, an EO manifests in the firms' strategic decisions to enter new international markets (Miller, 2011).

In a case study of eight ventures, firms with an entrepreneurial orientation (EO) were more likely to internationalize early as a result of an innovativeness and openness to international opportunity (Chandra et al., 2009). A study which examined privatization by the Spanish government from 1985 to 2000 found that entrepreneurial corporate venturing activity increased after privatization and resulted in greater internationalization (Romero-Martinez et al., 2010). Similarly, privatization of businesses by India's government in the early 1990s spurred entrepreneurial private ownership of start-up firms. Moreover, an entrepreneurial orientation has been shown to increase the speed of internationalization (Zahra et al., 2000). Firms possessing an entrepreneurial orientation identify and respond to environmental cues faster than competitors (Wiklund and Shepherd, 2003) and leverage market knowledge resources into market entry capabilities that maximize the speed and efficiency of entry (George et al., 2004; Grewal et al., 2011). Researchers have noted the increased speed and scope of entrepreneurial firms into international markets (Knight, 1997) and the greater scale and scope of exporting among entrepreneurial firms in

Finland (Kuivalainen et al., 2007). Evidence exists to support the positive effects of entrepreneurial firm characteristics on the choice and speed of firm internationalization in both developed and lesser-developed regions of the world (Ibeh and Young, 2001; McAuley, 1999; Zucchella et al., 2007).

With regard to small firms, size is not a barrier to internationalization (Bonaccorsi, 1992; Calof and Beamish, 1995; Katsikeas et al., 1997) and at a certain sales level, there is no difference between small and large firm export intensity (Cavusgil, 1984; Wolff and Pett, 2007). The ability to export is not a function of firm size or age, but more importantly, entrepreneurial human capital and internal resources (Westhead et al., 2001). An entrepreneurial orientation aids in overcoming size barriers for international growth (Wolff and Pett, 2007) and increases both international sales growth and market share (Fillis, 2001).

In emerging markets, the challenges are even greater. Yet, an entrepreneurial orientation aids SMEs in overcoming deficiencies by leveraging intangible resources for internationalization (Yamakawa et al., 2008). In fact, entrepreneurial capabilities are known drivers of entrepreneurial economic activity and may even be more important than tangible firm resources in emerging markets (West et al., 2008). As a result of the growing research on SME internationalization, entrepreneurship has been confirmed as a driver of internationalization among manufacturing SMEs (O'Cass and Weerawardena, 2009), new venture internationalization in the emerging market of China (Yiu et al., 2007), and is expected to be a driver of internationalization among India's professional service SMEs.

Hypothesis 1: A professional service SME's entrepreneurial orientation is positively related to the firm's speed and scale of internationalization.

3.2. Human Capital and the Degree of Internationalization

Human capital is the intelligence, skills, tacit knowledge, and expertise of human actors in an organization (Bollen et al., 2005). Human capital resources include the "training, experience, judgment, intelligence, relationships, and insight of individual managers and workers in a firm" (Barney, 1991, p. 101). Unlike individual personality traits, which have a less certain impact on entrepreneurial outcomes, human capital can be developed over time and transferred between individuals (Wright et al., 2010). A recent meta-analysis differentiates human capital into two distinct conceptual categories: (1) human capital investments, which include education and work experience, and (2) outcomes of human capital investments, which encompass acquired knowledge and skills that are related to specific tasks, such as running a business venture (Unger et al., 2011). More importantly, it is the latter outcomes of human capital that have a significant relationship with firm profitability and growth. In entrepreneurship literature, human capital is known to enhance the discovery and exploitation of business opportunities (Shane and Venkatraman, 2000). Thus, human capital enables the recognition, exploitation, and successful growth of business ventures.

Professional service firms rely heavily upon intellectual property, specialist expertise, and knowledge, which are key intangible drivers of internationalization (Erramilli and Rao, 1993). Although professional service SMEs possess a liability of "foreignness" when entering new markets, knowledge barriers to internationalization can be overcome with experience (Lu and Beamish, 2001). Managers with international experience rely upon experiential knowledge to identify professional service opportunities, decide which markets to enter, and how to manage the internationalization process. Both international stage theory (Johanson and Vahlne, 1977) and the "born-global" view (Knight and Cavusgil, 2004) agree that knowledge contributes to firm internationalization. Furthermore, international experience has been identified as a driver of SME internationalization (Javalgi and Todd, 2011; Crick and Jones, 2000).

With regard to professional services, a study of U.S. professional law firm expansion confirmed that human resources facilitate greater international market scope (Kor and Leblebici, 2005). Research suggests that human capital compensates for the lack of resources in small firms (Westhead et al., 2001), and knowledge intensity is a known predictor of international sales and growth (Autio et al., 2000). Knowledge intensive new ventures that possess unique resources exhibit a greater tendency for internationalization (Bloodgood et al., 1996). The rapid internationalization of "born-global" firms (Knight and Cavusgil, 2004) also suggests that knowledge or prior experience accelerates internationalization (Calof and Beamish, 1995; Knight et al., 2004). "Born-global" firms in Denmark and the U.S. attribute their success to leveraging intangible resources comprised of skills and managerial experience (Knight et al.,

2004). A body of prior research also supports the positive effect of human capital on SME internationalization (Autio, et al., 2000; Bell, 1995; Calof and Beamish, 1995; Ruzzier et al., 2007). Given the resource constraints of smaller firms and the skills needed to deliver customized professional services in SMEs, human capital is a key strategic resource and the source of knowledge for SME internationalization.

Hypothesis 2: A professional service SME's human capital is positively related to the firm's speed and scale of internationalization.

3.3. Relational Capital and the Degree of Internationalization

A professional service SME's relational capital is the value of firm-specific professional service relationships created by human capital. Relational capital extends the concept of customer capital, defined as an organization's relationships, interactions, and intimacy with customers (Stewart, 1994). Relational capital also encompasses knowledge of marketing channels, suppliers, and customer relationships (Bontis, 1998). Marketing literature cites relational capital as a valuable resource (Srivastava et al., 1998). Social exchange literature further defines relational capital as the personal relationships parties develop through interactions over time (Nahapiet and Ghoshal, 1998). Similar to the marketing literature, the social exchange literature states that relational capital creates value through the exchange of information for knowledge creation.

Professional service client relationships are a source of foreign market knowledge which is used to create customized local service products. In this manner, relational capital enhances the success of international ventures (Thuy and Quang, 2005). Relationships aid global market penetration, accelerate cash flows, and reduce costs (Srivastava et al., 1998). In the case of professional services, studies of Australian knowledge-based service exporters cite high levels of customer relationship skills as key drivers of international success (Styles et al., 2005). Greater customer involvement enhances both knowledge intensity and international sales growth (Yli-Renko et al., 2002).

A study that compared relationships with distributors in the UK and Australia found that relationships enhance export sales growth (Styles and Ambler, 2000). Recent research which examined SME knowledge resources also confirmed that the development of relationships in foreign markets facilitates SME internationalization (Zahra et al., 2007). The inimitable and non-substitutable nature of relational resources enhances export expansion and success (Morgan et al., 2006). Additionally, international business research supports the view that relational capital resources contribute to the delivery of value to global customers (Leonidou and Kaleka, 1998). In the context of customized professional services where relationship capital is enhanced from knowledge and satisfaction of clients' needs, international expansion of professional service SMEs is more likely to be successful.

Hypothesis 3: A professional service SME's relational capital is positively related to the firm's speed and scale of internationalization.

3.4. Human Capital and Relational Capital

Human capital creates relationship capital and without human capital, relational capital does not exist. Human capital creates valuable professional service relationships by understanding and satisfying customers' unique needs. Relational capital is a consequence of knowledge dissemination between parties, and as such, knowledge sharing enhances value (Bapuji and Crossan, 2005); thus, relational capital is created and its value is enhanced by human capital. The greater the service and customer knowledge possessed by the firm's human capital, the greater the development of relationship capital (Bollen et al., 2005). Human capital nurtures and enhances relational capital by drawing upon the specific skills and knowledge of professional service employees to provide satisfied, long-term client relationships. As clients' professional service needs increase with greater complexity, wealth, and geographic expansion over time, highly-skilled professional service human capital strengthens relational capital by satisfying a greater variety of customers' needs, which in turn, facilitates SME growth and international expansion to new markets.

In the case of professional services, a study of the relationship between clients and consultancy firms in London substantiates that the competence of the individuals involved in the exchange is crucial to

determining the quality and development of the relationship (Karantinou and Hogg, 2007). Even in the emerging market cultural context of Taiwan, human capital and relationship capital facilitated goal achievement and enhanced value by establishing relationships with external stakeholders (Tseng and Goo, 2005). Human capital enhances relationship capital (Bontis et al., 2000). Furthermore, as a result of increased interest in human capital, recent research has examined various models containing human capital and relational capital to clarify the relationships among intellectual capital components (Cabrita and de Vaz, 2008). Results of this research indicate that human capital has a significant and substantial effect on relational capital.

Hypothesis 4: A professional service SME's human capital is positively related to the firm's relational capital resource.

4. METHODS

4.1. Sample and Data Collection Procedure

4.1.1. Database of SMEs in the Emerging Market of India

To test the four hypotheses, data was collected from professional service SMEs in the emerging market of India. We selected this country for this study because SMEs in emerging markets, such as India, face considerable challenges and governmental support programs are relatively recent. In the early 1990s, the Indian government began encouraging entrepreneurial activities among small businesses in recognition of the important role of SMEs in the global and national economy (Todd and Javalgi, 2007). Consequently, India is now the world's largest ICT exporter and is ranked among the top 10 nations in world exports of several service sectors (WTO, 2009) and small business sectors (Venkataramanaiah and Parashar, 2007). Growth of India's services has been fuelled by SMEs. Output of India's 12.34 million SMEs grew by more than 50% between the years 2002 to 2006 (Karmakar, 2007) and accounted for 40% of exports (UNCTAD, 2008b). Insight into factors contributing to the international growth of India's SMEs would be useful for identifying policies that encourage economic development in emerging markets. When examining entrepreneurship in emerging economies, India has been the focus of only one study from 1990 to 2006 (Bruton et al., 2008).

Although there is no generally accepted definition of a SME, entrepreneurship literature most commonly uses the definition provided by the Small Business Administration (Oviatt and McDougall, 1994), which defines SMEs as independent enterprises with less than 500 employees. Classification of firms with fewer than 500 employees is also congruent with SME characteristics deemed appropriate by researchers (Leonidou et al., 2004; Lu and Beamish, 2001) and in accordance with the North-American Industrial Classification System (NAICS). According to an in depth examination of SMEs, the established definition of a SME is a smaller firm employing 500 or less employees, and/or having sales turnover less than \$25 million U.S. dollars (Leonidou et al., 2004; all monetary units noted in this study are expressed in US dollars).

In contrast to large firms, SMEs have limited financial and managerial resources (Hoskisson et al., 1994) which may impede growth and foreign expansion. SMEs face not only the same challenges as larger firms, but also potential deficiencies in resources not present in larger firms (Bilkey and Tesar, 1977; Westhead et al., 2004). Small businesses and large businesses are different species (Shuman and Seeger, 1986).

A descriptive profile of the sampling frame requirements (e.g., firm size and ownership) was provided to a research firm located in Mumbai, India. The database was comprised of the following sources: business membership web sites, city-wide data of IT companies, service publications, service and business-related journals, professional service business associations and professional associations of architects, chartered accounts, medical professionals, and law practitioners. Survey respondents were randomly chosen from a SME database of 4,572 contacts which was reviewed for accuracy. The total database was reduced by 32% due to an SME being incorrectly classified or a lack of complete contact information. Among the sample frame of 3,127 data points, 1,112 SMEs or 36% were randomly sampled and initially contacted.

Prior to mailing the survey, respondents (one per firm) were pre-qualified by phone to verify: (1) professional service classification, (2) international business involvement, (3) employee size less than 500, and (4) the respondent as being the owner, CEO, or key international management executive.

Among the 1,112 firms contacted, 730 or 66% were confirmed as meeting sample requirements. Of the 448 surveys forwarded to willing respondents, 199 surveys were returned for a 28% response rate. An overall 6.4% rate of response was obtained from the original 3,127 sample frame.

4.1.2. Data Collection

Responses returned were from the following regions: West India 54%, South India 21%, North India 19%, Central India 3%, and East India 2%. The sample included the following service sector distribution: 54% computer and information technology, 24% management consulting, 5% architecture and engineering, 5% health services, 4% financial services, 2% real estate, 2% accounting or payroll, 2% legal, and 2% entertainment and tourism services. Some sectors and regions were more heavily represented due to: (1) the difficulty of obtaining responses from privately owned SMEs, and (2) strong growth in specific sectors supported by government privatization policies and liberalization of the Indian economy in the late 1980s.

5. VARIABLES AND MEASURES

5.1. Degree of Internationalization.

Degree of internationalization (DOI) was measured using two items to capture the *scale* and *speed* of internationalization. The two items are based upon research which differentiates between firm internationalization and financial performance (Contractor et al., 2007; Elango, 2006; Kumar and Singh, 2008; Lu and Beamish, 2001, 2004; McDougall and Oviatt, 1996; Pla-Barber and Escriba-Estevé, 2006). The first item measures the scale of internationalization as the percentage of foreign sales to total sales (Contractor et al., 2007; Kumar and Singh, 2008; Lu and Beamish, 2001; McDougall and Oviatt, 1996). This item asks respondents to "Estimate the percentage of your company's total sales which are attributable to foreign sales."¹ Respondents selected from a scale ranging from 1 to 6 to indicate the total percentage of sales attributable to foreign sales as follows: 1 (less than 5%), 2 (6 to 10%), 3 (11 to 24%), 4 (25 to 49%), 5 (50 to 74%), and 6 (over 75%). The second item, speed of internationalization, asks respondents to provide the firm's percent growth in foreign sales compared to competitors since the start of international activities (Autio et al., 2000; Oviatt and McDougall, 2005; Wagner, 2004; Zhou, 2007). Respondents indicated their foreign sales growth by selecting from a range of 1 (much worse) to 7 (much better). The growth rate of international sales captures how quickly foreign revenues increase, thereby addressing one aspect regarding the speed of internationalization deemed important to understanding accelerated internationalization (Oviatt and McDougall, 2005).

5.2. Entrepreneurial Orientation

We employed the most widely used measure of entrepreneurial orientation (EO) (Rauch et al., 2009; Slevin and Terjesen, 2011) based upon the work of Naman and Slevin (1993), Covin and Slevin (1989), and Hult et al. (2004). The 5 item scale is a measure of entrepreneurial orientation at the firm level. The response format requires that the respondent select a response on a scale ranging from 1 to 7, where 1 indicates that the respondent strongly disagrees with the statement, and 7 indicates that the respondent strongly agrees with the statement. The items capture the respondent's belief that wide-ranging acts are necessary to achieve objectives, the firm initiates actions to which other organizations respond, the firm is fast to introduce new products and services to the marketplace, the firm has a strong proclivity for high-risk projects, and whether the firm is bold in its efforts to maximize the probability of exploiting opportunities. Construct validity of the scale has been established using confirmatory factor analysis, and invariance across cultures has been confirmed (Knight, 1997). Reliability of the scale has been established in prior studies with Cronbach alphas ranging from .77 to .88 (Hult et al., 2004; Hult et al., 2003; Hult et al., 2002; Naman and Slevin, 1993; Covin and Slevin, 1989).

5.3. Human Capital

The human capital (HC) scale utilizes five items to measure the skill, knowledge, and abilities of employees (Subramaniam and Youndt, 2005). The scale was developed from human capital and strategic human resource management literature and has been tested in more than 100 industries including services (Subramaniam and Youndt, 2005; Snell and Dean, 1992; Youndt et al., 2004). A Cronbach alpha of greater than .80 has been reported across several studies. The scale response format ranges from 1 to 7, where 1 indicates the respondent strongly disagrees with the statement and 7

indicates strong agreement. The items ask respondents to indicate their degree of agreement that employees: (1) are highly skilled, (2) are widely considered the best in the industry, (3) are creative and bright, (4) are experts in their particular jobs and functions, and (5) develop new ideas and knowledge.

5.4. Relational Capital

Relational capital (RC) was measured with a scale developed to capture a firm's relational resources viewed as the number, strength, and quality of relationships with key customers and channel members (Morgan et al., 2006). The scale consists of 4 items with a response format ranging from 1 to 7, where 1 indicates that the firm's relational resources are much worse than their major competitors' relational resources and 7 indicates that the firm's relational resources are much better than competitors' relational resources. Specifically, respondents were asked four questions regarding the strength of existing customer relationships in the export market(s), the quality of channel relationships in the export market(s), the duration of relationships with current distributors, and the closeness of existing customer relationships. A Cronbach alpha of .79 was reported in a prior examination of export venture relational resources in the UK and Germany (Morgan et al., 2006).

5.5. Control Variables

The following control variables were included since prior research suggests that these factors may affect a firm's degree of internationalization (Calof and Beamish, 1995; Li and Atuahene-Gima, 2001; Litz, 1997): industry sector (representing the industries noted in section 4.1.2) which included firm size (number of employees), firm age (number of years in business), and international experience (years of international business experience).

6. METHOD OF ANALYSIS AND RESULTS

6.1. Analysis

Prior to factor analysis and review of the reliability and validity of measures, the correlation matrix was examined for multicollinearity and appropriate correlation magnitude (Tabachnick and Fidell, 2007). Next, a multiple step structural equation modeling (SEM) process was undertaken. Dimensionality, reliability, and validity of the measures were tested using a measurement model and confirmatory factor analysis (CFA). Upon satisfactory evidence of the scales' psychometric properties, the hypothesized model relationships were empirically tested. SEM involves causal analysis whereby a model is evaluated against patterns of relationships among the collected data.

SEM analysis involves up to three sages. First, the conceptual model is developed. Second, the conceptual model is converted into a measurement model which specifies the relationships between variables.² The measurement model is assessed for unidimensionality and reliability of measures. Although Cronbach's alpha is typically used to assess reliability, this measure does not ensure unidimensionality (Cronbach, 1951). Third, the structural model is created for testing the model fit to the data. Goodness-of-fit criteria are used to assess the structural model.

Review of the bi-variate correlations (see Table 1) for all means, standard deviations, and correlations indicated sufficient correlation between variable pairs for factor analysis and that multicollinearity was not a problem. High means for human capital and relational capital substantiate the highly-skilled nature of India's professional service SMEs and strong relationships. The Kaiser-Meyer-Olkin result of the partial correlations among variables was computed as a second test of factorability and sample adequacy. The Kaiser-Meyer-Olkin measure of 0.88 is above a 0.60 level, indicating appropriate correlation of variables to perform factor analysis and reliability tests (Tabachnick and Fidell, 2007). As expected, an entrepreneurial orientation ($r = .36$; $p < 0.01$), human capital ($r = .28$; $p < 0.01$), and relational capital ($r = .41$, $p < 0.01$) were significantly correlated with SME internationalization.

Table 1
Means, Standard Deviations, and Bi-variate Relationships

	Mean	s.d.	1	2	3	4	5	6	7
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1. Age	10.04	12.13							
2. Industry Sector ¹	-	-	.09						
3. Number of Employees	37.00	25.00	.18 [*]	-.16 [*]					
4. International Experience (Years)	2.84	1.26	.32 ^{**}	.12	-.05				
5. Entrepreneurial Orientation	5.19	.88	-.02	-.14 [*]	.07	.06			
6. Human Capital	5.68	1.13	-.10	-.08	-.02	.01	.42 ^{**}		
7. Relational Capital	6.24	.84	-.00	-.13	.06	.05	.38 ^{**}	.44 ^{**}	
8. Degree of Internationalization	4.57	.98	.08	-.23 ^{**}	.30 ^{**}	.10	.36 ^{**}	.28 ^{**}	.41 [*]

*p < 0.05; ** p < 0.01

No means and standard deviations are provided as the service industry sector was measured as a categorical variable.

Inspection of the detrended normal plots indicated a slight data non-normality, which was confirmed by the Kolmogorov-Smirnov and Shapiro-Wilk normality tests. Examination of data found constructs and items negatively skewed and possessing a positive kurtosis. Strong kurtosis and skewness is often the cause of non-normality. In accordance with structural equation modeling of non-normal multivariate data, a bootstrap technique was employed (Byrne, 2001). To increase robustness, analysis of outliers was conducted by examining the Mahalanobis distance of data points. Next, measurement model results were compared to results with outliers removed. Fit indices and the chi square (χ^2) statistic with outliers removed indicated that the model fit did not significantly improve, and in fact, reduced the fit of the model. Therefore, inclusion of outliers does not negatively affect the hypothesized model's predictive ability. The next step undertaken was to assess the reliability and validity of the measures.

Prior to CFA using structural equation modelling, reliability and dimensionality were reviewed by examining Cronbach alpha magnitudes and item factor loadings. The scale items, average variances extracted, composite reliabilities, factor loadings, eigenvalues, and variance inflation factors for all scales are provided in Table 2. Composite reliabilities were above the recommended 0.70 level (Anderson and Gerbing, 1988; Fornell and Larcker, 1981), and average extracted variance exceeded the 0.50 threshold (Anderson and Gerbing, 1988; Hair et al., 1998). Reliability was established since all scale Cronbach alphas were above 0.70 (Nunnally, 1967). All scales exhibited convergent and discriminant validity as evidenced by correlations with an acceptable range, high reliabilities, no high factor cross-loadings, and unidimensionality (Tabachnick and Fidell, 2007). Furthermore, all scales possessed acceptable psychometric properties as exhibited by appropriate correlation of variables, reliability among variables, and distinctly separate constructs with no strong evidence of multicollinearity.

Table 2
Factor Analysis and Reliability Measures

Scale Items	Factor Loadings ¹			
Entrepreneurial Orientation (EO)	EO	HC	RC	DOI
1. We believe that wide-ranging acts are necessary to achieve our objectives.	.733	.180	.112	-.173
2. We initiate actions to which other organizations respond.	.741	.085	.044	.142
3. We are fast to introduce new products and services to the marketplace.	.719	.140	.178	.083
4. We have a strong proclivity or tendency for high-risk projects.	.731	.137	.233	-.026
5. We are bold in our efforts to maximize the probability of exploiting opportunities.	.778	.243	.100	.013
Human Capital (HC)				
1. Our employees are highly skilled.	.140	.895	.239	.040
2. Our employees are widely considered the best in our industry.	.216	.866	.100	-.060
3. Our employees are creative and bright.	.205	.895	.207	.018
4. Our employees develop new ideas and knowledge.	.131	.916	.193	-.006
5. Our employees are experts in their particular jobs and functions.	.214	.863	.200	-.025
Relational Capital (RC)				
1. Strength of existing customer relationships	.126	.192	.915	.057
2. Quality of our channel relationships	.221	.224	.844	.072
3. Duration of relationships with our current distributors	.177	.190	.853	.080
4. Closeness of existing customer relationships	.138	.201	.914	.035
Degree of Internationalization (DOI)				
Scale: Estimate of the percentage of the firm's total sales which are attributable to foreign sales	.078	.058	.130	.886
Speed: Firm's foreign sales revenue growth since the start of international activities comparable to competitors	-.031	-.083	.038	.899
Eigenvalue	2.87	4.27	3.39	1.40
Average Extracted Variance	.59	.86	.85	.70
Cronbach Alpha	.89	.96	.96	.89
Composite Reliability	.89	.97	.96	.82

¹ Bold items indicate primary factor.

6.1.1. Measurement Model Analysis

Next, the measurement model was estimated using the covariance matrix of the indicators for the exogenous and endogenous constructs as input. We assessed dimensionality of the scales and convergent and discriminant validity of the measurement model in accordance with Anderson and Gerbing (1988). We used confirmatory factor analysis to evaluate the measurement model fit employing the Delta2 index and the comparative fit index (CFI), the recommended indices since sample size and degrees of freedom are considered (Gerbing and Anderson, 1992; Hu and Bentler, 1999). The measurement model possessed an acceptable fit with a Delta2 index of 0.98 and a CFI of 0.98 with all model item path coefficients significant (Gerbing and Anderson, 1992; Hu and Bentler, 1999), indicating convergent validity. All correlations among factor constructs were significantly different from 1.0 and not significantly above 0.70, the maximum acceptable level before excessive multicollinearity exists (Tabachnick and Fidell, 2007). Thus, discriminant validity was established. Examination of standardized residuals also confirmed an appropriate fit with no statistically significant residuals. Given an acceptable fit, the measurement model was then converted to a structural equation model to depict the relationships between the manifest indicators and latent variables. With regard to controls, only firm size and industry sector had significant effects on the DOI.

6.1.2. Common Method Bias

Common method bias was examined using the techniques outlined in the literature (e.g., Podsakoff et al., 2003). First, wording of the items were tested in the sample market to ensure their clear meanings. Second, the measurement model was compared with another measurement model by adding a common method factor *ex post*. The two statistical models are similar in fit indices, showing no potential for common method bias (Williamset al., 1989; Podsakoff et al., 2003). Third, since cross-sectional data were collected, a Harman one-factor test (Gerbing and Anderson, 1992) was also undertaken if the results were inflated due to a common method variance test. Results of the one factor test indicated that the dependent variable was not subject to method bias.

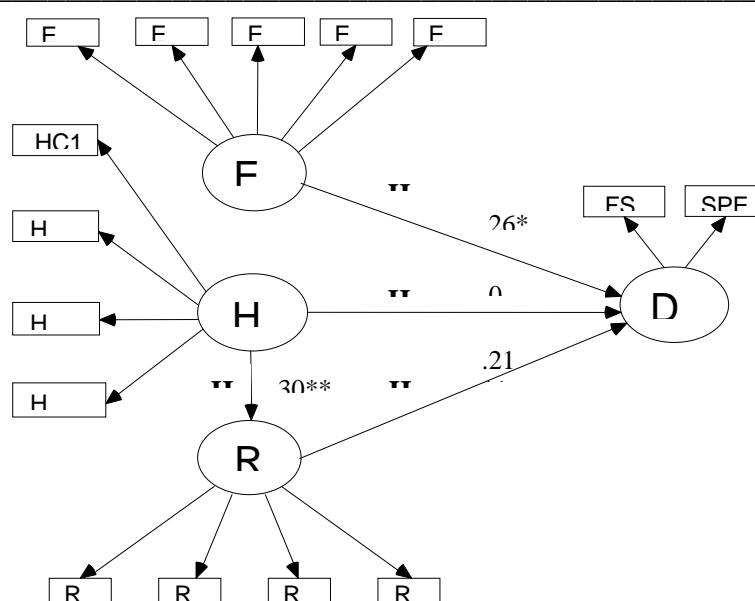
6.2. Hypothesis Tests

To test the hypothesized model relationships, AMOS structural equation modeling software (Arbuckle, 1999) was used with maximum likelihood estimation, the recommended method with sample sizes of 100 to 200 (Tabachnick and Fidell, 2007). Before assessing the individual parameters, the overall fit of the observed data to an *a priori* model was examined. Structural equation modeling relies upon non-significance of a difference between the covariance matrix derived using the hypothesized model and the covariance matrix derived from the sample. The χ^2 test is the most common fit measure recommended with samples of 100 to 200 (Tabachnick and Fidell, 2007). A rule of thumb states that the χ^2 divided by the degrees of freedom should be less than 2. However, since the χ^2 statistic is sensitive to sample size, additional measures of overall fit must be used. Research by Gerbing and Anderson (1992) finds the Delta2 index and CFI as the most stable and robust fit indices for model evaluation.

6.2.1. Robustness tests

Analysis involved estimation of three competing models, a full model with direct and indirect effects (M3), a mediation model (M2), and a direct effects only model (M1). The full model (M3) is the hypothesized model depicted in Figure 1 with direct links from EO, RC, and HC to DOI and an indirect link from HC to RC and then to DOI. The nested model M2 is similar to M3 except the direct link from HC to DOI is constrained to zero in order to examine the potential mediation effect of HC via RC to DOI. The last model estimated, M1, contains only direct effects of EO, RC, and HC on DOI.

Figure 1
Structural Equation Model with Standardized Parameter Estimates



* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

RC = Relational capital
 HC = Human capital
 EO = Entrepreneurial orientation
 DOI = Degree of internationalization
 FSTS = Percentage of foreign sales to total sales
 SPEED = Foreign sales revenue growth

As Table 3 indicates, pathways of all latent constructs in all models are significant except for the relationship between human capital and a SME's degree of internationalization. Next, measures of fit provided in Table 4 were examined. Goodness of fit indices for M3 establish an acceptable model fit ($\chi^2 = 149.36$ and d.f. = 100; $\chi^2/\text{d.f.} = 1.49$; Delta2 = 0.98; CFI = 0.98; RMSEA = 0.05; RMR = 0.08; GFI = 0.92; AGFI = 0.88; TLI = 0.97; NFI = 0.94) and a parsimonious model PRATIO = 0.74; PNFI = 0.69; PCFI = 0.72; (Hu and Bentler, 1999; Hair et al., 1998). Given the non-significant relationship of human capital with a SME's degree of internationalization, a competing direct effects only model (M1) was considered. Fit measures of M3 were superior to M1 on virtually every fit index (see Table 4). To further support model M3, a mediation test was undertaken.

Table 3
Model Comparison Pathway Estimates

Path	Model M1 <i>Direct Effects Only</i>		Model M2 <i>Mediation Model</i>		Model M3 <i>Full Model</i>	
	Standardize d estimate	t- value	Standardize d estimate	t- value	Standardize d estimate	t- value
EO → DOI	.26*	2.13	.28**	2.36	.26*	2.31
HC → DOI	.03	1.06			.03	1.01
RC → DOI	.22*	2.24	.23**	2.44	.21**	2.43
HC → RC			.30**	6.10	.30**	5.98
fte → DOI ^a	.25**	4.94	.25**	4.87	.25**	4.90
yrbe → DOI ^a	.08	1.03	.08	1.06	.08	1.06
age → DOI ^a	.00	.17	.00	.17	.00	.16
indus → DOI ^a	.06**	2.43	.06**	2.36	.06**	2.37

* p < 0.05 level; ** p < 0.01 level.

Path for control variables.

EO = Entrepreneurial orientation

HC = Human capital
 RC = Relational capital
 DOI = Degree of internationalization
 Firm size as fte = Full-time employees
 yribe = Years of international business experience
 age = Firm age since inception
 indus = Industry sector

Table 4
Tests of Models and Mediation

Model Fit Indices	Model M1 <i>Direct Effects Only</i>	Model M2 <i>Mediation Model</i>	Model M3* <i>Full Model</i>
χ^2	193.96	150.582	149.36
Degrees of freedom	101	101	100
$\chi^2/\text{degrees of freedom}$	1.92	1.75	1.50
p-value	.00	.00	.00
GFI	.91	.90	.92
AGFI	.86	.86	.88
PGFI	.60	.62	.60
RMR	.19	.08	.08
CFI	.96	.97	.98
NFI	.92	.93	.94
IFI Delta 2	.96	.97	.98
TLI rho2	.94	.96	.97
PNFI	.68	.71	.69
PCFI	.71	.74	.72
RMSEA	.07	.06	.05

* $\Delta\chi^2$ - Difference test between M2 and M3 nested models = 1.22 and d.f. = 1, not significant at $p < 0.05$.

6.2.1.1. Tests of Mediation

Mediation was tested (see Table 4) by employing a chi-square difference test of two nested models (Anderson and Gerbing, 1988) and by comparing the fit of the full model (M3) to a mediation model (M2). Both M3 and M2 possess acceptable fit (Hu and Bentler, 1999; Hair et al., 1998); however, when comparing individual fit indices, M2 does not possess a superior fit over M3. Furthermore, the χ^2 difference test ($\Delta\chi^2 = 1.22$ and d.f. = 1) is not statistically significant, indicating that the mediation model does not provide an improved fit over the full model (Baron and Kenny, 1986).

Second, to provide further support for our hypothesized model, we employed the logic of mediation testing outlined by Baron and Kenny (1986) which establishes three conditions: (1) the independent variable is significantly related to the mediator variable, (2) the mediator variable is significantly related to the dependent variable, and (3) the relationship between the independent and the dependent variable is reduced when both the independent variable and mediator are considered.

The first requirement that a significant relationship exists between the independent variable and the mediating variable is met since the pathway between HC and the mediating variable RC is significant (see Table 3). The second requirement that a significant relationship exists between the mediating variable RC and the dependent variable DOI is also confirmed (see Table 3). Lastly, the third requirement stipulates that the relationship between the independent variable HC and dependent variable DOI be reduced with consideration of both the mediator RC and independent variable HC. When comparing the direct effects

model (M1) and the full model (M3), results indicate that the direct path from human capital to the degree of internationalization is not significantly reduced given inclusion of the variable relational capital (see Table 3); confirming that RC does not act as a mediator. Finally, as Table 5 indicates, pathways of all latent construct items are significant. Given the acceptable measure of fit, reliability and validity of the measures, the hypothesized model (M3) was accepted and hypothesis testing is now reviewed.

6.3. Results

Table 5

Structural Equation Model Construct Indicators

Indicator	Estimate	S. E.	t-value
Entrepreneur Orientation (EO)			
EO1	.72	.12	6.24**
EO2	.99	.16	6.35**
EO3	.80	.11	7.00**
EO4	1.02	.14	7.31**
EO5	1.39	.22	6.24**
Relational Capital (RC)			
RC1	1.04	.05	20.91**
RC2	1.49	.14	10.79**
RC3	1.36	.13	10.38**
RC4	.97	.05	20.91**
Human Capital (HC)			
HC1	.88	.05	19.05**
HC2	1.08	.06	18.50**
HC3	1.24	.06	21.63**
HC4	.90	.04	21.58**
HC5 ¹	1.13	.06	19.05**
Degree of Internationalization (DOI)			
FSTS	.33	.12	2.77*
Speed	3.03	1.09	2.77*

* $p < 0.01$; ** $p < 0.001$

HC5 item dropped during Structural Equation Modeling.

The standardized parameter estimates of the relationships between latent constructs shown in Figure 1 revealed that an entrepreneurial orientation has a significant positive relationship with a SME's DOI ($\beta = 0.26$, $t = 2.31$, $p < 0.01$), supporting H1. However, the relationship between human capital and a SME's DOI was not significant ($\beta = 0.03$, $t = 1.01$); therefore, H2 was not supported. As expected, relational capital was found to have a positive significant relationship with a SME's DOI ($\beta = 0.21$, $t = 2.43$, $p < 0.01$) in support of H3. Consistent with the hypothesized relationship between human capital and relational capital, support was found for H4 ($\beta = 0.30$, $t = 5.98$, $p < 0.001$). Figure 1 shows the structural equation model with path coefficients and their significance levels.³

7. DISCUSSION

The purpose of this study was to investigate the key intangible resource drivers and speed of professional service SME internationalization in the emerging market of India. Empirical findings support the positive effect of an entrepreneurship orientation on internationalization as a force that aids in leveraging intangible resources for SME's internationalization in an emerging market (Yamakawa et al., 2008). Furthermore, the development of relational capital by service professionals was found to be a factor in determining the contribution of human capital to SME internationalization. As expected, human capital was found to have a significant positive relationship with a SME's relational capital (Bollen et al., 2005; Bontis, et al., 2000; Cabrita and de Vaz, 2008; Karantinou and Hogg, 2007; Tseng and Goo, 2005), which in turn, has a positive effect on a professional service SME internationalization. However, although relational capital was confirmed as facilitating international expansion (Leonidou and Kaleka, 1998; Morgan et al., 2006; Srivastava et al., 1998; Styles and Ambler, 2000; Thuy and Quang, 2005; Zahra et al., 2007), the effect of human capital on SME internationalization was not significant nor mediated by relational capital. Therefore, contrary to expectations, human capital of India's professional service SMEs did not have a significant direct effect on internationalization. These results indicate that human capital is a facilitator of professional services international expansion (Hitt et al., 2006) via development of relationships with foreign market customers and channel partners. International growth requires professional service human capital to possess strong relationship-building skills. The ability to build strong service relationships is critical for acquiring customers in new foreign markets or retaining customers when service firms follow clients into new international markets.

The findings of this study suggest that the effects of human capital are complex and require a fit between investments in human capital and service sophistication (Sirmon et al., 2007). Specifically, sophisticated services, which are tailored to customers' needs, use substantial information that is transferred between the client and the service provider and require sizeable investments in knowledgeable employees. In the case of professional services, employees must possess sophisticated service product knowledge and the ability to develop relationships that are both specific to the foreign market business sector and culture. Therefore, firms must invest in human capital to develop and leverage knowledge resources that are specific to the foreign market culture and service sector. In this case, India's accelerated SME expansion has been aided by the development of relationship capital, which provides knowledge of customer preferences, improves responsiveness to customer needs, lowers new customer acquisition costs, reduces service maintenance, creates premium-priced service value, develops barriers to entry, and permits brand category extensions (Srivastava et al., 1998).

Sample descriptives provide compelling evidence that the speed and scale of India's professional service SME internationalization is also accelerated. The average age of SMEs sampled was 10 years, of which 37% were international at inception and 82% having internationalized within 5 years. With regard to scale, the majority or 62% of SMEs offer services in 1 to 4 countries, 23% are involved with 5 to 8 countries, and 2% of the remaining SMEs offering services in more than 25 foreign countries. Annual revenues are also moderate to strong with 79% earning annual sales of up to \$999,999, 13% reporting \$1 million to just below \$5 million in annual sales, and 8% exceeding \$5 million in annual sales. Examination of foreign revenue reveals that more than 27% have experienced a foreign revenue growth rate of over 20% during the three years preceding the survey. The majority or 61.7% have established a wholly owned subsidiary, 15.4% are involved in joint ventures, 17.9% export professional services, 4% have licensing arrangements, and 1% have established international franchises. Thus, the majority of SMEs sampled have established a wholly-owned subsidiary abroad.

As is evident, this study dispels the notion that resource constraints of smaller firms limit successful international growth and confirms that size is not a barrier to internationalization (Calof and Beamish,

1995). More importantly, findings indicate that India's professional service SMEs experience strong foreign sales growth and accelerated international expansion early, which is contrary to the traditional stage theory of internationalization (Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977). When examining service sectors in this study, profitable accelerated SME international expansion is particularly evident in India's high technology service sectors, and as expected, internationalization was confirmed as varying across service categories (Javalgi, et al., 2003; Styles et al., 2005).

With regard to knowledge-based resources, entrepreneurial behavior of India's human capital propels emerging market SMEs to profitable positions in competitive global markets; hence, resources explain rapid internationalization (Knight et al., 2004). Clearly, the ability to leverage human capital resources in professional services is a key contributor to successful international expansion. Historically, leveraging human capital has involved increasing the ratio of support staff to professional employees, as in the case of U.S. law firms in an effort to generate more revenue per partner (Sherer and Lee, 2002). This leveraging of a scarce resource in law firms resulted in institutional change that was legitimized by firms and government institutions. Institutional acts, such as privatization and liberalization, may serve as mechanisms that enable leveraging of assets for economic growth. Examination of the productivity of India's private versus government-owned firms over 25 years suggests that the decline in state-owned firms has caused a significant increase in the productivity of human resources in India (Majumdar, 2007). Measures of employee input to economic output have risen dramatically over the period of liberalization, substantiating an increase in the creation of economic value per employee (Majumdar, 2007). As this study suggests, development of highly-skilled, entrepreneurial human capital that has been nurtured through government supported privatization and an educational emphasis on engineering and information technology, has positioned India to become a leader in global information technology trade. Therefore, the observed differences in the degree of internationalization of SMEs in this study may be due to sector or regional institutional economic policies in India.

8. LIMITATIONS AND FUTURE RESEARCH

Due to the cross-sectional industry sampling methodology, generalizability of findings is limited. Replication of this study in other emerging markets is needed to affirm cross-national invariance (Hansen et al., 2011) and to understand how culture affects entrepreneurial behavior (Hitt et al., 2006). For example, countries exhibiting higher levels of collectivism exhibit lower levels of venture activity even after consideration of institutional and economic factors (Li and Zahra, 2011). However, risk-taking new business initiatives are evidenced in the high uncertainty avoidance cultures in the emerging economies of Brazil, China, India and Thailand (Khanna, 2008). Thus, the collectivist nature of India's society (Hofstede, 1983) may pre-dispose India's human capital to relationship-building capabilities, which would represent a national advantage. More importantly, differing cultural propensities of human capital for developing relationships may exist and yield different service outcomes in various global contexts. Although cultural and institutional dispositions toward entrepreneurial activities have been documented in the emerging markets of Bulgaria, Hungary, and Latvia (Manolova et al., 2008), these factors may have varying effects in determining the propensity of human capital to seek international opportunities or create valuable relationships given each service sector's nuances.

What other factors may have contributed to India's service SME growth? An examination of institutional factors warrants attention since institutional theory may provide insight into emerging economies (Coviello et al., 2011; Hoskisson et al., 2000; Slevin and Terjesen, 2011). The strategic choices of entrepreneurial firms are a reflection of the institutional framework that entrepreneurs face. The model in this study should be tested in differing institutional contexts to examine potential effects of governmental and economic policies since country environments differ in promoting entrepreneurship (Manolova et al., 2008). Institutional frameworks may enable or constrain international entrepreneurship and offer a complementary view to the RBV and the results obtained in this study (Peng et al., 2008). However, institutional policies to stimulate venture capital activities may be less effective in collective societies (Li and Zahra, 2011). Lastly, prospect theory may also provide insight into why entrepreneurial behavior exists in emerging markets, since individuals may increase risky behavior when their future is bleak (Slevin and Terjesen, 2011).

9. CONCLUSION

Does privatization and liberalization motivate international entrepreneurship and economic growth in an emerging market? There are lessons to be learned from emerging markets. The findings from this study of professional service SMEs in India provide evidence of a changing global service landscape. India has emerged a leading contributor to global service trade and now possesses a comparative advantage in services (UNCTAD, 2008c). Privatization of state owned enterprises transforms industries, economies, and firms by encouraging entrepreneurship and gains access to resources (Aulakh and Kotabe, 2008) through increased foreign ownership of domestic firms for economic stimulus. Findings from this study suggest that greater institutional economic freedom encourages entrepreneurial new services in a market-based economy (Gohmann et al., 2008). As a result of profitable international expansion, outflows of foreign direct investment (FDI) from India are the largest from the South-East Asian Region (UNCTAD, 2008b) and India is ranked third among the most attractive locations for FDI (UNCTAD, 2009b). India's impressive growth has been nurtured by governmental trade policies and the establishment of the 2005 Special Economic Zone (SEZ) Act to promote exports. By 2009, SEZs created over 890,700 jobs and FDI resulted in robust growth in the electrical equipment, services, and telecommunications sectors (Jhamb and Kaushik, 2008).

Yet, questions remain. Do institutional policies alter the capabilities of human capital? Are certain cultures predisposed to entrepreneurship? Or does an entrepreneurial orientation inherently exist within human capital, since a firm is only a configuration of "the humanly devised constraints that structure human interactions" (North, 1990; p. 3). What triggers entrepreneurial behavior, and how does EO manifest in the capabilities of professional human capital? How is entrepreneurial behavior managed over time as the firm grows in size (Slevin and Terjesen, 2011)? Is EO a pervasive response found in all successful firms (Wales et al., 2011) and are there varying degrees of entrepreneurial behavior at multiple firm levels (Miller, 2011; Slevin and Terjesen, 2011; Wales et al., 2011). We believe that varying degrees of entrepreneurial attitudes and behaviors at various firm levels may be necessary for global success.

The current study's sample of SMEs indicates that firm level EO manifests in the pursuit of new international opportunities. Excessive EO at a top management level may result in extreme risk-taking and failure; whereas proactive EO at a mid-level may invoke the departure of professional service human capital to start their own business, such as when accountants and attorneys exit large firms to establish their own private practices. Alternatively, strong EO in functional areas, such as product development or customer service, may create innovative service solutions that are adapted to local market needs which in turn, build strong service relationships. An ideal EO vertical, horizontal, and temporal fit between the firm's strategy and the EO of the functional business units may provide the optimum configuration for global success (Wales et al., 2011). The effect of size in this study leads us to believe that a SME's entrepreneurial orientation may align with a wave model since India's SMEs face unstable emerging marketing conditions. We offer the perspective that SMEs cycle in and out of an entrepreneurial mode as management shifts limited resources between exploration and stabilization as the SME grows and adapts over time. We suspect that born global SMEs exhibit temporal effects and stronger levels of EO in earlier years.

In summary, smaller firms face challenges to internationalization; yet, firm size and an emerging market economy are not limiting factors. Assumptions about large versus small firms, developed as opposed to emerging economies, and the capabilities of human capital must not cloud our judgments of what drives global success. Institutional, industry, and sector specific conditions may alter resource capabilities. The dominance of industrialized nations has been challenged by the new service economy and SME positions of global dominance. Findings of this study and firms in the emerging markets of China, Turkey, and Taiwan (Khanna, 2008; Yiu et al., 2007) shed light on SME success and the reality that the current research agenda remains fertile.

An entrepreneurial orientation, highly-skilled human capital, and relational capital are key resources that enable professional service SME internationalization. These key resources have contributed to wealth creation and development in the emerging market of India. In the global marketplace, knowledge-intensive, entrepreneurial human capital is a formidable resource.

END NOTE

1. Congruent with recommendations based upon a review of EO research, the percentage of sales to new markets was used as an objective behavioral indicator of entrepreneurial new market initiatives (Miller, 2011).
2. In accordance with the recommendations to advance entrepreneurship research, entrepreneurial orientation (EO) was conceptualized as a reflective model (George and Marino, 2011).
3. The predictive power of a multiplicative EO measure was also compared to a summated EO scale (Slevin and Terjesen, 2011). To test the alternative measure, interaction effects were included in our model and found to be not significant; thus, a multiplicative EO measure does not explain a greater amount of variance.

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TWO STRONG ORGANIZATIONAL HANDS TO BRING INNOVATION OUT

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Abstract: Although the “Ambidextrous Organization” is not a new concept and contemporary literature on prior research has described it from many angles, in Serbian literature it is not sufficiently represented. Our goal is to promote ambidexterity in domestic literature as well as to introduce it to a broader audience, especially among people who lead our organizations – Serbian managers, as a concept that has already shown good results. We argue that the Ambidextrous Organization is a beneficial concept in long term for organizations in an unstable context, and that it could be a potential solution for Serbian organizations in their efforts to get out of a locked-in behavior pattern in which Serbian companies are recognized as sellers of raw / developed ideas, buyers of technology / manufacturers with cheap labor. This paper describes organizational ambidexterity from two angles: structural - usage of dual structures and strategies to separate and integrate exploitation and exploration units; and contextual - adjustment of the organizational culture – routines and policies – in order to make ambidexterity possible. As a back-up for this paper beside the literature, we used examples of successful foreign ambidexterity practices. A predominantly theoretical nature of this paper is, however, its biggest limitation.

Keywords: innovation, Ambidextrous Organization, exploration, exploitation

1. BACKGROUND: NEED FOR AMBIDEXTERITY

More than twenty years ago March (1991) has argued that *maintaining an appropriate balance between exploitation and exploration is a primary factor in systems survival and prosperity. He emphasized those adaptive processes by improving exploitation more rapidly than exploration would probably become effective in the short run but self-destructive in the long run. “Both exploration and exploitation are essential for organizations, but they compete for scarce resources, and as a result, organizations make choices between the two what in the long run could look like organizational choices between investments in learning and in consumption of the fruits of current capabilities”* (March, 1991). That competition can be considered as the fundamental tension at the heart of an enterprise’s long-term survival. *The basic problem for an organization is to engage sufficiently in exploitation to ensure its current viability, and the same time, and to invest enough energy in exploration and exploitation to ensure its future viability* (March, 1991). While exploitation and exploration represent two fundamentally different approaches to organizational learning and processing, recent literature has increasingly indicated the need for firms to achieve a balance between the two (He, Wong, 2004). This balanced view is embedded in the concept of ambidextrous organizations. *There is growing evidence to support the view that ambidexterity promotes organizational growth and adaptation* (O’Reilly, Tushman, 2007).

There is, however, some confusion in the use of the term Ambidexterity. According to Tushman and O’Reilly (2007), *ambidexterity is a specific capability embodied in senior leadership’s learning and expressed through their ability to reconfigure existing organizational assets and competences in a repeatable way to adapt changing circumstances*. Organizational ambidexterity is generally understood as a firm’s ability to simultaneously exploit and explore with equal dexterity.

Why is it important for a company to simultaneously explore and exploit? Companies (don’t) survive because of their (dis)ability to adapt to changing surrounding. Many companies from the Fortune 500 list from 20 years ago today don’t exist so the answer to question why some firms survived and some haven’t is in the fact that *the system that is structured as a core capability suited to a relatively static business environment turns into barrier in a discontinuously rapidly changing business environment* (March, 1991). *“Despite the transient efficiency of best practices, the cycle of doing “more of the same” tends to result in locked-in behavior patterns that eventually sacrifice organizational performance at the altar of organizational <death spiral>”* (Yogesh Malhotra, 2000) or success trap. An organization should not limit its activities to best usage of current knowledge base, but also must learn and gain the skills that might/will be useful in the future: *the process of organizational learning manifests itself in economically relevant innovations, i.e. in new creations*

of economic significance or either a material or an intangible kind which may be brand new, but are more often new combinations of existing elements" (Mattes, 2010).

Past innovative activities are important for future innovation because they provide a firm with a knowledge base that allows it to absorb technological competence on external sources. "An organization that doesn't explore in one period may not be able to explore in the future because of the lack of relevant knowledge" (Cohen, Levinthal, 1990).

Even if we accept that every organization for long term success should exploit (best usage of its current resources) and explore (nurturing emerging business that could grow) at the same time, another question that arises here is how to allocate people and resources from something that is successful and profitable and engage people, invest those resources in something that one day might make some profit? How to make senior management teams spend half of their time on something that might realize 5% profit, might make nothing or even losses?

*In order to have successful ambidextrous organization some conditions should be satisfied: top management must realize that the ambidextrous model is necessary for future survival of an organization and consequently have a **clear strategic intent** to implement it. Although every sub-unit would probably have its own culture, existence of the **overarching vision and values** is indispensable. A **senior team** should be **aligned and flexible** to manage ambidexterity. A common reward system should be based on **results for the entire business** (not on individual sub-units because every business is vulnerable at the beginning so competing for the same resources as traditional units and comparing results of new and old sub-units would not be fair). Subunits should be **physically separated** with targeted integration to leverage assets and capabilities. (O'Reilly, Tushman, 2007).*

Former president of "USA Today" Tom Curley avoid falling into the success trap. When his newspapers were top ranked, he established a new unit for online business. Traditional and innovation units had different standards, demands for profits. Curley maintained discipline in traditional and encouraged experimentation in new online business. He created a tool for fundamentally contrasting units, kept them physically and culturally distinct, and each reported directly to him (Tushman, Smith, Binns, 2011).

In order to be more competitive on evolving markets, we suggest that Serbian companies, at the same time with incoming of foreign investments, should adopt a new practice to simultaneously innovate and implement innovations, actually to stop current bad policy of buying new technological solutions and innovations and complementary know-how, and instead create and implement innovations themselves. It happens very often that our companies are dependent on knowledge of their foreign partners/technology sellers and that they often import technology without complementary know-how to use it. On the other side, we do have innovators individuals and many innovative companies that give/sell raw or developed ideas to third parties abroad to develop/implement them.

Lately, we have seen couple of initiatives: tight cooperation between explorative and exploitative organizations (software for rational usage of electrical energy made by Serbian company "Telvent DMS" in cooperation with Technical Faculty in Novi Sad was declared to be the best new innovative product the world in 2012.¹ and it will be hopefully implemented in Serbia too), and systematic support of exploration (building a big technology park in Indjija), but they represent the exceptions that prove the rule. The goals of this paper are to explain how those dual organizations should be designed and how to achieve that those opposite units successfully function together. Because of those initiatives in Serbia, for us it is very important to present this model just now because we argue that simultaneous exploitation and exploration should be supported from the very beginning of such initiatives. Any interruption in innovative streams can lead to difficulty with completing future project, and insufficient exploitation causes immediate failure of an organization. The paper describes characteristics of ambidextrous organization, its good and bad points, mission, purpose, significance and potential benefit. Our goals were to promote a concept of ambidextrous organization to a broader audience, to suggest it as an appropriate model to be applied here in Serbian companies because, although strong exploitative units are presupposed in ambidexterity, it emphasizes simultaneous existence and strengthening of explorative units so organizations could avoid technological and knowledge dependency, and in time they can create solutions-innovations and exploit them here with locally gained know-how.

¹ By consulting company "Gartner" from the USA, for more information, see www.politika.rs

2. BUILDING AMBIDEXTERITY

Organizational ambidexterity is usually described from **structural** perspective- to explain use of dual construction and different strategies for exploitation and exploration and from **contextual** angle-to indicate *behavioral* and *social* means to integrate exploitation and exploration, even at the organizational unit level (Birkinshaw, Gibson, 2004).

Tushman, and O'Reilly (1996) gave another definition of ambidextrous organizations based on organizational structure, which emphasizes organizational ability to explore and exploit through structural differentiation – *the subdivision of tasks into distinct organizational units that developed appropriate context for exploitation and exploration. "The separation of the entities (exploitative and explorative) can in some situations lead to the isolation of the structures focused on exploration which failed to have their idea accepted and to draw on the resources of the firm's other structures"* (Mahmoud –Jouini, Charue-Duboc, Fourcade, 2007). *"Structural ambidexterity requires strategic integration to ensure leverage and cross fertilization between differentiated units"* (O'Reilly, Tushman, 2008).

In order to prosper over the long run, most companies need to explore and innovate in more than one field. *Beside, incremental innovations, companies also have to make structural innovations. Small improvements in existing products and operations are important for companies in order to operate more efficiently and deliver greater value to customers, and applying technological or process advances are inevitable to fundamentally change some component or element of business. Finally, businesses need to come up with discontinuous innovations-radical innovations that totally change the basis for competition in an industry, often rendering all products or ways of working obsolete* (O'Reilly, Tushman, 2004). Similar rule applies to organizational strategy: *most of the innovative business models didn't devolve from the best practices or benchmarks of the organizations of yesterday that they displaced, but from radical re-conceptualization of the nature of the business* (Malhotra, 2000).

Explorative activities are associated with less certainties and higher risk for failure - but also with the potential for higher success. Management of these activities needs more degrees of freedom for the individual and less-structured work processes (Mirow, Hoelzle, Gemuenden, 2008). *Exploitative business units concentrate more on formal coordination mechanism such as centralization and formalization. Innovative businesses units have a more open culture, following a rather unstructured work process* (Mirow, Hoelzle, Gemuenden 2008). Because they use the same resources, *experimenting with new alternatives reduces the speed that existing competences are improved and refined* (March 1991). According to He and Wong (2004), *"a failed explorative effort may disrupt successful routines in a firm's existing domains, without any significant success in the new field to compensate for the loss in existing business"*. Tushman and O'Reilly (1996) explain further that *"exploitative activities are usually associated with mechanistic structures and routinized activities that help to raise productivity in these business units"*. Processes are tightened and are optimized for activities that lead to a better performance in a known environment. Firms adjust their structures also by the phase of the innovation process: *organic structures are employed to explore and they are followed by mechanistic structures to exploit* (O'Reilly, Tushman, 2007).

Generally, **"exploitation"** is about efficiency, increasing productivity, control, certainty, and variance reduction", actually in becoming more efficient in what organizations already know. **"Exploration"** is about search, discovery, autonomy, innovation and increasing variation", more uncertain more distant in time and sometimes represents a threat to existing organizational units. **"Ambidexterity is about doing both"** (O'Reilly, Tushman, 2007).

From contextual ambidexterity to open innovation

Possible distinctive positions of the locus of innovation (exploration) are: together with exploitative section in the same business unit so-called contextual ambidexterity, then in separated business unit (ambidextrous organization integrated at the senior management level) and finally the locus is partly placed outside of an organization-consumer based innovation. *There are some arguments that it is possible to have exploitive and explorative behavior in a single unit, (contextual ambidexterity) but this procedure demands high intellectual capabilities of the individuals within the innovating units, who have to decide themselves when and how to perform exploitative or exploitive activities* (Mirow, Hoelzle, Gemuenden, 2008). Contextual ambidexterity is not a structure, it is more an assumed boundary inside the business unit and because of non-existence of separation line *it can experience many barriers as a competition for resources or lack of inter-departmental collaboration* (O'Reilly, Tushman, 2007).

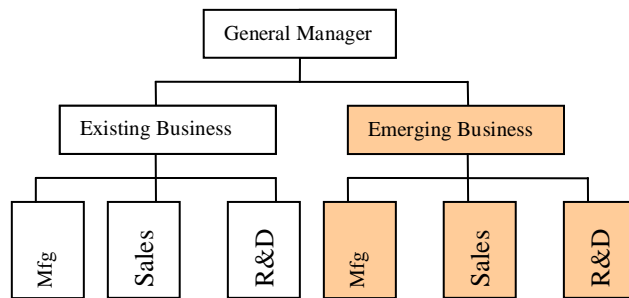


Figure 1: Ambidextrous organization
(according to: O'Reilly, Tushman, 1997)

On the other side we have arguments that managers cannot simultaneously explore and exploit and they must spin out the exploratory sub-unit (O'Reilly, Tushman, 2007). Some argue that it is impossible to have exploitation and exploration even in the same firm. Established companies can develop radical innovations and protect their traditional businesses by creating new business units that are integrated at the senior executive level (O'Reilly, Tushman, 2004). "Ambidexterity entails not only separate structural subunits for exploration and exploitation but also different competencies, systems, incentives, processes and cultures" (O'Reilly, Tushman, 2007) what increases the chances for conflict, disagreement, and poor

coordination. The most important decision is not about organizational architecture by which the innovative and traditional subunits are separated, but about choice of processes (a common set of values and shared meanings that provide a common identity, even though these values may foster different operating norms across the businesses and clear consensus within the senior team about the strategy and the importance of ambidexterity) to integrate these units in value enhancing way (O'Reilly, Tushman, 2007). According to Mirow, Hoelzle, Gemuenden (2008) the bigger problem is to implement new structures in the mind of the innovators and top management than to install the adequate structure in organization. "Arranging ambidexterity is not a structure and design task, but a leadership one". It requires a leadership team with subtle competences and skills necessary to provide a clear vision and strategic intent, a consensus and commitment within the team, the skills to manage dissimilar sub-units (explore and exploit) with clearly defined interfaces to leverage existing assets, and the ability to resolve the inevitable conflicts that this design embodies (O'Reilly, Tushman, 2007). Top management must decide about the right balance between new and core business, and by no means that decision should be pushed down to middle management. Organizations progress when their senior managers accept the tension between old and new business and foster a state of constant creative conflict at the top (Tushman, Smith, Binns, 2011).

Open innovation roused interest when scholars had realized that knowledge creation for many products can be created outside the boundaries of the firm and that individual or groups of users and consumers can be important resource for innovation especially in time of digitalization (Lakhani, Tushman, 2012). Open innovation is not a new model; it can be understood as an ambidextrous organization with partly open outer boundaries. According to Lakhani and Tushman (2012) the dimensions that determine the degree of openness and permeability of boundaries are the degree to which critical tasks can be decomposed (because of the digitalization process most of ideas and even physical objects can be presented in binary language) and the extent to which problem solving knowledge for these tasks is distributed (Internet enabled organization to have access to distributed knowledge of thousands of external individuals- cheaply). "Such task decomposition and the fact that widely distributed actors have access to unique knowledge move the locus of innovation outside traditional firm boundaries". (Lakhani, Tushman, 2012).

The innovation boundaries will be fundamentally different in the case when all necessary pieces of information are narrowly held in the firm and in case when knowledge is more widely distributed amongst many external actors. The more knowledge is dispersed, the greater is use of open boundaries and the locus of innovation moves to communities outside a firm (Lakhani, Tushman, 2012). When problem solving knowledge is concentrated, then firms internalize R&D, build an innovative culture, improve capabilities, absorptive capacities, and processes that locate knowledge necessary for solutions within the firm and/or with the trusted partners (Lakhani, Tushman, 2012).

Ambidextrous eligibility

Operational
Leverage

As we can see, building an ambidextrous organization is very long, complicated, and probably expensive process, appropriate for big companies, but it can provide organizational survival because of creating surrounding that supports (beside other things) creation of new knowledge. Tushman and O'Reilly (2007) gave an answer that the ambidexterity should be considered when operational leverage and strategic importance are high. (See Figure 2).

Operational
Leverage

Low	Independent Business Unit	Spin-off
High	Ambidextrous Organization	Internalize and/or contracting
	High	Low

Strategic importance

Figure 2 Ambidextrous eligibility
(according to: Tushman and O'Reilly, 2007)

We must also emphasize that studies had shown that large firms are more likely to simultaneously explore and exploit. While innovation is turning into more crucial assets, despite the prediction of some scientists (Schumpeter for example) those actors who generate it are not dominantly small and medium enterprises and creative entrepreneurs, but huge multinational companies with profits that many governments can only dream of. *They are today the most powerful agents of innovation and control about three quarters of the commercial technological knowledge* (Dunning, 1992). Multinational companies have realized on time that scale economy at its best is not enough to achieve and maintain competitive advantage and that *only continuous learning could be a permanent source of organizational progress* (Mattes, 2010). Kogut and Zander (1993) explained that, *especially in MNC, two processes, seemingly opposite, occur simultaneously: organizational learning-spreading knowledge through an organization and internalization of knowledge transfer market* sometimes by changing organizational boundaries (like in open innovation). *The results of researches suggest that small firms that pursue either efficiency or flexibility strategies are able to achieve optimal performance, but firms that attempt to mix efficiency and flexibility strategies significantly underperform* (Ebben and Johnson, 2005). If we take Tushman's and Benner's definition that *exploration is related to flexibility, decentralization, and loose cultures, exploitation is associated with efficiency, centralization, and tight cultures* (Benner, Tushman, 2003) then we can equalize efficiency strategy with exploitation, and flexibility with exploration.

Lakhani and Tushman (2012) argue that an *ambidextrous design with intra-firm structural inconsistency and structural linkages, is an appropriate designed choice when there is a strategic interdependence after tasks have been decomposed and when knowledge is heterogeneous distributed (within a firm or firm and external actors). Boundaries and structural heterogeneity in an ambidextrous organization enable the firm to operate simultaneously in different innovation modes.*

Dynamic capabilities - a condition for ambidexterity

Dynamic capabilities can be observed from the perspectives of strategy and organizational design. The first perspective suggests that dynamic capabilities are the ability of a firm to reconfigure assets and existing capabilities and explains long-term competitive advantage. The second describes ambidexterity as the ability of a firm to simultaneously explore and exploit and enables a firm to adapt over time (O'Reilly, Tushman, 2007)

Organizational capabilities are essential part of existing organizational routines, structures and processes and they show the firm's ability to adapt to/ compete in the environment. Senior leaders should nurture and refine these capabilities and, at the same time, to be prepared to reconfigure these assets as environment changes. In order to be able to do so, senior leaders must develop ambidextrous capabilities - set of paradoxical capabilities because competences and routines of senior leaders to reconfigure assets to compete in emerging and mature businesses are different than those required only for exploration or exploitation (O'Reilly, Tushman, 2007). With regards to ambidexterity, a dynamic capability can be seen as a set of actions (or routines) taken by

When a vice-president of IBM came up with an idea to set up a separate division, he was given permission to do so and promptly lost ten million dollars. He came in the office of Tom Watson, the founder of IBM and told him "I suppose you want my resignation." Watson looked at him and said in disbelief: "Are you kidding? We have just spent ten million dollars on your education." *

senior management that permitted the enterprise to identify opportunities and threats and reconfigure assets (people, organizational architectures, and resources) to adapt to these. (O' Reilly, Tushman, 2007).

Dynamic capabilities result from actions of senior managers who have key role to ensure learning, integration, reconfiguration and transformation (alliances, joint ventures) new product development, cross line of business innovation, generally to enable organization to maintain ecological fitness, to reconfigure existing assets and developed the new skills needed to address the emerging threats and opportunities (O' Reilly., Tushman, 2007). "To be useful, a dynamic capability must be a repeatable: that is, the underlying processes are explicitly learned and managed by senior leaders". These skills can be developed and they are difficult for competitors to imitate. However, this capabilities can be lost" if senior management is not explicit in protecting them (O' Reilly, Tushman, 2007).

According to O' Reilly and Tushman (2007) to be successful at ambidexterity firms must possess the capabilities of sensing, seizing and reconfiguring: "ambidexterity requires a coherent alignment of competences, structures and cultures to engage in exploration, a contrasting congruent alignment focused on exploitation and a senior leadership team with the cognitive and behavioral flexibility to establish and nurture both."

Capability of **Sensing** requires culture of openness that encourages debate, the commitment of resources by senior leaders (financial and time) to encourage a long-term thinking, and a senior management team that fosters a long-term mindset and promotes exploration. A certain balance in centralization and decentralization of control must be to encourage feedback from market-facing units because they are first to sense opportunities and threats, particularly in rapidly shifting markets (O' Reilly, Tushman, 2007).

Seizing opportunities is about making the right decisions and executing them, what need skilled, determined and strong leadership. **Reconfiguring**: Operational capabilities may provide competitive advantage at a given point in time, but for long-term success resources must be reallocated from the mature and declining businesses toward emerging growth opportunities. (O'Reilly, Tushman, 2007).

Two barrier types are linked to individual characteristics: capabilities and time resources of innovators and the motivation of individuals and can be considered to be the main reasons for barriers to innovation. (O'Reilly, Tushman, 2007). Ambidexterity is not instilled in an individual's ability to explore and exploit, nor is it simply a matter of organizational structure, although it is theoretically possible to conceive it in these ways. Ambidexterity is not a dynamic capability equivalent to ad hoc problem solving in which a business may <solve> a problem on a one-time basis by setting up successful exploratory venture. Rather, "as a dynamic capability ambidexterity embodies a complex set of routines including decentralization, differentiation, targeted integration, and the ability of senior leadership to orchestrate the complex trade-offs that ambidexterity requires". These are founded in a part of tacit knowledge and require long-term commitments to specialized resources (O' Reilly, Tushman, 2007).

Organizing to innovate

There is a sharp contrast between traditional, internal organization-centered models of innovation and recent ambidextrous or even open innovation model. "These fundamentally different and inconsistent innovation logics are associated with contrasting organizational boundaries and organizational designs" what occupies scholars of innovation, R&D, strategy, and organization theory as a central theme (Lakhani, Tushman, 2012).

According to OECD methodology there are y four types of innovation identified in the Oslo Manual for measuring innovation: product innovation, process innovation, marketing innovation and organizational innovation. O'Reilly and Tushman, (2007) argue that innovation occurs in three distinct ways. First is incremental innovation in which an existing product or service is made better, faster and cheaper. The second way of innovation occurs through major or discontinuous changes in which major improvements are made typically through a competence-destroying advance in technology and creates new product class or substitutes for an existing product. Innovation also occurs through seemingly minor improvements in which existing technologies components are integrated to dramatically enhance the performance of existing products or services.

The studies in wide range of management research areas have shown that exploration and exploitation require substantially different structures, processes, strategies, capabilities and cultures (He, Wong, 2004). We have already explained that exploration is generally associated with organic structures, loosely coupled

systems, path breaking, improvisation, autonomy, and chaos, and emerging market and technologies; and exploitation is associated with mechanistic architecture, tightly coupled systems, path dependence, reutilization, control and bureaucracy, and stable market and technologies (Lewin, Long, Carrol, 1999).

Scientists mostly agree how individual unit should be organized, but *they disagree about how and to what extent the differentiated units should be integrated* (Raisch, Tushman, 2011). *“It is important for organization to find a balance because a focus on exploitation may enhance short-term performance, and a form can lose its ability to respond to change. On the other hand, exploration may enhance firms’ ability to renew their knowledge base, what can trap them in an endless cycle of search and unrewarding change,”* (Raisch, Tushman, 2011). We have already explained that structural mechanisms enable an organization to cope with competing organizational demands that arise from the simultaneous pursuit of exploitation and exploration, but they are not sufficient for successful ambidextrous organization.

In order to manage differentiation-integration tensions, an organization constantly shapes its boundaries: it uses boundaries to differentiate business units with distinctive knowledge bases, while managing interactions across these boundaries, to integrate knowledge (Raisch, Tushman, 2011). Boundaries should be flexible, they should strengthen business unit’s identity, but they should be permeable at the same time to enable transfer of knowledge from other business units.

Raisch, S., Tushman (2011) *identified four categories of boundary activities that are integral for structurally differentiated units in an ambidextrous organization: reinforcing boundaries, nurturing across boundaries, buffering boundaries, and sharing across boundaries.*

Reinforcing boundaries category reflects the explorative unit’s efforts to separate- to strengthen its boundaries with mainstream units. This category includes three dimensions: to shape a distinct identity, to support different behavior, and to make specific skill set by acquiring new knowledge. **Nurturing across boundaries**-category describes the activities of organizational team over boundaries to provide the differentiated unit with resources. This category has two dimensions: to highlight the corporate team’s role in injecting functional know-how and to transfer of managerial expertise. Category **buffering boundaries** emphasizes the need and effort to isolate the explorative unit from exposure to external demands, pressures, and interferences of traditional units. It also include two dimensions: it highlights how the differentiated unit buffers its boundaries to defend its decision-making autonomy and it concerns the differentiated unit’s activities to retain a strategic control of operations despite the corporate team’s integrative efforts. **Sharing across boundaries** category explains the differentiated unit’s boundary activities to share resources with a mainstream units. The first of three dimensions concerns the sharing of operational assets between the differentiated units and the mainstream units. The second is engaging in joint market activities. The third dimension concerns the transfer of best practices and skills from the differentiated unit to the mainstream units. The transfer can be executed by transfer of managers, and the establishment of cross unit networks, and the informal exchange of knowledge across units (Raisch, Tushman, 2011).

Exploratory and exploitative units use different boundaries activity over time because different stages of projects demand different relation between those two: bigger autonomy or even isolation, exchange, leverage so they adjust boundaries according to demands. “All those changes and phases indicate that ambidexterity is a dynamic process” (Raisch, Tushman, 2011).

6. CONCLUSION

Twenty years ago March had emphasized the importance of simultaneous exploration and exploitation. In order to survive companies must improve every sequence of their business no matter how big or small they are, because they all compete at the same global market. If organizations want to compete in the short and long run, they don’t have luxury of choice: They have to meet current customer demands and new customer requirements. Our review suggest that ambidexterity (in structural, strategic, behavioral terms) could be a solution for organizing company in order to be successful in multitasking. *Ambidexterity is possible only if a firm develop certain set of abilities-dynamic capabilities- to learn and adapt to shifting environmental context. In a firm, organizational learning must take place in two levels: business units (exploration and exploitation) have to learn to cohabit, and senior management level itself has to learn how to maintain, protect and support ambidexterity, challenges the status quo, accepts failure, and provides the integration and transfer of knowledge* (O’ Reilly, Tushman, 2007)

Introducing an explorative unit might *help organizations sense and seize new opportunities. Introducing new business that is not profitable from the very beginning is not a way to tolerate inefficiency but a way to create a deliberate tension that uses existing firm assets and capabilities and reconfigures them to address the new opportunities. When done explicitly, this involves deliberate investments and promotes organization learning - what will result in a dynamic capability –a firm’s ability “to learn how to learn.”* (Raisch, Tushman, 2011).

Our goals were to promote concept of ambidextrous organization to a broader audience, to present its characteristic in order to explain why we think that is appropriate model for Serbian organizations. We think that our companies will stay dependent on high technology and refined know-how for some more time, but we argue that there are fields where it is possible to create in-house solutions-innovations and exploit them here with locally gained know-how.

This paper provides a starting point for future research on how ambidexterity creates a balance between current and future needs of organization and its convenience for implementation in Serbian organizations. We explained most important characteristics of ambidexterity mission, purpose, significance and potential benefit, how, and why it should be implemented. Ambidexterity, like every other organizational design, is not a silver bullet for all organizational problems, but if it is led explicitly and consistently enables short and long term progress of an organization.

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THE ROLE OF PATENT INDICATORS IN INNOVATIVE PERFORMANCE

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Abstract: *The paper presents an important aspect of innovation performance measurement, concerning the role of indicators of patent protection in innovation process evaluation. Being one of the key intellectual property rights, patents have been widely recognized as an innovation management supporting tool which can also be used for strategic planning purposes. For this purpose, patent analysis is applied as an activity of analysing patent documents contained in patent databases. In addition, based on patent indicators as patent data of a certain type derived from patent databases, the evaluation of innovative activities can be conducted. The review of three approaches to the assessment of patent indicators is presented in the paper, followed by a comment on their relevance to innovative performance.*

Keywords: *innovation, patent indicators, innovative performance*

1. INTRODUCTION

Innovation is a well-developed and extensively examined area of management, since it is widely identified as the basic development and competitiveness factor, with increasing importance in the age of knowledge-driven economy directly based on the production, distribution and use of knowledge and information. Rising importance of knowledge as an economic driver implies intensifying influence of innovation management. It is broadly recognized that successful innovation management includes defining innovation strategy and coordinating with other relevant strategies in organization, such as intellectual property strategy. In that sense, with the increasing amount of revenue generated from intellectual property rights (especially patents), intellectual property management is becoming a strategic component of corporate business operation (CSU, 2004).

The question of using intellectual property rights in the domain of innovation management is important for two main reasons (Stošić, 2007):

- radical innovations during the last decade of the 20th century - emerging technologies with domination of ICT, telecommunications etc;
- globalization processes have direct influence on increasing needs for legal protection in innovation projects, especially in the beginning phases - generating new ideas.

Since patents are intellectual property rights aiming at legal protection of innovation processes outcomes that have technical nature, they can serve as indicators of innovative performance. The performance can be measured directly for technical product or technical process as for specific invention, or on a larger scale for R&D activities of organizations and industry branches. As a basis for measuring innovative performance through patents, patent databases are used which is one of the main patent analysis tasks.

The paper addresses one of frequently asked questions on measuring firm's innovative performance, concerning patents as one of inevitable indicators, both on micro and macro level. In that sense, a review has been given of three approaches, the first two (Ernst, 2003, Germeraad, 2010) discussing patent indicators applied to patent portfolio analysis and the third one (Littmann-Hilmer & Kuckartz, 2009), applicable to evaluation of patent documents as single innovative projects, as well as patent portfolio analysis.

2. INNOVATION AND INNOVATIVE PERFORMANCE

Lots of innovation definitions can be found, having in mind that this concept has evolved significantly over the last decades. In its wider context, it is the process of turning the possibilities into new ideas and putting them into practical use. Observed as a specific form of change, innovation can be defined in various fields, since J. Schumpeter has defined it, thus establishing the theory of innovation, formed as a distinctive academic discipline from the 1980s (Filippov & Mooi, 2010). In a remarkably short time, economic globalization has changed the world's economic order (European Commission, 2012) bringing new challenges and opportunities and putting innovation in the central place as the key driver of knowledge-based economy. The significance of the innovation strategic dimension also must be stressed, since it creates the possibility for enterprise to gain competitive advantage based capability to realize successful innovation projects.

As European Commission's *Green Paper on Innovation* has indicated, innovation is the renewal and enlargement of the range of products and services and the associated markets; the establishment of new methods of production, supply and distribution; the introduction of changes in management, work organization, and the working conditions and skills of the workforce. In the OECD and Euro stat's 3rd edition of *Oslo Manual* - guidelines for collecting and interpreting innovation data, basic definition of innovation covers realization of a new or significantly improved product/service, process, marketing and organizational method, thus recognizing four types of innovation (Oslo Manual, 2005). According to criterion of novelty degree, innovation can be incremental (small improvements) and radical (completely new product/services etc.) while some authors also identify semi-radical type of innovation, based on the interaction between technology and business model changes (Davila, 2005).

When it comes to measuring innovative performance, literature on innovation and related topics has a long history of trying to identify common set of indicators. However, the results of many studies have not yet led to a generally accepted indicator of innovative performance or a prevalent set of indicators (Hagedoorn & Cloudt, 2003). Measuring innovation performance can be carried out both on macro and micro level. Macro level implies assessment innovation performance on the national level, while micro level implies measuring on the company level. Different kinds of innovation surveys have been implemented in extremely large number of countries - EU, OECD, non-OECD countries in the different regions and continents. For example, in Europe, methodology and research known as Community Innovation Survey (CIS), was conducted in various European countries, aiming at collecting data to recognize range of *innovation activities* as wide as possible (such as R&D expenditures, product design, trial production, market analysis), *innovation input/output factors* and indicators (like patents, introduction of new products, processes and organizational changes) and variety of different factors that influence *innovation process* (hampering and stimulating innovation, like sources of knowledge, reasons for innovating, strength of various appropriability mechanisms (Stošić, 2006).

It should be fundamental to mention IUS (Innovation Union Scoreboard) of PRO INNO Europe® initiative which aims to become the focal point for EU innovation policy analysis. IUS is a tool which gives comparative assessment of the innovation performance of the EU27 Member State including Croatia, Iceland, the Former Yugoslav Republic of Macedonia, Norway, Serbia, Switzerland and Turkey. The IUS 2011 distinguishes between 3 main types of indicators and 8 innovation dimensions, capturing in total 25 different indicators (Innovation Union Scoreboard, 2012).

Table1. IUS by types of indicators, dimensions and number of indicators per dimension

	Main type of indicator	Innovation dimension	Indicators (Number)
1	Enablers	Human resources	3
		Open, excellent and attractive research systems	3
		Finance and support	2
2	Firm activities	Firm investments	2
		Linkages and relationship	3
		Intellectual assets	4
3	Outputs	Innovators	3
		Economic effects	5

Patent indicators can be found among Firm activities set of indicators, more precisely Intellectual assets, identified as:

- PCT patents applications per billion GDP;
- PCT patent applications in societal challenges per billion GDP.

Measuring innovation performance on micro (corporate) level is a relatively new area and many corporations have no experience in determining suitable metrics. It depends on how each company defines innovation and requires careful review in order to discover the usefulness of chosen innovation metrics. Some of diagnostic tools and innovative performance merits which help organizations to evaluate, benchmark and improve their innovations are illustrated in the following two tables. Table 2 includes patent indicators related to Developmental perspective in Balance scorecard (BSC) as a strategic management and measurement system.

Table 2. Innovation Measurement Tools (Tin, 2005)

Tools	Indicators	How it works	Devised by
Index of Corporate innovation (ICI)	Corporate culture Leadership Workforce Capacity Organizational processes and structure Collaboration and partnership Investment in innovation Innovative performance	Employees will be asked to complete on-line surveys. The consultant will then analyze the surveys and provide the ICI report card to the organization. From the results, action plans will be devised and integrated into the organization's operations and strategy.	Conference Board of Canada
Balance scorecard	Indicators relevant for measuring innovation Customer perspective The satisfied customer index (%) Customer-loyalty index (%) Developmental perspective R&D expenses (\$) R&D expenses/total expenses. (%) Investment in training/customers (No.) Patents pending (No.) Average age of company patents (No.) Ratio of new products (less than X years old) to full company catalogue (%).	The balanced scorecard methodology builds on some key concepts of previous management ideas such as Total Quality Management (TQM). It involves developing outcome metrics based on the priorities of the strategic plan.	Developed by Robert Kaplan and David Norton. Applied by both public and private organizations worldwide

Especially, the Return on innovation investment (ROI2) should be taken into account, as a comprehensive measure of innovative performance, allowing companies to compare innovation returns with returns from other types of investments (Table 3).

Table3. Performance Metrics(Tin, 2005)

Metric	Components	Potential Implications
Return on innovation investment (ROI2)	Cumulative net profits generated from new products launched Research costs + development costs + incremental production costs + initial commercialization pre-launch costs	Single, standard measure for comparing performance between divisions, over time, and within industry.
Cumulative profits	Cumulative (3-5 years) profits from new products	Impact on income statement
Cumulative revenues	Cumulative (3-5 years) revenues from new products	Impact on income statement
Growth impact	Revenues from new products over 3-5 years 3 year revenue growth	Contribution to firm growth
Success rate	Number of new products exceeding 3-year original forecasts Total number of new products commercialized in last 3 years	Indicates quality of planning
New product survival rate	Number of new products remaining in the market (time period X) Total number of new products launched (time period X)	Provides insight about the demand of new product introductions relative to total new product efforts

3. PATENT INDICATORS AS A MEASURE OF INNOVATIVE ACTIVITIES

Patent is an intellectual property right which protects inventions as technical solutions. Patents are granted in administrative procedures conducted by official authorities – normally patent and intellectual property offices. During the administrative procedure the invention that can be related to product process, or use is being classified using standardized classification system. The most commonly used classification system is the IPC (International Patent Classification) dividing all technology fields into over 70 000 hierarchically structured categories. Within the patenting process, the invention is disclosed to the public by official publishing done by the patenting authority. Published invention is entered into patent databases, and subsequently examined for patentability. If patentability criteria - novelty, inventive step and industrial application are met, the patent is granted.

Patent as a preventive intellectual property right gives right to patent holder to control patented invention on one country's territory for a certain period of time in terms of exclusive right to commercially exploit the invention and to prevent others from such exploitation. The exploitation comprises production, sale, marketing, import etc. In addition, patent protection provides the owner with exclusive right to hold, transfer and licence the production and sale of the patented product or process.

In appropriating the benefits of innovation, patents are considered as a sustainable factor of influence, in the sense of inventor's protection from imitation coming from competitors. Different analysis of using patent protection can be found, with potential benefits, but, also, limitations, due to eventual patent protection strength. Whatever the reasons for or against patent protection might be, there is no doubt about the fact that patents motivate inventors and certainly represent a sign of achievement. In this way patents are strategic tools highly significant for any technology oriented organization and if effectively used can constitute substantial competitive advantage of any innovative company.

Another characteristic of the patent system is its informatics function, derived from legal condition of publishing of the invention subject to patenting in order to provide public with the patent information. Patent information enables further R&D activities which are normally excluded from patent protection. Besides using patent information as source of ideas that can be used in R&D processes, patents are objective measure of R&D activities (Ernst, 2003) and can be used as technological progress indicators which are the main task of patent analysis. Patent information can be accessed through free and commercial patent databases, e.g. through Espacenet free database accessible online (EIC, 2012).

However, the experience of European countries shows that this strategic function of patents is usually neglected or not fully exploited by the companies. One of the reasons, beside the lack of awareness of the importance of patent as a strategic tool, can also be difficulty in using patent information (Nielsen, 2004). The insufficient knowledge in handling patent information can be overcome by trainings, provided in Serbia by the Education Information Centre established at the Intellectual Property Office (EIC, 2012).

Innovation management requires defining patent strategy in the way that corresponds to business strategy and different functional strategies of the enterprise. A patent strategy can be defined as a framework of decision making processes and procedures that should ensure that a company's patent activities support the company's business (Wijk, 2005). Patent strategy should be especially coordinated with innovation strategy, which can be found in innovation literature as broadening 4P of innovation with the new one: Product, Place, Price, Promotion and Patents. Also, when it comes to the new product development (NPD as product innovation), there is a strong connection between this intellectual property right and competitiveness that can be achieved through innovation (Stošić, 2002). This is one of the reasons for the innovation project team to take the key role in making the right decisions about planning and providing legal protection during the whole innovation project from idea to commercialization.

4. REVIEW OF SEVERAL APPROACHES TO PATENT INDICATORS

In order to use patent information to measure and evaluate innovative activities or to analyze company's patent strategies patenting indicators can be deployed (Ernst, 2003). In this section, the three approaches of establishing patent indicators are being reviewed. The main aim of the section is to point out to possible patenting indicators that could be used for evaluation of company's innovative activities.

Ernst (Ernst, 2003) introduces several patenting indicators (Table 4). Patent activity is a fundamental patent indicator related directly to R&D activity of the company. It is defined as number of patent applications of

company in certain technological field. The paper further introduces technology share as a measure of firms competitive position in a technological field as patent activity per number of all competitors' patent applications in a technological field and R&D emphasis as ratio of patent activity and company's total patent applications (patent portfolio).

Table 4. Patent indicators (Ernst, 2003)

Important patenting indicators for competitor monitoring		
Patent indicator	Definition	Meaning
Patent activity (PA_{iF})	Patent applications (PA) of firm i in technological field (TF) F	Extent of R&D expenditures of firm i in TF F (interest of firm i in TF F)
Technology share (based on patent applications)	PA_{iF} / PA of all competitors in TF F	Competitive technological position of firm i in TF F (quantitative)
R&D emphasis	$PA_{iF} /$ Number of firm s (i) total patent applications	Importance of technological field F for firm i (R&D emphasis)
Co-operation intensity	Number of joint patent applications with partners in TF F / PA_{iF}	Access of firm i to external knowledge (and identification of partners)
Share of granted patents (Q_1)	Granted patents of firm i in TF F / PA_{iF}	Technological quality of firm i 's patent applications
Technological scope (Q_2)	Diversity and number of IPC classes in firm i 's patent applications (PA_{iF})	Technological quality of firm i 's patent applications
International scope (Q_3)	Size of patent family and share of triad (US, JP and EPO) patents of PA_{iF}	Economic quality of firm i 's patent applications
Citation frequency (Q_4)	Average citation frequency of PA_{iF}	Economic quality of firm i 's patent applications
Average patent quality (PQ_{iF})	Sum of all indicators of patent quality (Q_1 – Q_4)	Average total quality of all patent applications of firm i in TF F
Patent strength (PS_{iF})	Product of average patent quality (PQ_{iF}) and patent activity (PA_{iF})	Technological strength of firm i in TF F
Technology share (based on patent strength)	PS_{iF} / PS of all competitors in TF F	Competitive technological position of firm i in TF F (qualitative)
Relative technology share	$PS_{iF} /$ Max. patent strength of a firm in TF F	Distance of firm i to the technological leader in TF F

The patent activity and technology share and R&D emphasis derived from it can be regarded as quantitative indicators which are not taking into account the quality of company's activities. Hence, the following set of patenting indicators - patent quality indicators related to certain technological field are further introduced using the patent activity definition (Ernst, 2003):

- share of company's granted patents in a technological field per patent activity,
- technological scope as diversity and number of patent classes (IPC classes) relating to a patent activity,
- international scope as size of patent family and share of US, Japanese and EP patent documents relating to a patent activity and
- citation frequency as average citation frequency of patent activity.

A patent family is a set of related patent documents (including applications and granted patents) published in various countries protecting the same invention (OuYang & Weng, 2011). Finally, average patent quality as sum of all indicators of patent quality is given, which constitutes a quality indicator from a commercial perspective, and not a legal value indicator (Ernst, 2003).

In addition to the patent quality there are following patent strength indicators, representing technological strength of a company defined:

























- patent strength as product of average patent quality and patent activity,
- technology strength as patent strength of a company per patent strength of all competitors in technological field representing competitive technological position of a company and

- relative technology share as a ratio of patent strength and maximal patent strength of a firm in technological field, expressing the distance of a company to the technological leader in a field.

On the basis of empirical data an example is given showing impact of patent quality on the assessment of the competitive position of the three companies in a specific technological field with a conclusion that neglecting the quality aspects of the patents would have led to a substantial devaluation of company's technological strength and therefore its competitive position in a technological field.

Another paper (Germeraad, 2010) discussed the study of Intellectual Assets Inc. which identified following key portfolio attributes (Table 5), referring to patenting indicators, related to the innovation strategies defined in the Games of innovation by Miller and Floricel. The paper explains how the indicators can be used to consider the patent's potential role in the company's overall innovation strategy.

Table 5. Key patent portfolio attributes (Germeraad, 2010)

Portfolio Size	Patent Fences	Patent Velocity	Portfolio Momentum	Claim Quality	Claim Scope	Geographic Coverage
Sole Holder 	Multi-Generation 	Faster Than Competition 	Building 	High 	Broad 	Broad 
Largest 	Single Generation 	Equal To Competition 	Holding 	Moderate 	Moderate 	
Upper 20% 	Focused 	Episodic 	Pruning 			
Average 	None 	Slower Than Competition 	Pruned 	Low 	Narrow 	Specific 

- Portfolio size is looked at as a key element in IP strategy. This indicator could be treated as analogue to the previously described patent activity, technology share and R&D emphasis;
- Patent fences are created by generation of self-citations around company's core technology patents. A patent citation which can be done by the applicant or by the patent examiner links a patent for core technology to the follow-on patents which are based on the core patent. A self-citation is a patent citation where both the cited and the citing patents are held by the same company. When the percentage of self-citations for a given patent rises to over 20%, indicating that the company that originated the technology holds 20% or more of the follow-on patents, a patent fence begins to form, making it difficult for other entities to create products and services in that area. The patent fence essentially extends patent protection on the core technology by protecting products incorporating the most commercially important aspects of it, creating longer-term and more solid protection for the company's most valuable and commercially important technologies. Building patent fences constitutes typical patent strategy contributing to overall business strategy of a technology oriented company;
- Patent velocity refers to the time between the granting of initial patents and the patenting of follow-on technology. If kept high can lead to creating patent fences ensuring the advantaged position of the company;
- Portfolio momentum growth trend of patent portfolio, eg +, -, = 10% per year;
- Claim quality as enforceability of a patent claim in a litigation proceeding - chance of being upheld as valid an enforceable in litigation. However, the assessment of claim quality was not further discussed, except that it can be done by IP attorneys or specialized IP software. Uncertainty, but probability of successful enforceability could be increased by having more patents and more patent claims in a portfolio;

- Claim scope refers to the breadth and uses covered by a single patent. Typically, for new and evolving technologies the claim scope will be broad since the breadth and scope of the art may not yet be known. New possibilities of invention realization;
- Geographic coverage is relating to the number of countries where the invention is protected. This indicator could be equivalent to the previously described international scope.

The attributes of patent portfolios described here can also be used as IP metrics (assessing the business value of an invention) for the performance of R&D organizations and for defining particular innovation strategies (Germeraad, 2010).

Previous approaches to assess R&D activities of a company are designed for patent portfolio analysis. The following one proposed by Littmann-Hilmer and Kuckartz (Littmann-Hilmer & Kuckartz, 2009) is claimed to be suitable for evaluating single patents as well. For these purposes the following patenting indicators, named market value indicators, were introduced:

- Patent market coverage expressed by patent family size, contributes to the market value of a patent.
- The technological scope of protection is shown by the range of patent classes assigned to the patent application in the official examination procedure carried out by the patent office. The number of classes is proportional to the patent market value.
- Legal scale of protection is defined by the scope of patent claims, taking into account the number and structure of patent claims - independent and dependent claims.
- In terms of citations, there are forward citations - frequency of document citation by others, and backward citations in the official examination reports made by patent offices.

The paper is further discussing the methodology of applying most appropriate innovation strategy regarding the previously calculated patent indicators.

5. CONCLUSION

The main goal of this paper is to contribute better understanding of the role of different patent indicators in measuring the innovative performance of companies, having in mind that a number of various indicators can be found. The three approaches reviewed are showing the possibilities of using patent indicators for assessing innovative activities. The aim of the review was to show the complexity of links between patents as intellectual property rights and innovation activities quantified by patent indicators. All the three studies stressed the importance of patent family size (geographic coverage, market coverage) corresponding to the territory covered by patent protection contributing significantly to the market value. Another highly relevant patent indicator is frequency of citations where further differentiation to self-citations, forward citations and backward citations is made. Both indicators are highly relevant in different patent analysis activities (OuYang & Weng, 2011).

All the indicators reviewed express commercial (market, economic value) of patents except claim quality and claim scope (Germeraad, 2010) and legal scale of protection (Littmann-Hilmer & Kuckartz, 2009) indicating legal value of a patent. Because of the fact that they fall in the domain of patent right, they are especially worth considering.

Claim enforceability is difficult to calculate, and can only be roughly estimated, since the final decision is made by the court in litigation procedure. It is further stated that it could also be brought in correlation with the total number of patents and number of claims (Germeraad, 2010). Although, the number of claims could serve as a measure of legal scope of protection (Littmann-Hilmer & Kuckartz, 2009), it is difficult to determine how the number of claims is influencing enforceability of patent without conducting deeper analysis. Generally, the number of independent claims increases patent scope, unlike the number of dependent claims which, being narrower in scope than independents claim, have no further effect on the claim scope.

On the other hand, the relationship between technical scope and scope of the claims can be determined with more certainty. Technical scope, expressed by number of patent classes assigned to the patent is indicating the subject matter of the invention, i.e. implying possible application field, as purely commercial indicator. Hence, it is in correlation with scope of the claim, starting from the function of the claim which is to define the subject of the invention, although patent claims can have much broader interpretation requiring expertise in patent law.

Patent strategy is part of innovation/business strategy and by evaluating patents, the R&D activities as a measure of success of an innovative technology oriented company can be assessed. For this purpose patent analysis has to be conducted using proposed patenting indicators. The prerequisite for the analysis is the knowledge about basic patenting principles and about patent search which can be obtained in Serbia at seminars provided by Intellectual Property Office. The technology assessment can be made on various levels - for a single invention, R&D project, patent portfolio, industry clusters etc.

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HIGHER EDUCATIONAL INSTITUTIONS OF SOCIAL SCIENCES AS INNOVATIVE ORGANIZATIONS²

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Abstract: *In this paper authors attempt to emphasize the need for change in the management of Serbian higher educational institutions of social sciences. Managers, as deans, need to reorganize the institutions into innovative organizations. The authors offer three arguments to confirm the thesis of the necessity of changing higher educational institutions of social sciences in innovative organizations.*

Keywords: *higher educational institutions of social science, innovation of educational process, innovation of management higher educational institutions, new technologies, Serbian higher educational institutions of social science*

1. INTRODUCTION

The economy is in the fifth stage of the of economic development activities (Fitzsimmons & Fitzsimmons, 2006. p. 5). It is dominated by services that enhance quality of life. The most important are the services in the fields of education, health, research, entertainment and recreation.

Education has always played an important role in the development of society, but now it has an outstanding role. First, educational institutions are important players in the modern services market. Second, education creates knowledge through multiple connections with science and technology, while knowledge is the dominant economic resource. Modern economy is called *knowledge economy*. The term knowledge economy means the economy is being developed on the basis of production, distribution and use of knowledge (European Commission, 2004, p. 22.) The economy based on knowledge is characterized by a high degree of correlation of those who create and those who use knowledge in all economic activities. The knowledge embedded in innovation and technology is fast expanding economic structure, creating new dynamics. Now it is period of transition from knowledge-based to knowledge-driven economy. The main features that cover the knowledge-driven economy are: knowledge is increasingly considered a commodity - it is packaged, bought and sold in the manner and at levels never seen before; advances in ICT as well as significantly reducing the cost of collection, and knowledge transfer; and degree of correlation factors of knowledge has increased dramatically. In addition to knowledge, time as resource is very important in the new economy. Business goes in the direction of real time enterprise. The role of time in creating companies competitive advantage, lays new requirements in front of education. Education cannot be developed under the influence of the economy demands, but in conjunction with science and technology, it creates directly the economic structure. Therefore it is not surprising that the U.S. universities in 2009 had invested mostly in research of education, as non-scientific fields - \$ 921 million (Britt, 2009)

This work studies change in the higher educational level and engaged in social sciences.

2. LITERATURE REVIEW AND HYPOTHESIS

Approximately half of the 20th century philosophers gave great attention to the social sciences, while in recent years, particularly, focused attention has been on the economy. The basic question posed by philosophers of science was fundamental difference between social sciences and natural sciences. Until now there was no single response. Johann Droysen was probably the first philosopher who has made

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terminological distinction between the concept of explanation and understanding. Natural science gives an explanation, but social science gives an understanding. Wilhelm Dilthey argued that the difference stems primarily from the structural relationships that scholars of natural and social sciences have on their subjects. Subject-object relationship is considered to be characteristic of natural sciences. Social sciences are based on the subject-subject relations. The aim of the study of human or social sciences is the understanding of social phenomena, which involves different categories: meaning, purpose, value, growth and ideal. It emphasizes that the nature of the social world is absence of causal order. Every social fact has a historical dimension. These views have opened the question of relativism of social sciences. Many authors adopt the position of individualism. However, the society goes beyond the individual, both in space and in time and as a whole, which is more than the sum of its parts. Human behavior is guided by reason-action relation. The main thesis is about what gives rise to human behavior: the reasons, not causes. Weber tried to find a compromise solution to the naturalistic and hermeneutic model of social sciences. He offered the *ideal type* methodology. These are hypothetical, *as-if* models. The present socio-economic reality in a way consists only of the parameters in the model. Thus, human beings are reduced to a few parameters - *homo economicus*, *homo sociologicus*, and *homo psychologicus* in accordance with the topic that describes and explains the purpose of economists, sociologists or psychologists. When the ideal type is empirically confirmed, it suggests social regularities, which serve as an explanation of social action. Further work on getting to know the essence of social science was influenced by Darwin's theory of evolution and Freud's psychoanalysis. Evolutionary biology is of utmost importance for the study of human behavior and thought. At 1975th appeared the book named *Sociobiology*, by EO Wilson. This book had sparked anger because it asserted that the social behavior of animals and humans have biological roots. Sociobiology is the systematic study of the biological basis of all forms of social behavior - all kinds of organisms, including humans (Weinert, 2009, p. 264-265). The great part of human behavior follows the norms and conventions, and is inspired by social values. These conventions, norms and values tend to vary from society to society. Sociobiology shows that these differences are the result of genetics. Genes are the ones who have allowed the development of the capacity for culture that is the basis for the tendency to develop a culture or another. But a man should his innate aggressiveness, propensity to warfare and the like under control and to rationally manage conflicts. We need to find a compromise between nature and nurture. The evolution of society is more a result of culture rather than genetics. Scientists from the social sciences cannot guarantee this approach at this point. On the basis of sociobiology has developed evolutionary psychology. Evolutionary psychology seeks to establish a firm link between evolution and social sciences. If the social sciences become a specialized branch of biology, the traditional autonomy of the social sciences will disappear. Proponents of evolutionary psychology point out the need for a new model of social sciences - Integrated Causal Model which is based on the human capacity: the symbolic language of learning, understanding and reasoning, perceiving the material world, the predictions of the future, the organization of social life, mating and food preferences; to recognize young people that they allowed a routine to solve complex tasks. They find that the traditional social sciences have failed due to disregard the biological dimension of human existence. However, at the present time there is an alternative evolutionary psychology research program, which has yet to determine their status. In addition to evolutionary psychologists, Freud had led to a revolution in the history of thought. Perspective is included. He argued that one should look at people from the standpoint of their unconscious motivations, rather than rationality, because of the unconscious dynamics. Freud created *homo psychologicus*.

These philosophical dilemmas suggest that social sciences are expecting dynamic period of development. This raises the question of education in the field of social sciences. The problem of modern education is that there is no logical or conceptual connection between belief, teaching and learning on one hand, and critical inquiry on the other hand. That given belief is not necessarily associated with a critical examination and can last without it, while that critical inquiry is the essence of knowledge and cannot survive without it (Nola & Irzik, 2005, p 19). It is necessary to change the present form of education. Education should not give only beliefs. It should include a belief and/or opinions of why they should or should not be holding a belief. Education should give a product of critical inquiry - knowledge and understanding. Without the rules of critical inquiry, learning in education is nothing more than obtaining the information, beliefs or income adjustments opinions. Linking learning and education provides a working definition of minimum education (Nola & Irzik, 2005, p. 51): *Education is the coordinated process, typically but not always involving teachers, in which the goal is to bring about pupil learning (including learning that, learning how to, learning why, etc.) and the process has a successful outcome*. Education is connected with science and technology, and can be presented as to the Figure 1 (Komazec, 2012).

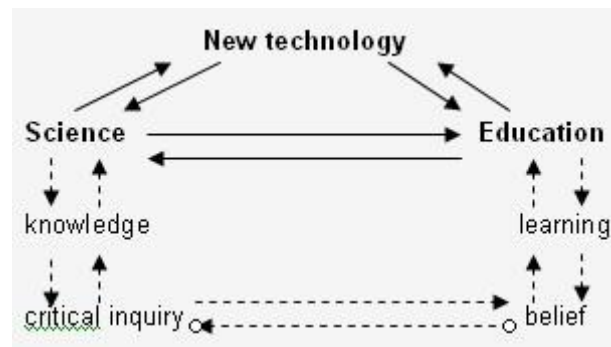


Figure 1: Relationship between science, new technology and education

Today, there is no doubt about the fact that competitive advantage is achieved with new technologies that usually stem from scientific findings. Because science and technologies are largely implemented in enterprises, the third key element of knowledge - education, moved to companies. New types of educational institutions - corporate universities are developing. According to Annick Renaud-Coulon, president of the *Global Council of Corporate Universities* there are about 4,000 such institutions in the world, with more than 4 million students (Theil, Overdorf & McNicoll, 2011.)

Based on quotes upward of the scientific findings, authors support these hypotheses:

H_0 - Education became one of the key drivers of economic development.

H_1 -The educational institutions apply new emerging technologies and change the educational processes.

H_2 - Changes in the educational process requires innovation of management

H_3 - Serbia is not sufficiently technologically developed, and it has to pay particular attention to management of educational institutions, because education can help Serbia in achieving necessary level of technological development

H_4 - The higher educational institutions of social science have to become innovative organizations.

3. FINDINGS

X_0 : Big changes are happening in science and technology. Information on investment in science, technology and innovation suggests that the global picture of the scientific technological power of certain countries is rapidly changing (Silbergliett et al., 2006). Superior, former rulers receive strong competition. It is expected that the U.S. will continue to be a world leader in S & T capabilities and capacity, and innovation, but not the only one. It will not dominate in all technical areas. Some countries specialize in certain scientific fields, or invest in specific development programs. Globalization promotes the diffusion of technological solutions, but does not bring uniformity of science and technology. Speed of technology development will continue to accelerate, as the fields of science will become more integrated. The pace of these developments shows no signs of abating in the next 10 years, and it appears that their effect will be almost unbelievable. Many technology trends and applications will have a huge effect in changing the society, and will require further research and development, and consideration of consequences, the development of market forces and public debate. Knowledge and skills of people to implement, maintain, adapt and use new technologies gains great importance. From this perspective, human capital and technology are tails and heads on a coin or two indivisible aspects of the accumulation of knowledge. Innovation is seen as a gradual and cumulative process, and the development of future technology depends on the prior attainment level of development. Deep relationship between education, science and technology is confirmed by the exact indicators of two eminent institutions. Ericsson has developed *Ericsson's Networking Society City Index*, which allows states to compare with the best and to find opportunity through benchmarking for faster learning (Regardh, 2011). (Compare the cities, because they are less complex and measurement criteria are consistent.) Indices have proven that there is a strong link between the maturity of the application of information and communication technologies and socio-economic development of society and individual development. According to the last measured data (2011) Singapore has the highest rank, followed by Stockholm, Seoul, etc... Another organization, *The Information Technology and Innovation Foundation*, calculated based on six criteria (human capital, innovation capacity, entrepreneurship, IT infrastructure, economic policy and economic performance) that Singapore is the most developed country in terms of competitiveness. In Singapore, 38% of the population has higher education, on the 1000 workers they have 9.7 researchers and 1.4% of GDP invested in R&D of companies, 0.9% for public institutes, venture capital is 0.25% and 6.96 % is earmarked for information technology (Bennett, 2010, p. 43). It is followed by Sweden, then Luxembourg, Denmark,

South Korea, USA etc... There is no development of science, and technology without a good educational system.

X₁: In knowledge-driven economy, and with the rise of the Networked Society, schools are changing. Shape of future school is based on an individualization that is deeply embedded in new technology, and new way of living, characterized by an assimilation of work and play. New technologies, particular ICT, make possible achieving two fundamental human needs – communication and curiosity. A project named *The Future School* gives good picture of changing. A project is co-financed by Ericsson Consumer Lab, an organization that provides consumer insight to influence strategy, marketing and product management within the Ericsson Group, and Riksbankens Jubileumsfond, an independent Swedish foundation designed to promote and support scientific research. The ethnographic field work in Chicago and Hong Kong was done in cooperation with Conifer Research (Persson, 2012) It is identified the following six key areas of change: Work tools, Workspace, Infrastructure requirements, Ways of working, New roles for teachers and Skills, knowledge – and games. New working tools means 1:1 programs, in which every student and every teacher has a computer, and have become the model for progressive schools that focus on integrating ICT into education. Ericsson find interesting that several schools are making great use of interactive whiteboards. Like an analog whiteboard, an interactive whiteboard is a fixed device, but it can support interaction with each student' computer. Some experts view these devices only as a stepping-stone on the road to a classroom that has no fixed devices at all, while others recognize the potential of interactive whiteboards for supporting both individual and collaborative work. Workspace is changing, not only physical but also virtual space. Several of the schools studied in the project have broken down walls to make large rooms with plenty of lightweight movable desks and chairs that can be rearranged to suit the needs of each class or group of students. Students can work in "islands of learning in large rooms, creating flexible classrooms that enhance collaboration. Virtual space enables schools to interact and learn from each another. Classes in different countries are using Skype to communicate with each other and take virtual tours of each other's schools. Teachers are using blogs and social media to exchange ideas and lecture materials, driving forth new pedagogical ideals. In a society with omnipresent connectivity, the focus should not be on whether to work online or offline, but rather on using the best work tool and space for the specific task and situation at hand. Infrastructure requirements are related to connectivity. Teachers will use ICT to manage, observe, coach, protect and evaluate students. Without stable, high-speed connectivity, many of these tasks will fail. The school of the future will require hybrid forms of connectivity, including wireless, fixed and mobile broadband, to meet the need for flexible but reliable high-speed internet access. And that connectivity will be required not only in schools, but also when students are on the way to and from school, in locations such as the library and even at home etc. The Future School use different ways of working. Textbooks (both analog and digital) are still being used, but only represent one collected interpretation and presentation of a subject. Project-based learning seems to be the way of the future. Students are learning how to divide and take responsibility for different parts of their projects. Promoting leadership skills through project-based learning is meant to prepare students for future work at the management level. Teachers will continue to play a main role in students' learning process, but with new tools and changed ways of working, a new role for teachers is emerging. The teacher is more important than ever, but not as an all-knowing deity, but rather as an instructor or coach whose wisdom goes beyond mere textbook facts, expanding into the realm of everyday life and including the use of Facebook and Skype. Technology is making schools more transparent, offering new ways for parents to keep track of their children's performance at school and to establish direct contact with teachers and school administrators. Schools are facing new challenges in their mission to prepare students for their working lives. With the rise of the Networked Society integrated technology is creating the need for new, century skills, such as information and ICT literacy; communication; collaboration; and critical and analytical thinking. The focus in education is shifting from rote memorization and worksheets to collaboration and content creation. New technology has also brought gaming into schools. The gaming part includes lectures, and extensive physical and intellectual work. Science, global issues and strategic thinking are natural focus areas during the game challenge.

H₂: Gary Hamel in his book *The Future of Management* insists on innovation on management. He gives many arguments for that. In new circumstance, with rapid changing of business enviromental, companies practice management similar as scinetifical management from time of Frederick Taylor. Challenges faced by business leaders of the 21st century are numerous and unprecedented, and can be compared with those with whom they are experiencing the world industry pioneers a hundred years ago. Most companies are aware that there has been a radical change in the business. Spent tens of millions of dollars in efforts to achieve the desired changes, but do not achieve the goal - the return on investment. One reason is that using methods that were used in a different, simpler, the previous environment. This has caused huge resistance and firing people, the loss of staff morale and turmoil in organizacijonim cultures (Anderson &

Ackerman Anderson, 2001, p. 35). Over the last fifteen, twenty years the changes are more open, complex, continuous, and require changes not only the organization but also the employees, especially leaders. This type of change can be called a transformational change. In Figure 2 is shown that types of organizational change.

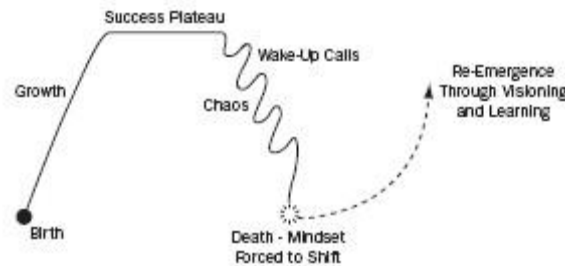


Figure 2: Transformational change

It is time for managers and employees to expand the awareness, skills and access to, and requires a broader approach that could be compared with mastery. Mastery implies a multidimensional approach, focusing on all aspects of the effort and the striving to achieve excellence in all these areas. Specialization in one area and neglect others, does not lead to excellence. The more you improve skills in one area, it is more a call for further development of others. Whatever you ignore becomes a weak link. Or, as Vladislav Bajac beautifully written in *The Book of Bamboo: The opportunity was missed when he made a mistake. Because the Masters are perfect; it is easier to perfect that you never make a mistake, but they will not be able to fix it*) Competitiveness is based on speed. The basic rule of competitive games is that *the fast eat the slow*. On the other side, demands side, it seems that the world is slowly marching in the type of self-replication. The concept of self-replication can be interpreted as a copy of a work of art by the artist who created the original. It has long been known that people's basic needs by seeking to meet new ones, and eventually sought their own development. The period of self-replication is based on new technologies, especial on ICT which enable individual delivery. Already today there is self-replication in the field of music and video projections. Clients express their identity, choosing from a variety, diversity and abundance of what they like best. New management lays change of knowledge. It need for so-called *just-in-time* knowledge. This type of knowledge comes from a new way of doing business - *Real time enterprise* (RTE). RTE is based on a different conception of time. Modern understanding of time means to transfer the so-called *causal time* to *flow-time* (Purser, Bluedorn & Petranker, 2005, p.1.) The concept of flow-time regarded the future as creative dynamic that is not limited to past knowledge. The future comes from what is happening at present. Such a future requires knowledge that comes from creative action in real time, i.e. *just-in-time knowledge*. In a rapidly evolving environment, decisions are not based on calculations, negotiation or adjudication, but the inspiration. Knowledge is results from the deep improvisation, allowing the vision to become a factor of change.

H₃ – Serbians economic system is weak. Main reason for that is circumstance she has been found herself during last twenty years. Serbia has been faced with sanctions, bombing and quite a bit unsuccessful transition of economy. Economic structure performs mostly low-tech companies. In Serbia, according to statistics, 3.4% of the population is illiterate, 21.8% have completed primary school, and 23.9% of the population has only primary education, 41.1% medium, 4.5 % increase and 6.5% higher education. Almost 50% of the adult population is at an elementary level of education or less. This means that about two million people over the age of 15 years without adequate working and living skills and competencies, and that many of them have serious problems to find and keep jobs. This corresponds to the current educational profile of the unfavorable economic structure and competitiveness of the state, dominated by low technology. Structure of employees in 2008 year, by level of education was: 7.6% of unskilled, semiskilled 5.5%, 17.7% of eligible, 5.3% of highly-skilled, 4.6% with primary education, 31.6% with high school diploma, 8.1% to 19.6% of college and university education. Output from such adverse economic structure can only be found by increasing the quality of education. Because of that, education have to change. It must follow the way of working presenting in *The future school*. EU gives Serbia a chance and open all doors for cooperation in educational fields.

H₄ According to the foregoing and reasoned opinions, it seems that the higher educational institutions of social sciences in Serbia are in a period of transformational change. To successfully manage these changes it is necessary to be reorganized into an innovative organization. This process will be extremely difficult. This

opinion is based on the knowledge of the results of transition higher educational institutions of social sciences in recent years. In accordance with the *Law on Higher Education* higher education institutions should be accredited under the new law and to work on new principles and standards. Analysis of 45 accredited or in process of accreditation higher education institutions in the field of social sciences can be concluded that were number of problems. One of the biggest problems is the insufficient knowledge of the changes of students, and teachers. Students do not understand the changes resulting from the Bologna, and therefore quality of evaluation teachers and educational process is low. In this way, they do not get quality information to improve the process. Teachers tend to work under the old principle and resist change. In addition there are serious problems in the technical and technological equipment. Facilities are far from the 1:1 program. Thus, for example, one of the most prominent state institutions, with 50 years of tradition, has one computer to 37 students. Besides it is rarely to find organizations that have fewer than 40 students per teacher, so the interactivity education is not enforceable. One of the new problems will arise from the Strategy of development of higher education in Serbia. Although the document is in the process of public hearings, is likely to be part of the strategy relating to the social sciences to adopt. It is anticipated cuts in funding social sciences students, or reduction in the institutions in this field. Under such circumstances high-education institutions have to become more innovative organization, which shall at all times be open to change and able to be changed as soon as possible. It is necessary to provide adequate technology to offer various educational programs and thus gain a significant advantage over the competition. To become an innovative organization, it is necessary to update the management, or the dean has to learn new skills and abilities. Dean addition to expertise in his/her scientific area should have knowledge in management and the computer-literate, particular knowledge of ICT. These requirements are too high, so many teachers do not want to perform this function. In addition, the high duties on the management take time for scientific work, which is essential for further progress. Some find solutions that correspond to their friends on their scientific work. It is a dishonorable solution. Therefore, the authors of this paper are considered to be functions of the dean and vice dean needed more professional. *The Future school* implement high-tech and high tech organizations can not operate without the knowledge of management and knowledge of technology, it is necessary to further knowledge of the dean as managers of higher education institutions. It is therefore necessary to find a new solution that would induce ablest scientists, who are very competent in their field, to further education in the field of management and technology. Encouragement should definitely include some way of evaluating its performance. It is not sufficient the position of dean of honor only to the individual. It is necessary to receive a certain category of scientific competence, because they would have multidisciplinary education and to show creativity in solving complex tasks, similar as new software.

4. CONCLUSION

The conditions in which higher education institutions perform seem to be radically changed. First, the social sciences are in a dynamic period which arises from different views on the nature of social science, the emerging network society and the need for better knowledge of man and his nature. Second, new technologies are changing the educational institution. The six key areas of change are: work tools, workspace, infrastructure requirements, ways of working, new roles for teachers and skills, knowledge – and games. Also technologies, in particular ICT, translate educational institutions into high-tech organizations. Third, on the services market, which dominates in the modern economy, education has a significant share, and increases the competitive struggle. On the educational market there are more and more corporative universities. In Serbia there are additional reasons. If higher educational institutions should be changed in accordance with *The future school*, they would create a realistic assumption for the development of the economy. In addition, it is anticipated by Strategy of higher education to cut a budget for higher education institutions in social sciences. All listed changes take the shape of transformational change. For managing these changes it is necessary to adopt innovations of management and reorganize institutions into innovative organizations. Because of that deans, as managers, have to have new knowledges, skills and abilities. They need to know management and new technologies.

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EFFECTIVENESS OF THE NATIONAL MEASURES TO INNOVATION SUPPORT INFRASTRUCTURE AND PROMOTION OF INNOVATION

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Abstract: *A total of nine SME innovation and competitiveness support programmes are evaluated, implemented by the Government of Serbia and managed by the Ministry of Economy and Regional Development (MoERD), Ministry of Science and Technological Development (MoSTD) – since March 2011 integrated within the Ministry of Education and Science (MoES) – and the National Agency for Regional Development (NARD)³. For several years Serbia has gained access to and is integrated into the main EU support programmes for research, innovation and competitiveness. Meanwhile, Serbia has successfully set up the infrastructure to manage EU-based programmes and to promote innovation. In this paper we will present the so-far Serbian experience in the promotion of innovation through unique national competition in innovation and innovation fairs as well as the results of the effectiveness of the established business incubator network.*

Keywords: *innovation infrastructure; best technology innovation competition; innovation fairs; business and technology incubators; Serbia*

1. INTRODUCTION

Main goal of the transition of the economy and society in Serbia is creation of knowledge based economy, based on adequate national system of innovation (NSI) (Lundvall, 1992). Innovation infrastructure is driver of business sector restructuring and link between different components of NSI. Building of innovation infrastructure in Serbia is a painful process due to long period of economic and social struggles, political instability and still not finished transition toward market economy (Kutlaca, 2008; Kutlača and Semenčenko, 2004).

Ministry of Education and Science and the Ministry of Economy and Regional Development with National Agency for Regional Development are national institutions which provide support to promotion of innovation activities through project Competition for Best Technology Innovation (MoES) and to establishing of business incubator network as a part of the innovation infrastructure (MoERD and NARD). Also, there is a form of innovation fairs which is organized as a part of the business fair, rather than separate event, which contributes to the overall promotion of the innovation in Serbia. It is famous as Business Base, fair organized by MoERD and NARD. The aim of the Competition for the best technology innovation is to promote the entrepreneurial climate in Serbia and assistance to potential and existing high-tech entrepreneurs, who are willing and able to own ideas and inventions spill over into a market valuation of innovation. Target groups are potential and existing high-tech entrepreneurs, so the scaling of the objectives is adjusted to them.

Innovation fairs in Serbia are most frequently considered as a meeting place for inventors and exhibition of their creative ideas, prototypes or projects. Therefore, the prevailed perception of the innovation fairs is referring to the activities of the plenty of the associations of the inventors, which have been established in ex-Yugoslavia. It seems that the concept of innovation fairs with the purpose to be exhibition of the achievements in innovative industries, start-ups and research labs is not launched yet. The nature of the available innovation fairs is exhibitions of the achievements of the mostly conservatively organized associations of the inventors rather than the brokerage event where the inventors and investors can meet and create the innovation partnerships.

³ The assessment of the innovation and competitiveness support programmes is done against the government strategy for development of competitive and innovative small and medium-sized enterprises and the related policy aims and expected intermediate results. Detailed reports are produced for each assessment result by a team of experts in ICIP project, SE Prof. Dr Djuro Kutlaca and JE Sanja Popovic-Pantic, M.Sc, as well as team members, Dusica Semencenko Ph.D, as MPI expert and technical support of Marija Mosurovic M.Sc. and Zorica Mitrovic (ICIP, 2011).

The network of business incubators in Serbia has been established with the aim to provide support to SMEs mostly those which are technology based/oriented. The analysis of both programs to promote innovation and the last one which is actually part of the innovation infrastructure has been done in the framework of the comprehensive Assessment of Innovation and Competitiveness Support Programmes, realized within the ICIP project in 2011.

2. EFFECTIVENESS OF THE NATIONAL PROGRAMS TO PROMOTE INNOVATION

2.1 Competition for Best Technology Innovation

The project Competition for Best Technology Innovation is initiated in 2005 by the Ministry of Science and Environmental Protection of Serbia. The idea for this project came from Faculty of Technical Science Novi Sad based on successful pilot competition for its students conducted in 2003. The success of this competition initiated proposal for a national competition to the Ministry of Science and Environmental Protection. Proposal was that Ministry provides technical services for project and it was so since 2005. All costs for the technical realization of the competition are paid from the budget. In addition to the role of funder, the Ministry has taken the job of promoting and organizing various subjects in the organization of competition. They are, in addition to the above mentioned, the Faculty of Technical Sciences in Novi Sad, the Serbian Chamber of Commerce and the system of regional chambers of commerce, local governments and companies.

The aim of the project Competition for Best Technology Innovation is to promote entrepreneurship in Serbia and assistance to potential and existing entrepreneurs, who are willing and able to own ideas and inventions spill over into the market valuable innovations. Besides receiving awards all participants who pass first round get access to some expertise through training and consultation to create an innovative strategy out of its new or substantially altered the product / service / process / software on the market.

The basic idea of the Competition is that the combination of innovation and entrepreneurship are recipe for competitiveness for all individuals, companies, universities and state. This is why there is wish to promote entrepreneurial spirit among researchers, students, innovators, creative individuals, teams and companies, especially those who will contribute through its activities to the economic life of Serbia be quickly transformed to a knowledge-based economy. The overall result achieved during the competition for the best technological innovation since 2005 by 2010 year are as follows:

- The cooperation between Ministry of Science and Technological Development of Serbia and the Ministry of Science and Technology of Republic Srpska started in 2007 -so the competition for the best technological innovation was also organized on the territory of the Republic Srpska;
- The number of reported innovations by the end of 2010 is 1615, the total number of innovations that pass the first round of review is 970. But it should be noted that in 2008 due to the simplified procedure of competition there was no second round of review. So with the exception of the 2008 in the second round of reviews was included 68.07% of innovation after the first reviews;
- Total prize money so far was 53.18 million dinars, of which 46,335,000 dinars was funded by MSTD;
- In the final total for all six years were 68 contestants, the total prize fund for them amounted to 41.88 million dinars. In addition to finalists, awards were given to semi-finalists and also there were prizes for special categories. Total award for special category was 7,385,000 dinars;
- So far in this competition a total of 5360 competitors participated, it was held 234 trainings, 476 teams have written a business plan for setting up a business based on their inventions and 115 teams have drafted marketing plan;
- Over 350 reviewers from home and abroad, has participated in this contest;
- For the first round of review there were two forms, one for category implemented innovations and one for innovative ideas;
- The form for innovative idea consists of seven parts:
 - business idea – this section evaluates how much research area is up-to-date and in what extant presented ideas are clear,
 - product/service/process/software – this part evaluates readiness of product/service/process /software to be presented on market, protection of idea and if the idea, potentially, presents in some aspects environmental hazard,
 - possibility of application – self evaluation about possibility of application,
 - market assessment – in sense of market target and market absorption,
 - competition – assessment of competition,

- general assessment – this part consists of assessment if the idea is based on accurate technical assumptions, degree of novelty and valuation of idea,
- competency assessment of reviewers by contestants,
- the last part consists of assessment of competence in the field of ideas and assessment abilities of analyzing the business;
- The form for application of implemented innovations consists of following parts:
 - business concept – which evaluates if benefit to the customer is well explained, in which way it is explained and if idea is explained in professional way,
 - product/service/process/software – this section examines if the idea reflects the new thinking and innovative content regarding the product/service/process/software or a new approach to market; if concept is ready for the market; if imitation of the product is possible and if protection of innovation is adequate,
 - market assessment – consists of assessment of market size and potential participation of competitors, identification of target groups and competition,
 - business model – evaluates the level of the awareness of the team about the market opportunities for their innovation and their commitment to the implementation of innovation at the market. Also, in this part evaluation is considering if “plan B” is created and if there is potential for growth,
 - conclusion –should summarize key arguments of the importance of that particular innovation in terms of markets, production, team skills, etc.
 - competency assessment of reviewers by contestants - is the last part and it examines opinion of contestants about competency of reviewers in area of idea and business part.

2.1.1. Policy recommendations

The project Best Technology Competition is one of the most attractive approaches of government to promotion of innovation.

Main obstacle for sustainable continuation of the Best Technology Competition in Serbia is status of the competition within MSTD's annual programme of activities and budgeting. The recommendation is to define appropriate managerial as well as financial scheme which could allow sustainability and continuation joined with adequate monitoring and assessment of effectiveness and performance of the competition.

Partially limit of this competition is that only access to contest is online, competitor must be very well IT educated to get participate in the contest.

One of the recommendations also could be that at least in some part of contest it should be in English. For example the awarded finalists should have presentations of their innovations in English and also the website of the whole contest should have its translation in English.

During the competition phase and specifically the presentation of innovations the awarding committee might consist as well of competent researchers and of business people contributing with additional expertise in the final stage of competition. With additional competency both technically and commercially, the inventors and innovators might be brought closer to the market with their new ideas and pilot products.

The competition and specifically the award event might need more targeted promotion also the final event is broadcasted on TV programmes at attractive hours. The award event should be held with the presence of the business society. At one point of the competition phase measures or events might be organized to enable a closer presence of innovations and inventors to potential investors or users/buyers of inventions. A special presentation to this group of investors is recommended.

It is also recommended to establish robust monitoring, evaluation and impact assessment Monitoring and Evaluation (M&E) system for this Programme support.

2.2. Innovation fairs - situation analysis

Key actors in this activity are Associations of the inventors of Serbia, Vojvodina and Belgrade. They are organizing both exhibitions as individual events of the achievements of their members as national and international events, and exhibitions as a part of the sector's fairs usually of Technical Fair, held in May in

Belgrade, Agriculture Fair in Vojvodina or Business Base, which is organized for 9 years at the Belgrade Fair. Although established in socialism, associations of investors try to catch up with the new trends in terms of regional and international networking with the similar associations worldwide, still remaining non-connected enough to the market. Therefore, there is a rather weak level of the commercialization of the inventions and innovative ideas, which are promoted in the scope of the either sector's fairs or entrepreneurship fairs.

Apart from them, there are numerous local associations which indicate that the innovation culture in society is spread but in spite of the scope of its expansion, it is not highly profiled but rather amateurish.

One of the most active local associations of inventors is Belgrade Association of Inventors which is famous for organization of the largest Serbian Exhibition of inventions and new technologies, which has been taking place in Belgrade for 30 years in continuity. Association of inventors and authors of technical improvement is active in promoting their members through organization of different fairs, exhibitions, conferences (BAI, 2012). They also have active web site and there is also available web database of their inventions and patents which can be searched according to the sectors. For their members, association is organizing the "open door" consulting when they can learn more on the legal aspects of the protection of their invention. This association provides to their members services in protection of their intellectual property rights as well. According to the data available in the Association of the inventors in Serbia, majority of the inventions come up in healthcare sector, agriculture, food processing, energy efficiency and mechanical engineering.

Serbian Chamber of Commerce as well as National Agency for Regional Development is providing the continuous support to the associations of inventors through non-financial support. Business Base as a fair where mostly business support organizations are promoted, is offering free of charge the stand to the Association of Inventors. NARD and MOERD have a grant schemes to support innovation activities of SMEs but not to the inventors. Also, SIEPA in their program to support export of the competitive SMEs supports the protection of IPR for innovation.

The infrastructure to support inventors and innovators to protect their inventions is also equipped with the special unit within the Serbian Chamber of Commerce, as there is a Board for Technological Innovations (CC, 2012).

The accession of Serbia to the European Patent Organization in the October 2010 facilitated to the Serbian citizens the acquiring of protection in all the member countries of the EPO. The membership in this organization, which covers 38 states including Montenegro and Bosnia and Herzegovina as extension states, enjoys great reputation with regard to the quality of registered patents and provides transfer of knowledge and technologies. However, the awareness of the importance of the protection of IPR is still at the low level which can be documented by the small number of patent applications submitted to the national IPO in last 10 years: 350-400.

2.3 Key findings and policy recommendations

Innovation fairs in Serbian economy are still connected to the exhibition of the inventions, organized mostly by the national and local associations of inventors. Accordingly, these exhibitions are organized individually or as an integral part of Business Base or other relevant fairs in sectors such as: healthcare sector, agriculture, food processing, energy efficiency and mechanical engineering. It is obvious that the activity of this associations, which usually have in their title "invention" or "innovation", is promoted and exhibited separately from the innovations of the SME's at the sector's fairs, which indicates that the inventors and innovators are not only "physically" but also practically, excluded from the core innovation activity of the SME sector.

On the other hand, innovations created by SMEs are usually promoted as a part of company-innovator's campaign, but not as a market innovation itself. This facts show that there is not appropriate innovation fair which would bring together innovative industries, start-ups, research labs and investors.

It is pretty clear that there is not developed methodology and procedure to evaluate the potential of invention to be developed into innovation and to become "marketable". Also, there is not such kind of authorized body, which would be able to implement such a procedure. It seems that there is also lack of the mechanism to inter-link inventions with the potential to be developed into innovation with the investors, as inventors and innovators usually have a lack of the financial resources.

Regarding the support to the inventors which is still perceived as separate from the innovative activities in SME sector, there are some services in place. Business support organizations are mostly providing the service of protection of the IPR while some of them as NARD has signed the memo of understanding with the Serbian Intellectual Property Rights Office (IPRO) which in practical terms means, that they signpost the inventors to IPRO. Some of the inventors complain that this is not valuable for them, as the taxes are too expensive and should be paid periodically, all the time.

NARD, MoERD, SIEPA, City Council MoSTD has launched in two recent years grant schemes to support the innovativeness of SME sector. If that practice become regular, it will be good to relate innovation fairs to the promotion of the examples of the “best practices” that will come out from that financial support. Also, the achievements reached in the project Competition for Best Technology Innovation should be promoted as well at the innovation fairs, since they usually stay short of the resources to commercialize, even awarded, innovative solutions in the product/process/technology development. That approach will bring multifunctional benefits:

- encouragement of the SMEs to continue the innovative activities;
- rising the competitiveness of the Serbian SME sector;
- rising the awareness on the importance of the innovativeness among the SMEs;
- attraction of the investors to Serbian SME sector;
- better visibility and transparency of the achievements of the grant schemes.

The main recommendations and proposed corresponding actions in the field of effectiveness and efficiency of programme are:

- Repositioning of the concept of the innovation fairs from the old-fashioned perception refer to the mostly non profitable projects of the inventors into the promotion of the cutting-edge technologies and achievements in profitable sectors;
- As a part of the new concept of the innovation fairs, online-matchmaking and networking should be organized through the web portal developed for the purpose of the continual activity which will be performing in the period between two annual innovation fairs;
- Relate the innovation fairs to the promotion of the examples of the “best practices” that will come out from the either direct innovation support provided by the relevant governmental unit in charge for Science Policy, or regular innovation support grant schemes organized by MoERD and NARD;
- Integration of the “Competition for Best Technology Innovation” into the new concept of the innovation fairs.

3. EFFECTIVENESS OF THE ESTABLISHED BUSINESS INCUBATOR NETWORK

3.1. Key findings of analysis

The study analysis on business incubators identified existence of 22 incubators in the network. The sources for research were three databases: databases of the Ministry of Economy and Regional Development, database created by Business Technology Incubator of Technical Faculties) and database of incubators registered in the Agency for Business Registers. Out of 22 incubators, 11 responded and the findings are based on their responses. All of these incubators have been established with, at least, one of the key listed goals: support to the development of entrepreneurship; promotion of entrepreneurship ;improvement of competitiveness; reducing unemployment; keeping young educated people from economic migration; making the link between science and economy ;technological development and increased innovation; training, education and retraining; Sustainability, economic and regional development.

Most of analyzed incubators operate in service sector mostly, with an exemption of a few incubators with prevailed manufacturing industries. By the Law on innovation, incubators could be registered as this sort of entity since 2005. Therefore, most of the respondent incubators (8 incubators, 72.73%) operates between 2 and 5 years, while three incubators (27.27%) exist up to 2 years.

Number of employees in these incubators is ranking from one to five employees (this is the case in 10 incubators, 90.9%), while the only one incubator has 19 employees.

In 90.9% of cases (10 incubators) the founders are cities and municipalities in which incubators operate (Kragujevac, Uzice, Nis, Subotica, Zajecar, Zrenjanin, Raca, Palilula, Prokuplje). Apart from them co-

founders are: Vojvodina Investment Promotion, regional agencies, centers, associations and chambers of commerce, universities, private companies and in some cases they are result of NGO initiatives.

When it comes to the number of companies operating within the incubator, 45.45% (5 incubators) currently have 10 tenants; while in 54.55% (6 incubators) operate over 10 tenants. The largest number of companies operating within one incubator is 16 (Business Incubator Krusevac), while the smallest number is two tenants (Innovation Centre for Entrepreneurship Development Raca). Total number of tenants analyzed in the 11 incubators is 108.

Number of employees in companies varies from 3 to 65 employees, while the total number of employees in these incubators is 352. Tenants can be divided into two groups: the first group which consists of four incubators (36.36%) with up to 11 employees, the second group consists of the remaining seven incubators (63.64%) with over 30 employees. Business Incubator Subotica is an incubator which enterprises have the greatest number of employees- 65 in total.

The incubation period for tenants for five (45.45%) incubators is three, for other five (45.45%) incubators is four years, only one incubator stipulated that enterprises incubation period is six months (IHIS).

Only three incubators (27.27%) had completed the first period of incubation. The total number of unsuccessful incubations in these incubators was seven, because of the unsuccessful incubation in two cases only one tenant left the incubator, while the one of the incubators have left even five tenants. On the other hand the number of tenants in these incubators which has successfully developed a business and left incubator for this reason was 22. It can be concluded that tenants who left incubators in 75.86% cases were case of successful incubation.

The total score in all incubators so far is: the number of tenants who have left the incubators is 17, while 36 of tenants have developed a successful business and therefore left the incubator. Of all tenants that have so far left the incubators 67.92% of companies have left after the successful incubation.

The largest number of unsuccessful incubation in an incubator is seven, while the largest number of successful incubation is 12, which means that 12 companies have successfully developed their businesses within the incubator and after incubation period left it. This incubator is in Nis.

The total income that these incubators made is 250,948,550.00 dinars, while net profit 15,616,160.00 dinars. In 2010 three incubators (27.27%) had a net profit of 0.00 dinars out of which two have been recently established. The most profitable in the past years has been Business Incubator Subotica, with 477,000 dinars, while the highest income generated the Business Technology Incubator of Technical Faculties Belgrade, with the revenues of 24,731,000.00 dinars in 2010. Business Incubator Subotica also achieved high profit rate of 13.07%, Business Incubator Zrenjanin of 9.66%, while the remaining 9 incubator (81.82%) realized profit rate of less than 4.00%.

Findings on the services provided to the tenants, show that all 11 incubators (100%) provide to its residents service of networking with other companies, then 90.91% (10 incubators) provide business improvement activities and trainings; 81.82% (nine incubators) provides marketing promotions, training, writing business plans, organization of fairs and exhibitions for the tenants and their representation and handling of photocopiers and other office equipment, while 72.73% (8 per incubator) provide services of public relations, then 54.55% (6 incubators) provide planning, access to financial resources, handling information and communication equipment, 45.45% (5 incubators) provide accounting services, 36.36% (4 incubators) negotiation and legal assistance and at the end 27.27% incubators provide communication services for multiple users.

Incubators also offer the services to non tenants, which are usually networking, consulting, training, writing of the business plans for clients etc. Incubators are usually associated with governmental bodies and agencies - even 10 incubators (90.91%). The rest of them are operating within the universities or faculties while only three out of 11 incubators (27.27%) is associated with consulting companies.

3.2. Policy recommendations

Analysis and conclusions of this report provide basis for the following recommendations and proposed corresponding actions to policy and decision makers responsible for innovation infrastructure in Serbia:

- National Programme for incubators with tenants – companies which are technology based/oriented, should be governed by the Ministry responsible for Science and Technological Development (at the moment MoES – Ministry of Education and Science). This Programme should provide support to incubators, stable source of funding and liability of reporting, monitoring and evaluation of them. In addition MoSTD should propose adequate instruments for cooperation between Universities and other R&D organizations and Incubators in order to improve innovation capacities of the tenant companies;
- National Programme for incubators with tenants – companies which are business oriented, should be governed by the Ministry of Economy and Regional Development. This Programme should provide support to incubators, stable source of funding and liability of reporting, monitoring and evaluation of them. MoERD should propose adequate instruments for improvement of business performance, visibility in business community as well as networking in business clusters of tenant companies;
- Incubators that are even partially state-owned must be accountable and cooperative with their founders, considering monitoring and evaluation of activities and social responsibility within local and national economy;
- Incubator's administration should established functional cooperation with national partners responsible for functioning of European Enterprise Network in Serbia;
- It is necessary to create mechanisms for better cooperation between management of Incubators with institutions that can help them to improve performance and operations of incubators and tenants, providing training programmes, certification and accreditation procedures, access to international funding schemes, etc.

Policy recommendations in the field of effectiveness and efficiency of programme are:

- Consultative meetings of MoERD and MoES (Ministry of Education and Science) should be organized at the regular bases with the aim to ensure compatibility of the strategic development of the incubators in Serbia;
- Registers of the technology based and business based incubators should make as corresponsive;
- Set up the criteria for establishing of the business incubators based on the "best practices" from EU and launch the accreditation procedure, which will distinct business incubators from the associations and clusters;
- Establish the effective selection mechanism of tenants which will promote the best applicants for start-up credits. This action implies good communication between banks, awarding institutions (NARD, MOERD, MoES, Fund for development etc). Launching this practice will contribute to avoid developed business to exist within the incubators.

4. CONCLUSION

Best Technology Competition contributed to the rise of awareness on innovation among entrepreneurs and to the outspread of entrepreneurial spirit among innovators. This national measure to promote innovation achieves the goals and in order to make this project sustainable, stable financial and managerial scheme should be set up.

As to innovation fairs, repositioning of the current concept of innovation fairs is needed which will bring also new approach to the commercialization of inventions. This concept should enable online-matchmaking and networking through the web portal developed for the purpose of the continual activity which will be performing in the period between two annual innovation fairs.

Although rather new part of innovation infrastructure, incubators in Serbia has achieved number of successful outcomes, such as development of new products and services, successful incubation, increase of employment and profitable performance. Most of the incubators in Serbia support service oriented tenants, although there are a small number of incubators in which operate manufacturing companies. Considering types of tenant companies, some of incubators could be classified as technology based, and others which are business based incubators. Therefore, different types of incubators ask for the more tailor-made set of services and it is expecting that their offers of services will be more specialized in the future.

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CROSS-BORDER INNOVATION PROCESS WITHIN THE EU ECONOMY

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Abstract: *The problem the paper focuses on is how to avoid economical misbalance that non EU transition countries cause when entering the EU. They enter their bad economies which disrupt the harmony of the EU economy. This approach leads to solving their problems only when they enter the society of generally highly developed EU countries. The problem should be resolved much earlier. In fact, the authors explore what could be the best way to introduce innovation as a philosophy and methodology into processes and activities in these countries long before their accession to the EU. Authors' hypothesis is that a cross-border innovation centre could be a platform of innovation activities between EU members and non EU member states. They have done a cross-border survey of random samples of about 100+100 SMEs, big companies and NGOs in cross-border regions: Vojvodina in Serbia and South Great Plain in Hungary. The survey which was performed gives data about basic innovation knowledge and cross-border possibilities of innovation process. The analysis of survey results has shown a lack of real understanding of the term of innovation, innovation development and cross-border innovation. Many suggestions the authors got were related to multinational spread of innovation. The contribution of this paper is a new model of a cross-border innovation centre which would bring more developed and innovative countries upon their entering the EU. This would reduce investment into their innovation activities and help in generating new products, processes and services, as such creating a unique innovation platform which would be of help to harmonize the EU economy by helping non EU countries before becoming EU members.*

Keywords: *innovation, cross-border, platform, model, transition countries, EU harmonization*

1. INTRODUCTION

The twenty-first century brought big changes into the capitalism world, especially in Europe and the USA. The usual flow of products, capital and working force starts to be misbalanced. The primer request of capitalism is to produce more and more and to increase profit with always growing profit rate shows impossible to follow. Mass production of products, even customized to consumer's demands, was not sufficient. For the first time a new phenomena appeared: mankind doesn't need increasing production, but strives towards new ideas, innovative products, services, processes. This all came in the worst moment for the European Union. The EU has just incorporated new members which makes this Union weaker and in position to be obliged to economically harmonize the EU area. This caused EU to involve experts in solving new increasing problems. Also, this made EU create some documents which would put a new base of EU strategic management highlighting the value of innovation as a new way of thinking and working. Open innovation and continuous innovation are two parallel branches of innovation process, both having a significant role in the European way towards the future.

The subject of the paper is the innovation process in non EU transition countries from which some are candidate countries (Croatia, Montenegro, Serbia) and others are potential candidate countries (like Former Republic of Macedonia, Albania, B&H, Kosovo).

The problem in focus is how to avoid economical misbalance which these countries make upon entering the EU. They bring their bad economies which disrupt the continuity of the EU economy. This causes solving of their problems only when they become members within the society of developed EU countries. The problem should have been solved much earlier. One of the solutions, an important one, is to start innovative activities before their entrance into the EU.

Actually, authors research what could be the best way to introduce innovation as a philosophy and methodology into the processes and activities of those countries before their entrance into the EU, having in mind the lack of knowledge about innovation in non EU countries.

This paper has the objective to present analysis of results about innovation issues and cross-border innovation aspects between non EU countries and EU members from the view point of innovation consumers and suppliers. The basic issues of this paper are:

The research object: Innovation as a tool of the EU economy harmonization

Hypothesis: A Cross border innovation centre could be a platform of innovation activities between EU members and non EU member states.

Research task: To set up a new model of a Cross border innovation centre by using survey of innovation subjects

Methodology: Survey made by using online questionnaires involving 100 respondents from Vojvodina and 100 respondents from south Hungary that answered the questionnaires. Data collecting, analysis and benchmarking are used to make a conclusion.

The paper proceeds as follows. The next section deals with literature review. The methodology is presented in the third section. The forth section explains the way the authors conducted the research and empirical results of the analysis. The last section is a conclusion with suggestions for the future research.

2. LITERATURE REVIEW

Global economy is turbulent. This is surrounding in which organizations function. (Eisenhardt et al., 2010). Changing environment is always unstable. Lack of stability is consequence of technical innovations, competition and knowledgeable human resources (Schreyog, Sydow, 2010). Organizations are forced in such conditions to be innovative. This makes them capable to face with new requests like: new market segments, demanding costumer requests... (Levinthal, 1993; Floy, Lane, 2000). Innovative processes which are permanent define Continuous Innovation (CI). CI consists of permanent improvement combined with radical operations, both resulting from knowledge gathering and using. These issues create flexible organization which is able to shape by changes (Boer, 2001).

Many articles and books are dealing with innovation, most of them focusing on corporate innovation. Some discuss why most business firms in advanced economies use only a fraction of their innovation potential. They suggest a new organizational form which is "collaborative multiform network". This form incorporates certain futures of innovative organizations along with some new necessary strategies, structures, capabilities and managerial philosophy (Miles, Miles & Snow, 2005).

Continuous innovation is not a natural process which occurs automatically within an organization. It is result of an active management and engagement with workers in an effort to initiate and sustain momentum (Cole, 2001). Some authors, like Zander and Solvell find cross-border innovation as an important process, but they analyze only cross-border innovation within multinational companies and they don't use wider access to regional concept. They find emergence of cross-border innovation in multinational corporations to avoid duplication. Such an international process would identify diversification of capabilities and ensure faster development of companies based on innovation. This increases importance of international innovation network (Zander, Solvell, 2000).

The Oslo Manual in its third edition published in 2005 discusses regional innovation and gives some rules how to create regional innovative strategies having in mind necessity to have consensus of policy makers and those involved in issue of regional innovation. This Manual defines basic terms connected with innovation and describes possible indicators valuable for the measuring of results of innovative process (Oslo Manual, 2005).

Cross-border regional innovation model is analyzed in Vang, Asheim, and Coenen's (2008) paper presented at the Conference: "New patterns and paradigms in global innovation networks". It presents regional innovation system RIS which uses knowledge exchange system which consists of two subsystems: knowledge exploration subsystem and knowledge exploitation subsystem (Vang, Asheim, Coenen, 2008).

Important issue of European future is to harmonize its area focusing on economy. Sufficient economic development should be base of common social and cultural activities and should ensure joint future of this new alliance. Problem addressed by the paper is a big difference in the level of development between old

EU members, countries which entered the EU during last decade and countries which will become EU members soon. Most of “Newcomers” are transition countries coming from the socialist regime which have been transformed into new capitalism states during the worst period of the big economic crisis, which is especially felt within capitalistic world. The European strategic goal is to overcome difference between old and new members and to gather new members as much developed as possible. Many European documents have aim to reach these requirements. The development which is requested must be result of new approach where innovations are core of all human activities.

What does continuous innovation mean for them, for the least developed? Do they start from zero point or they do re-start when enter the EU? Are there in position to improve, to innovate or to learn about those processes from more developed countries? How to assist them to enter the EU, as equal members, and not as states whose entry will likely require additional efforts in the protection of the EU economy.

This paper uses European directives for increasing innovation level by supporting cross-border innovation regional concept (Regional Innovation Strategies under the European Regional Development Fund, 2002) and directives for regional innovation strategies (Innovating regions in European network, 2005).

3. METHODOLOGY

The research which was performed by authors of the paper was financed through IPA (Instrument of Pre-accession Assistance) cross-border program Hungary-Serbia, second call for proposals. The proposal was made by two partners: Information centre for business standardization and certification of Novi Sad (Serbia) and Dél-alföldi Regionális Innovációs Ügynökség Közhasznú Egyesület of Szeged (Hungary).

Concerning the project it is very important that the accession of Serbia to the EU is in preparation. It is justified that the innovation strategic planning should be done in both regions by realising the cooperation with the neighbouring region and by the harmonization and optimal exploitation of resources. The first innovation strategy in the South-Great Plain region was made in 2004, and it has been constantly revised since 2008. There has not been a regional innovation strategy in Vojvodina yet. However, the South-Great Plain strategy also stops at clarifying relationships linked to national and communal innovation and it does not pay attention to cross-border innovation relations that are also important. The aim of this project was to fill these gaps by creating:

- a) Supplement of the South-Great Plain innovation strategy in relation to the Vojvodina regional innovation system, possibilities of cooperation, common cross-border innovation planning and the mutual interest from advantages of the new R&D major investments;
- b) Transmission of the South-Great Plain regional innovation strategy as a benchmark planning methodology and
- c) Commencement of strategic planning in Vojvodina by elaborating the Vojvodina regional innovation strategic concept based on pilot sampling and the dissemination of this among concerned economic participants.

The target groups of the project are primarily the stakeholders who participate in the link of innovation (SMEs, universities, research institutions, industrial enterprises) and those who have unquestionable role in the aspect of competitiveness of the region.

Benefits of the performed project will be:

- Strategic preparation for the accession of Serbia to the EU (as model for other non EU countries);
- Defining the possibilities of breakout to reach economic growth;
- Discovering cross-border cooperation in the field of research and development;
- Exploring possible cooperation;
- Enlarging the range of innovation services and counselling of bridging organizations;
- Increasing commitment of stakeholders towards innovation;
- Defining operational priorities in national resource planning;
- Defining possible big projects and their cross-border characteristics;
- Realizing innovation in the society.

The regional innovation strategic planning has many diversified but well-tried and applied methodology throughout the EU. In general each planning method starts with the elaboration of a questionnaire and a

primary survey. Since the South-Great Plain regional innovation strategy has a well defined and implementable methodology, it is applied for:

1. Processing of planning methodology of the South-Great Plain Innovation Strategy as a curriculum, elaborating and making available the related educational/training material related;
2. Organizing training(s) to Vojvodina participants according to the training material in the first point;
3. Elaborating common (on-line) questionnaire;
4. Sampling based on 100-100 questionnaires:

Serbia: intends to measure the 3 groups of examines: innovation companies, public funding research institutions, bridging institutions (they link those who need innovations and those who utilize innovation);

Hungary: concerns specifically cross-border innovation relations by analysing: public funding research institutions and universities, industrial participants and bridging institutions;

5. Creating a common database for innovative participants;
6. Statistical analysis of questionnaires and drawing appropriate conclusions;
7. Secondary data collection: going into deeper analyses where it shows as necessary;
8. Preparation of the strategy:

Hungary: completion of the South-Great Plain Innovation Strategy with relations, cooperation, and common planning points of innovation system of Vojvodina as a region;

Serbia: creating the Vojvodina Regional Innovation Strategy;

Common: defining the main points of the innovation strategy concerning to the two regions, defining synergies, differences and common possibilities of development.

The current project aims at the common strategic development, which concurs with the strategic target of the programme, that is to develop the two regions in a harmonic, cooperative and sustainable way, while also taking the business, educational and research-development targets into consideration. The project intends to reach the followings: reducing isolation of border areas by improving cross-border accessibility; synergies and co-operation in the economy; and to intense cultural, educational and research interaction.

The project directly supports economic development and reducing economic differences along the border region, and by opening up possible links, it creates an opportunity for long-term cooperation. The project also provides opportunity to increase the level of employment and balanced progress of the concerned regions. The activities serve the economic and social development of the border regions with respect to environment. The project is structured by setting long-term sustainability as an aim, and to ensure it, we integrated in the project activities. In the implementation of the project, enforcing the principle of sustainable development in the border region is a specific aspect, since the cooperation of local enterprises is an aim which must be achieved, with special attention to the cooperation of innovative companies on both sides of the border, which promotes the economic development of the companies, thus contributing to the positive advancement of the social status.

Concerning the long-term goals the following objectives have to be mentioned:

Increasing the cooperation between border regions: the objective comprises the increase in business connections, joint investments, and strengthening of cooperation with organizations and institutions.

It was very important to choose the right group of organizations which answers would make the real picture of cross-border innovation potential.

The sample was made from:

- a) organisations which need innovations: SMEs, big companies, public institutions, local authorities, government of Vojvodina and its departments,
- b) organisations which offer innovation services:
 - universities, faculties, R&D institutions, consulting agencies,
- c) organisations which transfer innovations
 - innovation centres, scientific parks, industrial networks, regional innovation agencies, chambers of commerce, business centres, technological parks, clusters, banks and financial institutions.

The research was done through following steps:

1. Creating of data base of respondents with general data and contact data
2. Creating of bilingual questionnaire
3. Primary data collection
4. Creating of data base
5. Statistical analysis of primary data

6. Statistical analysis of secondary data
7. Conclusions

Questionnaires were created during two workshops, first when partner from Hungary transferred its best practice to Serbian partner and the second one, when many stakeholders were involved in creating questions by including their innovation interests, services and troubles. In cover letter was explained that research was a subject of an IPA CBC project and definitions of some basic terms from the field of innovation were included, like:

What is innovation?

Who are innovation suppliers, innovation users and innovation transfers?

What is regional innovation strategic planning?

All questionnaires were sent by email. Respondents were called sometimes to remind them of giving answers. Big companies were visited and interviewed about the innovation subject.

4. EMPIRICAL RESULTS WITH ANALYSIS

Questionnaire in Serbia consists of two groups of questions:

1. Questions related to design of regional innovation strategy of Vojvodina

2. Questions related to design cross-border innovation strategy for an unique region of: Vojvodina in Serbia and South Great Plain in Hungary

There were sent:

-550 questionnaires in Hungary (answered 110, what is 20%) and

-620 questionnaires in Serbia (answered 106, what is 16%)

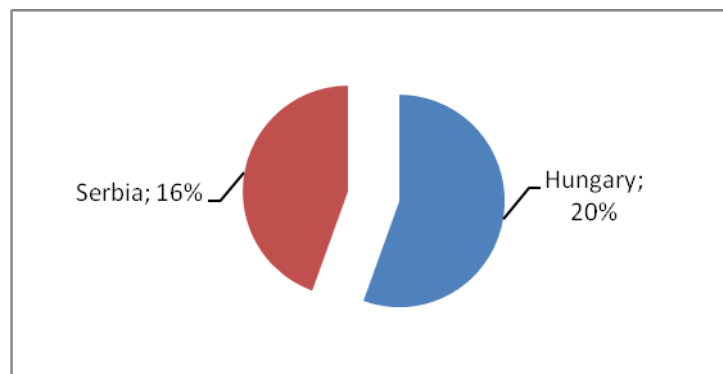


Figure 1. Percent of answered questionnaires in both regions
Source: Authors

4.1. Analysis of questions related to design of regional innovation strategy of Vojvodina

Analysis of answers on some questions which build a picture about level of innovation knowledge in Serbia will be presented.

- ✓ What does your firm consider „an innovation“ to be?

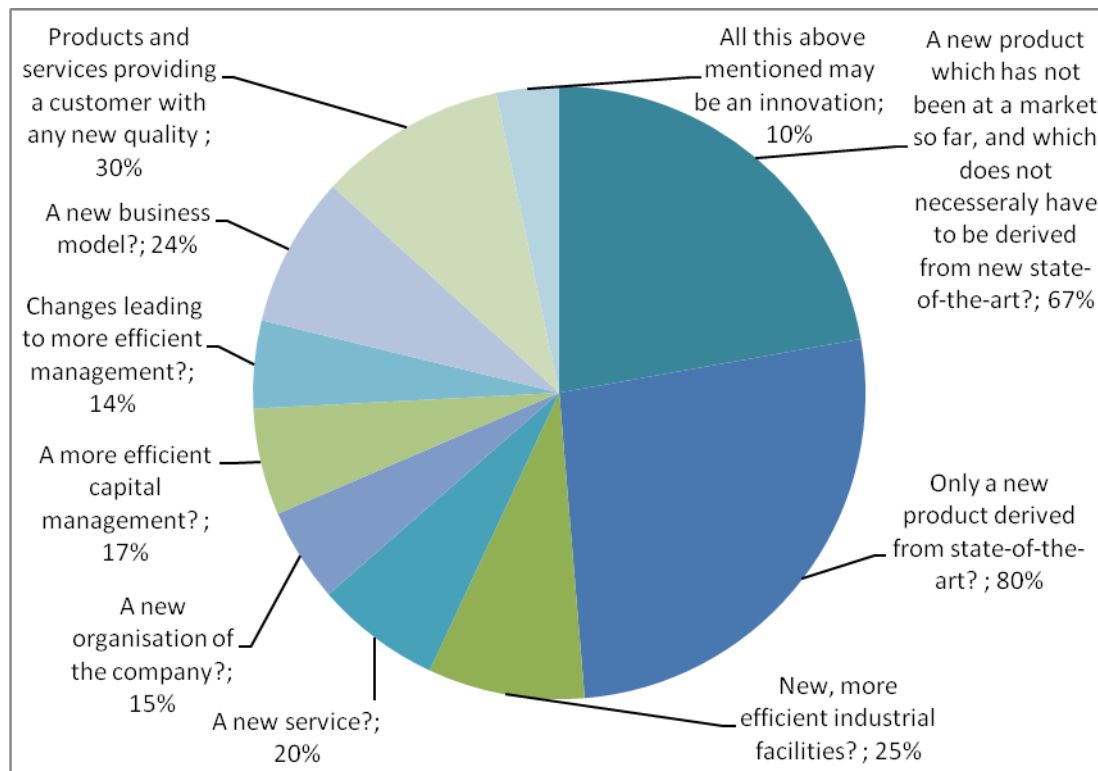


Figure 2. Structure of answers to the question: What does your firm consider „an innovation“ to be?
Source: Authors

Analysis of answers presented in Figure 2 shows missing knowledge about core substance of innovation. Most respondents, 80%, include only new products into term of innovation. Only 14% point that more efficient management could be possible innovation platform. Some of them, only a little percent of 10% consider all (management, organisation, services, products...) as potential source of innovativeness.

✓ What are the sources of innovation ideas in your company?

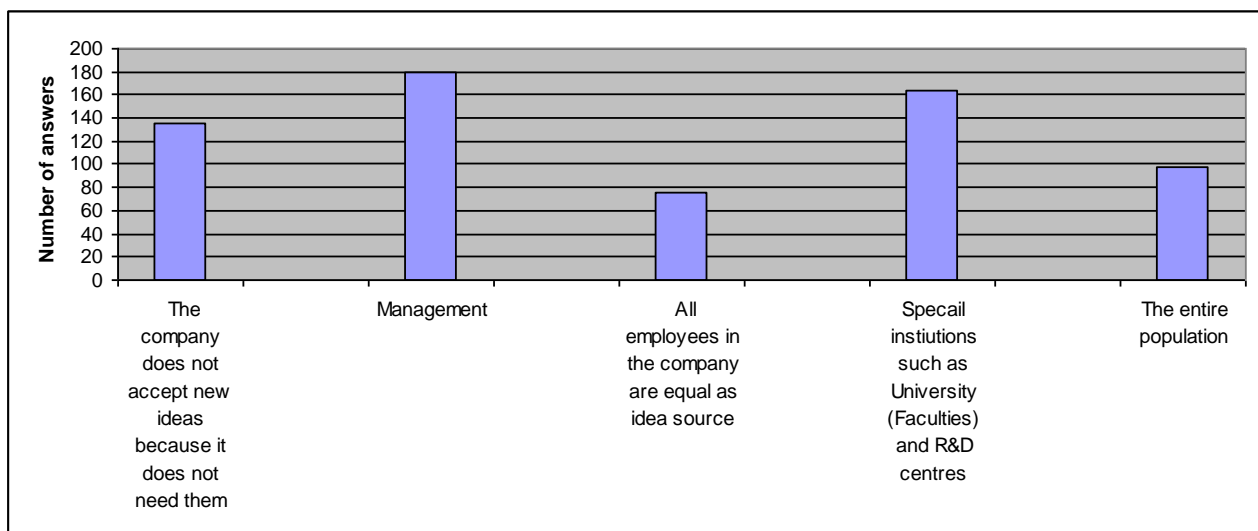


Figure 3. Structure of answers to the question:
What are the sources of innovation ideas in your company?
Source: Authors

Most responses referred directly to the management as an important issue of innovation. This shows that employees wait for management to generate progress and to solve problems of companies' sustainable

development. They regard themselves, employees, as not enough, or better to say, the least responsible for innovation as the base of the company's future. The reasons for this could be discussed having in mind significant number of answers which show that companies' management doesn't accept suggestions of working force as a pool of information, inventiveness, initiatives. Workers are not stimulated to be part of innovation process, they regard their ideas as needless for management. They wait for special institutions regarded as "innovation suppliers" to input innovations into the company's life.

4.2. Analysis of questions related to design of regional innovation strategy of Vojvodina

A separate group of questions is related to cross-border aspects of innovation. Namely, how innovation process doesn't recognize borders as limits. It should be analysed within wider territory. As Vojvodina and south Hungary have many similarities, innovation should be considered within cross border context. Some issues as: demography, culture, history, working habits, resources are similar between two regions. The big difference is Hungarian belonging to the EU and better economical perspective.

Such consideration brings to the point that two regions must have joint and complementary innovation strategic actions. These will brought to better competitiveness and future prospective of the cross-border region. Practically, first cross-border projects were initiated by the EU funds through Cards program, in 1990. The following part presents vision of cross-border innovation activities of examinees.

- ✓ Are you participating/or have been participated in a cross-border innovation project?

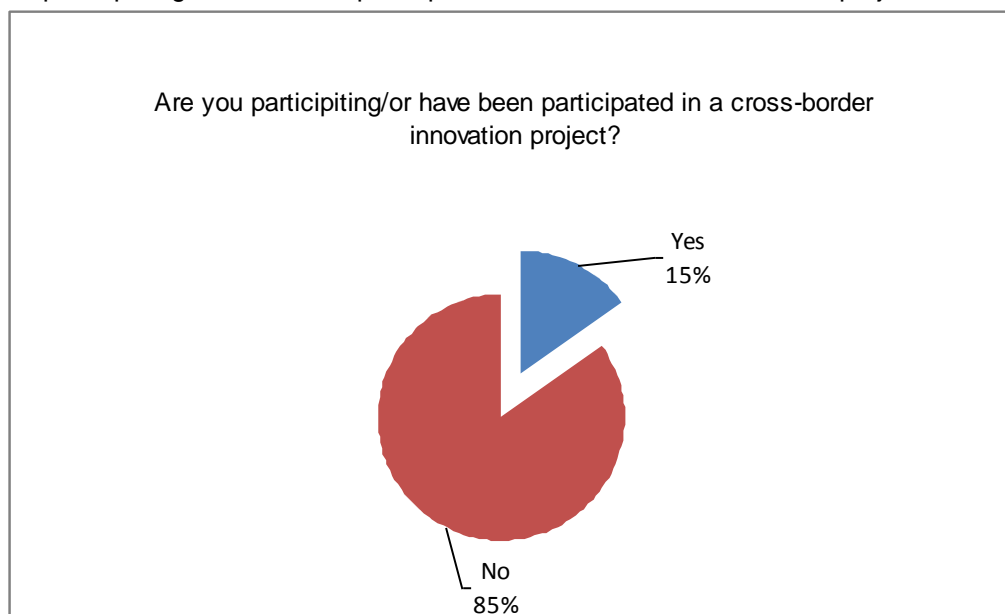


Figure 4. Structure of answers to the question: Are you participating/or have been participated in a cross-border innovation project?

Source: Authors

Experience with cross-border projects is very, very low. Only 15% have it. This shows that is necessary to increase awareness of possibilities of such cooperation for the whole region.

- ✓ Do you support cross-border study programmes?

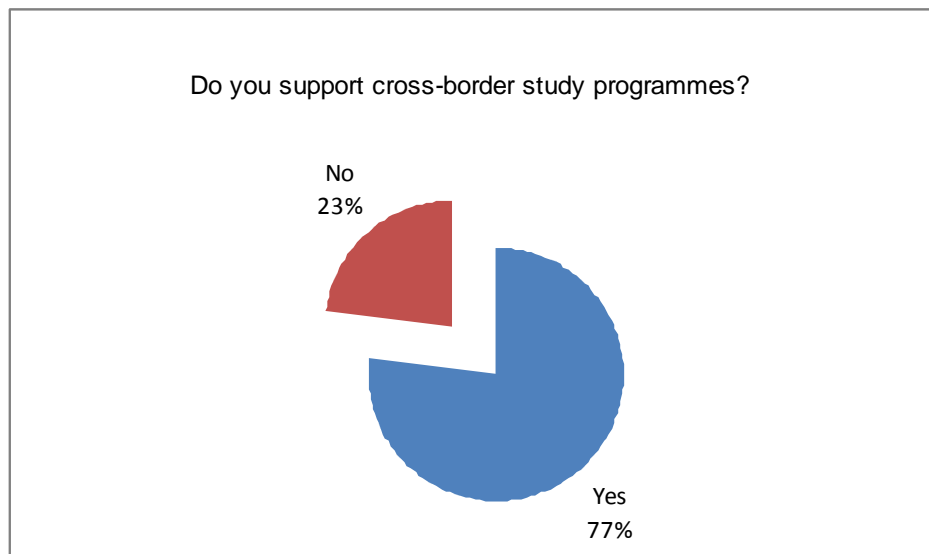


Figure 5. Structure of answers to the question: Do you support cross-border study programmes?
Source: Authors

The majority supports cross-border innovation study programmes. This leads to the suggestion to create joint study programmes in the area of innovation which would help to initiate and to push innovation activities strongly. These programmes could be for young students but also for adults, in the form of long-life learning.

- ✓ Have you ever thought about cross-border innovation activity?

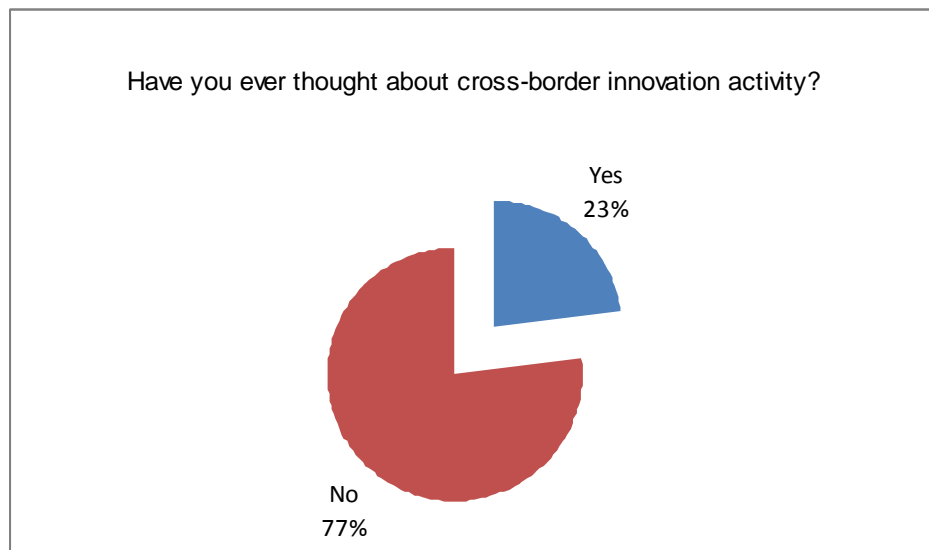


Figure 6. Structure of answers to the question:
Have you ever thought about cross-border innovation activity?
Source: Authors

This question supports our explanation about need to improve knowledge in the field of innovation and necessity of building awareness and institutions for innovation capacity building. The graph shows that only 23% examinees have ever thought about cross-border innovation activities.

- ✓ Do you support a creation of joint database of innovation potential resources (innovative firms, experts, suppliers, tools...)?

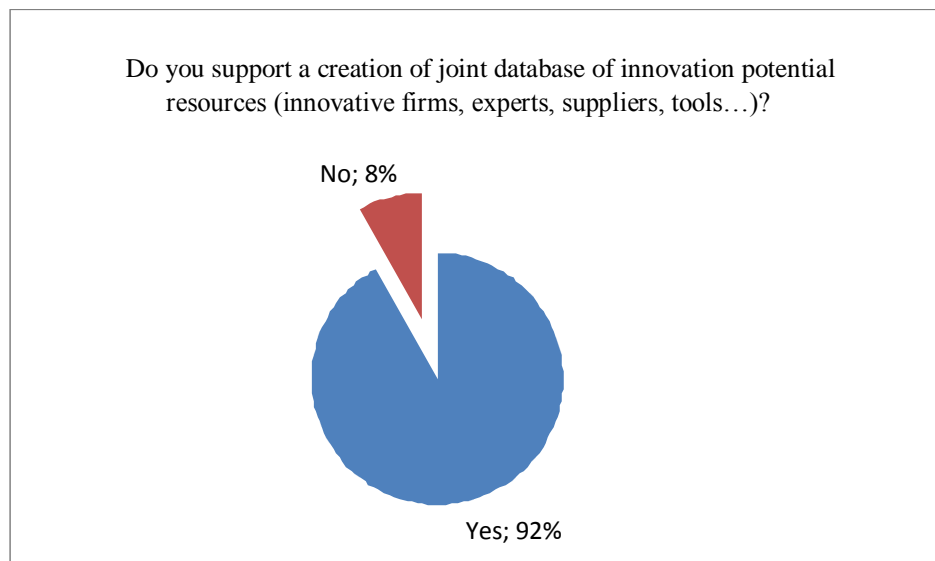


Figure 7. Structure of answers to the question: Do you support a creation of joint database of innovation potential resources (innovative firms, experts, suppliers, tools...)?

Source: Authors

Almost all (92%) who answered to the questions support idea of having joint innovation database. Database would offer pool of innovation experts, trainings, resources available to all stakeholders.

✓ Do you support cross-border SME associations (clusters)?

Results analysis show that 90% organisations support establishing and functioning of cross-border clusters which could join interests of all subjects from both countries such creating new value. Exchanging of problems and ideas will result with a new quality that will increase competitiveness of the region.

5. CONCLUSION

The project which is in progress and should give as a result Regional innovation strategy of Vojvodina has aim to influence policy makers to support area of innovation and all innovation subjects, but specially to stress potential and importance of cross-border innovation activities. Results analysis show lack of knowledge, activities, innovation results. Solution made according to received answers is a collaborative multiform network which would have function of a distributed cross border innovation centre. It confirms hypothesis that cross border innovation centre could be a platform of innovation activities between EU members and non EU member states. Such a centre would reduce costs of innovation activities and help in generating new products, processes and services, as such creating an unique innovation platform which would help to harmonize the EU economy by helping non EU countries before becoming EU members. Described model would be a core of innovation activities of cross-border networks of SMEs, like the cross-border clusters. It should incorporate following functions:

- a) education centre: Centre for start up and long-life education
- b) financial centre: Corn for financial institutions which want to support innovation based on different tools.
- c) development and research centre: SW and tools for innovation activities
- d) products laboratory centre for testing, pilot projects support, standardization and certification.

These functions must be managed by highly educated knowledgeable experts who have theoretical knowledge, social skills, but also realized real projects, that means practical experience in the economy. The supposed model is the result of Cross-border innovation strategy with cross-regional interest between two cross-border regions of Serbia and Hungary which was created within an EU funded IPA (Instrument of precession assistance) project. It is result of needs expressed in survey of random sample of about 100 SMEs, big companies and NGOs in cross-border regions: Vojvodina in Serbia and South Great Plain Hungary. The survey which was performed gives data about knowledge of basic issues like: invention, improvement, innovation, continuous and open innovation and comments on suggested new cross-border innovation model.

Contribution of the research is creation of a new model of distributed cross-border innovation centre which is not only multinational companies oriented. It encompasses all innovation activities of cross-border area in the field of products, processes and services. Such a model could be financed through instrument of pre-accession financial aid of the EU. Presented paper has contribution to the theoretical and practical issue of continuous innovation which would pull the future members of the EU into innovation life cycle before their entering the EU. Further research should analyse achievement of the suggested centre and diversify its functions.

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DISTINCTIVE CHARACTERISTICS OF THE SERVICE SECTOR AND ITS INNOVATION CHALLENGES

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Abstract: *Services play a key role in developed economies. Industries that deliver help, utility, experience, information, or other intellectual contents have expanded rapidly in recent decades and now account for more than 70% of a total value added in the OECD countries. Market-based services (that is, excluding those typically provided by the public sector, such as education, health care, and government) account for 50% of the total and have become a major drive of productivity and economic growth, especially as the use of IT services has grown. Services have also emerged as the main source of job creation, often compensating for job losses in the manufacturing area. Business services, such as computing, information services and R&D services, have generated more than half of the overall employment growth in many countries in recent years. Moreover, they encourage the improvement of competitive firms' performance in all sectors of modern economies. Since we now live in a services-based economy, it is disconcerting that universities are not more focused on the vital services sector in their research activity. At a time when concerns about outsourcing and off-shoring white collar jobs are raising alarms, a field that could assist in understanding how to add value to those jobs goes unexplored. Our ability to achieve further rise in our standard of living requires a deep understanding of how to innovate in services.*

Keywords: *service sector, characteristics, innovations, challenges, future*

1. INTRODUCTION

Globalization, increasing automation, the growth of the Internet, and the dynamic componentization of business are driving the reconfiguration of service sector at a scale and pace never before seen in history. The opportunity to innovate in services, to realize business and societal value from knowledge about service, to research, develop, and deliver new information services and business services, has never been greater. The challenges are both the multidisciplinary nature of service sector, which combines business, technology, social and organizational environment, and demand innovation as well as the lack of formal representations of service systems (Spohrer & Riecken, 2006)

More importantly, services play a key role in developed economies. They have expanded rapidly over recent decades and accounted for 70% of total OECD value added in 2000; on the other hand, market services (*i.e.* excluding government services) accounted for 50% of the total. Market services have become the main driver of the economy and the major contributor to productivity growth, especially as the use of information and communications technology (ICT) services has grown. Services are also the main source of job creation across the OECD area. While the service sector accounts for a lower share of total employment than of total output, market services was the only sector to make a positive contribution to job creation over the past decade in all OECD member countries. Job creation in services was often compensated with job losses in the manufacturing sector. Although service-sector jobs are frequently viewed as labour-intensive and characterized by low productivity, skills in this sector have undergone a rapid process of upgrading. As a result, the service sector attracts increasing attention from policy makers and other stakeholders interested in increasing economic growth and job creation (OECD, 2005a)

Several factors contribute to the expansion of the service economy. At the macroeconomic level, increasing manufacturing productivity and growing competition from developing countries limit employment growth in manufacturing and motivate efforts to focus on higher value-added activities. At the firm level, rising investment in intangibles, growing emphasis on knowledge management, a renewed focus on core competencies, and outsourcing play major roles. Within the manufacturing sector, services previously

produced in-house are now obtained via outsourcing. By the mid-1990s, services accounted for nearly 25% of the value added embodied in final demand for manufactured goods, compared to 15% or less in the early 1970s (Sheehan, 2006).

2. CONCEPTUAL FRAME

Where did the term “services” come from? The modern usage arose out of the U.S. Department of Commerce’s Standard Industrial Classification (SIC) codes in 1930s. In these codes, the major economic sectors were agriculture, manufacturing, and services. At that time, services was a residual category for other activities that didn’t fit into agriculture or manufacturing. Today, stretched beyond the point of being meaningful, that residual is the bulk of economic activity, and by far the fastest growing part of economic activity in the world.

How is the term “services” defined today? Some authors, as stated in Chesbrough & Spohrer (2006), suggest that: “A service is a change in the condition of a person, or a good belonging to some economic entity, brought about as the result of the activity of some other economic entity, with the approval of the first person or economic entity.” Services mean jobs and growth, but the companies who have been leading the charge lack a strong conceptual foundation for their work and are now reaching out to academics. To be sure, these firms have accumulated substantial knowledge bases from their engagements in each industry vertical market. But the knowledge bases are often company confidential and have not been studied by outside academics. Any larger patterns that might clarify and illuminate their functions have avoided detection to date.

The nature of services activity is broad (government, health care, education, finance, transportation, communication, business, and so forth). Services exchange is qualitatively different from both the earlier agricultural and manufacturing epochs. It involves a negotiated exchange between a provider and an adopter (supplier and customer) for the provision of (predominately) intangible assets. This frequent lack of a central artifact raises an important and interesting corollary: *Each party in the exchange needs the other’s knowledge in negotiating the exchange*. The provider lacks the contextual knowledge of the customer’s business, and how the customer is going to leverage the offering to compete more effectively in the market. On the other hand, the customer lacks the knowledge of the full capabilities of the provider’s technologies, and the experience of the provider from other transactions in assessing what will work best. While information asymmetries have always existed in economic exchange, the intangibility of services and the scale of modern B2B IT result in new levels of coordination complexity.

Before going any further, we should be clear as to what we mean by services since the term has so many varied and broad uses. When we use the term “service” or “services,” we are referring to service offerings provided for and/or co-created with customers such as professional services, retail, financial, telecommunication, healthcare, and many others. We also include services that are offered in conjunction with goods such as training and network support services in a technology company and even service that is derived from a tangible product such as the service embedded within an onboard GPS system in a car. What all of these services have in common is an interface with an actual customer whether through technology or interpersonal interactions.

3. DISTINCTIVE CHARACTERISTICS

3.1 Services as Processes

One of the most distinctive characteristics of services is their *process* nature. Unlike physical goods, services are dynamic, unfolding over a period of time through a sequence or constellation of events and steps. The service process can be viewed as a chain or constellation of activities that allow the service to function effectively. For example, a professional consulting service is represented by events occurring between business partners, beginning with learning about each other, developing a service agreement, a series of meetings, project deadlines, and deliverables. This service could take place over a short time frame or it could take place over several years. To function effectively for the client, the entire sequence of consulting activities should be coordinated and managed as a whole, over time, with emphasis on including the resources and steps that produce value for the customer. An analysis of the client’s consumption and co-creation process, interactions with the provider firm, and the underlying support systems is essential to managing this chain of service activities. While many of the essential activities that support the consulting

service are invisible to the client, understanding that fact and how these activities link to the client is essential to ensuring the value proposition.

Understanding how customers evaluate the service process, and how those judgments evolve, is also critical. Some research suggests that it is the summation of all the steps, or service encounters, within a service process that is evaluated by the customer and not just individual interactions with service providers. Other research examines the distinct events (i.e., service encounters) associated with a service process that are evaluated along unique attribute dimensions. Still others propose that the character of the process itself may play a greater role than the actual outcome in determining overall evaluations.

3.2 Services as Customer Experiences

In recent years the business world and trade press have become enamored of the notion of the “customer experience.” Some people advanced the idea that we are in an “experience economy,” in which the orchestration of memorable, even “transformational” events for customers is the key to differentiating one’s offering from those of competitors and escaping commoditization in an increasingly crowded competitive marketplace. Although the terms “customer experience” and “service experience” are frequently mentioned in the business press without explicit definitions, one article defines a customer experience as “the internal and subjective response customers have to any direct or indirect contact with a company.” Others have conceptualized a service experience as “the cognitive, affective, and behavioral reactions associated with a specific service event.” This definition implies a time-bounded progression of related interactions involving the customer and other people and/or technology in the production and consumption of a service. Customers have experiences, and all services create experiences. A main issue for managers is whether the company has the capability to systematically manage that experience, or whether it is simply left to chance. Effectively designing and managing the customer experience requires presenting a series of clues that function holistically to meet or exceed customer expectations.

3.3 Service Development and Design

Organizations that are more successful in providing new services keep their service development processes from being ad hoc. In other words, they prepare and move systematically (and often iteratively) through a set of planned stages from the establishment of clear objectives, to idea generation, to concept development, service design, prototyping, service launch, and customer feedback.

Service design requires an understanding of the customer outcome and customer process, the way the customer experience unfolds over time through interactions at many different touch points. A well-designed service that is pleasing to experience can provide the firm with a key point of differentiation from competitors. A smoothly delivered service with a positive outcome is more likely to result in favorable service quality and brand image evaluations, which both have influence on customer loyalty. Recurrent service quality problems are often the result of poor design (Bitner, Ostrom & Morgan, 2008).

4. SERVICE INNOVATION CHALLENGES

Companies, governments, and universities worldwide have recently awakened to the realization that services dominate global economies and economic growth. Yet, in practice, innovation in services is less disciplined and less creative than in the manufacturing and technology sectors. There are many reasons for this historic lack of rigorous attention to the unique aspects of service innovation. Some of these reasons are rooted in the remnants of the industrial revolution and the habitual fascination with tangible products and hard technologies as a source of product innovation, as well as an underlying belief that services have no tangible value.

Beyond these historic reasons, however, the lack of widespread and disciplined innovation in services derives at least partially from the nature of services themselves. Services are based on - and in many cases dependent on - human, interpersonal delivery systems, suggesting a need to focus on process and experience innovation. Traditional product innovation tools emphasize the design of tangible, relatively static products with physical properties. Services are fluid, dynamic, and frequently co-produced in real time by customers, employees, and technology, often with few static physical properties. Thus, many of the invention protocols and prototype design techniques used for physical goods, hard technologies, and software do not work well for human and interactive services, or at least they demand significant adaptation to address service innovation challenges (Bitner, Ostrom & Morgan, 2008)..

In recent years, a number of surveys have made it increasingly clear that service-sector firms are innovative, but with patterns of innovation that differ from those in the manufacturing sector. In general, innovation in the service sector relies less on in-house R&D than in the manufacturing sector. Whereas countries with high levels of R&D in their manufacturing sectors (measured as a share of value added) also have high shares of innovative manufacturing firms, this relationship does not hold for the service sector. Germany, for example, reports very high rates of innovation in the service sector, but low levels of R&D spending as a share of value added in services. Conversely, reported rates of innovation in Denmark and Norway are below the European average despite high relative levels of spending on services R&D (Sheehan, 2006).

5. THE CENTRAL ROLE OF COMPUTING

Rust & Miu (2006) pointed out that computing plays a central role in the service revolution by facilitating the communication, storage, and processing of information. Using IT, businesses have improved communications both internally and with customers. Different departments within the same company can easily share information electronically, and businesses and customers can now contact each other via email. Firms now have the ability to collect and analyze information on customers' entire purchase and contact histories. Since IT has drastically decreased the cost of customization, marketing to smaller segments has become economically feasible. As technology continues to decrease the cost of customization, the logical end is one-to-one marketing, with businesses targeting each customer separately and providing individually customized marketing.

Over time, firms can build relationships with customers by inferring their needs and providing service to meet those needs. Information also gives consumer the power. Consumers can receive information about a broader range of businesses, as well as perform their own searches to find the product that best suits their needs. Consequently, businesses are faced with greater competition and greater need to differentiate. Firms must provide the best value for better-informed consumers or fail to attract them.

6. THE FUTURE OF SERVICE SECTOR

Computing and IT provide a particularly strong support for a shift toward service by supplying information and tools to facilitate communication and build customer relationships. As the capacity to gather and process information grows, companies can use their new knowledge to offer customized service. Thus, with more information available to improve service, information-driven service becomes necessary for customer satisfaction and profitability. Many businesses have focused on cost reductions made possible by technology, but concentrating only on cost savings is an outmoded vestige of the production mind-set, from which companies must escape to succeed.

Academic research indicates that tunnel vision on productivity and efficiency can drive unintended service quality erosion, which may hurt revenues and profits despite cost savings. Instead, companies should utilize IT to expand revenues through better service as well as to cut costs via automation. Real-time communication with customers is becoming easier and more affordable. Companies can quickly identify customers' desires, guide them to products that meet their needs, and provide the necessary level of service. Additionally, firms can promptly detect and fix customer problems, again increasing customer satisfaction and building long-term relationships.

Companies are learning from relationships with their customers. Using computer databases in conjunction with information collected through surveys, businesses can better understand customer attitudes, perceptions, and behavior. Armed with this new knowledge, businesses can design and improve service to ensure long-term profitability. Finally, service gives firms a new tool for financial accountability. Customer equity is a measure of future cash flows that is useful in business valuation, and facilitates the calculation of return on investment for service improvements or any other business improvement. In addition, customer equity enables companies to compare prospective returns on investment from competing service strategies (Rust & Miu, 2006).

On the other hand, if policy makers wish to strengthen economic growth and improve the foundations for the future performance of economies, the services sector will need to do better. But strengthening growth performance is not the only challenge facing policy makers; countries are also confronted with the growing globalization of services and manufacturing and with rapid technological change. This has raised doubts about the capacity of economies to create new jobs, while at the same time offering new opportunities for

international trade and investment. Addressing these challenges and strengthening the potential of services to foster employment, productivity and innovation will need to build on sound macroeconomic fundamentals and involve a combination of structural policies. The OECD (2005b) report on services encourages policy makers to take action in the following areas:

- *Open domestic services markets to create new job opportunities and foster innovation and productivity*
Further regulatory reform of services markets will create fresh opportunities for firms to develop new services, meet emerging global demands and increase employment. It will also increase the incentives for companies to innovate and improve productivity growth. While much progress has been made in opening services markets, further steps are needed, e.g. in reducing the degree of public ownership in competitive industries such as air transport, in addressing anti-competitive practices in professional services, and in reducing barriers to entrepreneurship.
- *Take unilateral and multilateral steps to open international markets to trade and investment in services*
OECD work shows that the benefits of international trade and investment in services are highly significant, for both OECD economies and developing countries. Policy makers can take unilateral steps to open markets to international competition, for instance by reducing barriers to foreign direct investment. At the same time, multilateral action is needed to ensure a broad opening of markets and a wide distribution of the benefits. OECD members should therefore seize the opportunities offered by the ongoing WTO Doha negotiations to open their services markets.
- *Reform labour markets to enable employment creation and adjustment to a growing services economy*
Effective labour and social policies are essential to help OECD economies adjust to globalization, structural change and the shift to services. To strengthen employment creation in services, policy makers should address high labour taxes that affect the job prospects for low-skilled workers and the development of personal services in OECD economies. Employment protection legislation should be reformed in countries where it is overly strict, to help improve the capacity of these economies to create employment and enhance productivity growth in services.
- *Adapt education and training policies to rapidly changing requirements for new skills*
Since most services involve direct contact with customers, human resources are key to services sector performance. Education policies are important to help workers adjust to globalization and structural change and should help provide the qualifications that are needed in services. However, they need to be supplemented with actions, partnerships and co-financing by firms, workers and governments to foster life-long learning. This will require improved incentives for private financing of life-long learning and actions to ensure equitable access to formal and on-the-job learning.
- *Adapt innovation policies to the growing importance of services innovation*
Innovation policies remain ill adapted to the growing importance of innovation in services, and to the new potential for product and process innovation that is due to information and communications technology (ICT). Policy makers should consider how existing public R&D can better address the needs of the services sector and improve the links between services sector firms and public research. In modifying policies related to intellectual property in services, governments will need to strike a careful balance between innovation and the diffusion of service innovations to other industries.
- *Remove impediments that prevent services firms from seizing the benefits of ICT*
To seize the benefits of ICT for services, governments should continue to encourage effective competition in ICT infrastructure, network services and applications, notably for broadband. They will also need to increase the trust in electronic business, e.g. by developing effective regulatory frameworks. Regulatory barriers, e.g. to digital delivery and digital content, also require reform, as they are not adapted to the new potential offered by electronic business. Moreover, governments can take action themselves, by developing public services and digital content.
- *Provide a fiscal environment which is conducive to the growth of services*
Governments will need to avoid that the interaction between the application of EU and non-EU value added taxes, as well as sales taxes, leads to new tax barriers to cross border services. Tax treaties should be reviewed to avoid such activities being subject to double taxation. Tax dispute settlement procedures should be accelerated and reinforced, notably for cross border services and intangibles.

Reform of services sector policies provides an important opportunity for policy makers to strengthen employment, productivity and innovation. It will also help in strengthening the capacity of OECD economies to adjust to economic globalization in services and to the growing importance of services to future growth in OECD economies. The policies advocated in this report are mutually reinforcing. This is important since seizing the new growth opportunities in the services sector and adjusting to globalization will be possible only through a comprehensive strategy based on a policy mix that is suited to each country or circumstance.

7. CONCLUSION

One may reasonably ask, why is this the time for considering a field in services science? To be sure, the role of services has been growing in the economy, but this has been a long-term trend over many decades. What has prevented the emergence of a field earlier, and equally, what enables such a field to emerge now? The critical enabler today is ICT. As these technologies have advanced according to Moore's Law, the ability to codify and transmit knowledge, and to reuse and recombine that knowledge, has grown exponentially as well. More subtly, advances have enabled knowledge to be separated from artifacts in the form of high velocity information. Stripped of the artifacts in which they were previously embodied, this information can move at much higher velocity in specialized businesses, professions, and tools. In addition, the information is not consumed in the exchange, but remains available for additional use or reuse by others. This was not true in the earlier epochs, where the consumption of a product meant that others could not consume it. It is this liberation of knowledge into information, and embedding that information in systems augmented and accelerated by Moore's Law, that explains why the services science field may now be able to emerge. Similarly, the knowledge embedded in business organizations is being codified, modeled, and separated from the businesses, again accelerating the velocity at which this new kind of information - formal representations of business - can be reused and customized.

The future of the service economy depends on worldwide appreciation, dedication, and encouragement of innovation as a key component. The growing importance of services in the economy implies that efforts to improve standards of living, boost productivity, and create jobs must focus increasingly on the service sector. Whereas the service sector has often been characterized as a locus of low wage, unproductive, and un-innovative jobs, recent evidence gained through innovation surveys and better statistical data discredits this view, confirming that services are indeed innovative and, in some areas, more innovative than manufacturing.

In fact, knowledge-intensive services, whose value added is intangible rather than incorporated in physical products, play an increasingly dynamic and pivotal role in today's knowledge-based economy, contributing to innovation in all economic sectors. Firms in the telecommunications, finance, and business services have among the largest investments in R&D in the service sector and a strong reliance on highly skilled workers. Policymakers will need to determine how best to stimulate the growth of these sectors and to enhance the development and exploitation of knowledge in other service-sector industries. In other words, they will need to determine how best to promote innovation in services.

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INNOVATIONS OF INSURANCE COMPANIES AND INVESTMENT FUNDS

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Abstract: *The aim of this paper is to review recent progress in innovation activities of investment funds and insurance companies. The paper reviews main innovation trends globally, their causes and consequences. The research has identified that innovations of insurance companies and investment funds are predominantly incremental and focused on products although they usually refer to processes, marketing and overall organisation as well. In investment fund industry main innovations recently have included credit swap defaults (CDS), Exchange Traded Funds (ETF), hedge funds, social impact bonds and other innovative products. In insurance industry, in addition to incremental innovations such as amendments to contracts' terms and conditions, recent innovations encompass microinsurance, enterprise risk management, e-business applications, bancassurance, index insurance and alternative risk transfer. By summarizing the current state of knowledge of innovation activities among insurance companies and investment funds, the paper could be useful for domestic investment funds and insurance companies in their efforts to identify possible areas for innovation, as well as for the government bodies to understand why fostering the creation of an innovation-friendly environment will bring benefits not only to financial services industry but to society as a whole. Finally, the results presented in the paper are a good starting point for future research.*

Keywords: *innovation, insurance companies, investment funds*

1. INTRODUCTION

Etymologically innovation means to renew, to restore and the word stems from Latin word *innovare*. It essentially means the introduction of something new or different. Innovations are usually classified into product and process innovation (e.g. Oslo Manual, 2005; Greenhalgh & Rogers, 2010; Allen & Yago, 2010; and Pain, 2011). Product innovation is the introduction of a new or significantly improved product or service that improves the range and quality of those currently offered. Process innovation is the introduction of a new or significantly improved process of production or delivery of goods and services. In addition to product and process innovations, classifications can also encompass organisational innovations (e.g. Oslo Manual, 2005; Allen & Yago, 2010 and Pain, 2011) as well as marketing innovations (e.g. Oslo Manual, 2005 and Pain, 2011). According to Oslo Manual (2005) "an organizational innovation is the implementation of a new organizational method in the firm's business practices, workplace organization or external relations" (p.51). Also, according to Oslo Manual (2005) "a marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing" (p. 49).

Furthermore, innovations can be classified by the degree of novelty. It is well known (e.g., Schumpeter, 1934 and Abernathy & Utterback, 1978; Oslo Manual, 2005; Greenhalgh & Rogers, 2010; Allen & Yago, 2010; and Pain, 2011) that innovation not necessarily means the introduction of radically new products and processes. In financial services, especially in insurance industry, innovations are more often incremental in their nature (Pain, 2011). In this regard, depending on the degree of radicalism innovations can be divided into incremental, evolutionary and transformational (Pain, 2011).

Innovations have had a paramount importance throughout the human history. Innovations such as fire, wheel, agriculture, pottery, irrigation systems, use of metals, writing and so on, actually directed the history. Without innovations humans would never calculate, write, sail, drive, trade and improve their overall well-being. The success of the Japan and Japanese companies after the Second World War is the obvious example of the importance of innovations. Namely, the success of Japanese companies in global markets is mainly attributed to continuous innovations by Nonaka & Takeuchi (1995) who pointed out that their success originates in their „capability to create new knowledge, disseminate it throughout the organisation, and embody it in products, services, and systems“.

Nowadays, innovation is the key driver of competitiveness, economic growth and prosperity (Chandra, et al, 2009). Marklund, Vonortas & Wessner (2009) point out that “innovation is essential to economic life, as it is the main determinant of economic productivity and productivity growth in firms, sectors, regions and nations and thus it is strategic issue for business of firms and public policy” (p.3). Innovation activities are especially important for companies doing business globally as confirmed by Knight & Cavusgil (2004). By investigating companies that expand into foreign markets and exhibit international business from or near their founding they highlight the critical role of innovative culture as well as knowledge and capabilities. Investments in research and development are common nowadays in order to foster innovations. However, it became obvious that new knowledge can generate economic growth and jobs only by its transformation through entrepreneurship in innovations (Audretsch, 2009).

Since the ancient societies of China, Mesopotamia, Egypt, Greece and Rome, financial innovations have always underpinned other innovations and made possible agriculture, especially the production of olive oil, wine and sugar and production of precious goods (Allen & Yago, 2010). The roots of insurance can be traced back to 5000 B.C. when in China traders divided their cargo into several ships in order to diversify risks of carrying out the goods over the Jangce river. The development of modern insurance started with first insurance company established in the U.K. in 1667 (Njegomir, 2011a). Finally, first mutual fund has been invented in 1774 in the Netherlands (Allen & Yago, 2010). More recent studies (e.g., Ćirić & Njegomir, 2011) indicate that the development of financial services is indispensable for entrepreneurship and innovation. Insurance companies and investment funds facilitate innovations in other industries. By accumulating capital and providing risk diversification on one hand and by fostering technological progress on the other, financial innovations facilitate economic growth and improve social welfare (Chou & Chin, 2004). The question that we are trying to answer in this paper refers to types of innovations that are present in the insurance and investment fund industry.

2. INSURANCE INDUSTRY INNOVATIONS

Historically, insurance companies have been conservative regarding innovations, especially those of radical character. Although innovations in insurance as well as in other industries present the foundation of the success there are many studies that indicate to conservativity. Pearson (1997) on the basis of the analysis of insurance industry in Great Britain during the period between 1700 and 1914 points out that innovations in insurance are important ingredient of success but have mainly counter-cyclical character and they are relatively undynamic. Garth (2011) indicates that insurance companies had been innovative during the sixties and seventies of the twentieth century while after that they became less innovative.

Innovation is recognized to be especially important for market oriented insurers. Lado and Maydeu-Olivares (2001) investigated the influence of competitive environments on the uses of market orientation in insurance companies in the EU and the USA and the effects of market orientation on innovations. They found that EU and US insurance firms analyze and react to their environment differently and that is reflected in a differential impact on their degree of innovation. However, there are no identified overall market orientation differences nor between market orientation and innovation degree and performance. They also found a positive impact of overall market orientation on insurance firms' innovation degree and performance in both the US and EU markets.

The thesis of the relationship between innovation and long term success in insurance has been confirmed by many studies. Lehmann & Zweifel (2004) have confirmed the thesis for health insurance. By ascertaining that important motive for deregulating social health insurance were to encourage product innovation and analysing risk selection in deregulated social health insurance, they found that cost savings achieved by non-US managed care plans are attributable to product innovation. Garth (2011) indicates that while insurers were innovative they achieved growth, expanded customer access and became more efficient. Lee, Wang & Chang (2011) have found that marketing innovation cast a significantly positive impact upon the performance in the case of life insurance companies listed in Taiwan. By analyzing a panel data set of 12 private life insurance companies over the financial period 2006-2009 in India Dutta & Sengupta (2010) found that increasing investment on IT-infrastructure which is resulting with technological innovation in business operation has a favourable impact on efficiency. Innovations in insurance also have positive impact on financial intermediation, capital accumulation, risk diversification and increased economic efficiency (Pain, 2011).

Despite the traditional conservative approach to changes in products, processes, marketing and organisation, the pace of innovation activities in insurance industry has been identified recently. New regulations such as Solvency II in Europe, changing competitive environment not only among insurance companies but also with other industries such as an investment or pension fund industry, changing nature of existing and emergence of new risks, such as environmental liability risks, increasing probability and intensity of loss events because of external influences such as terrorism or climate changes, the need for constant influence on public confidence in insurance, changing in customer preferences, economy, politics and technology are all forcing insurance companies to innovate. Aforementioned and similar changes are happening all the time and are pushing insurers to constantly respond to them by innovations. In the continuation we explain the most important recent innovations in the global insurance industry with no particular order.

Insurance is a type of financial service that potentially can provide evasion of high costs of other risk management approaches. Also, insurance can provide preservation of financial position in the event of a loss but also protect from the poverty. However, insurance is usually seen as a luxury by poor or at least there is their distrust in the security of coverage as it cannot be felt, smelt or touched. As a result of expressed needs microinsurance has been developed as a model for organisation of insurance activities for the poor. Microinsurance provides financial indemnification in the case of a loss event, provides avoidance of other cost ineffective mechanisms of loss protection, which as a final result has reduced poverty (Njegomir, 2011b). The term „microinsurance“ appeared at the beginning of nineties and since the middle of nineties it has been in use by International Labour Organisation and UNCTAD. Motives of microinsurers creation are various. Microinsurance is essentially intended for the poor, unemployed or employed in informal sector, or in other words, for persons that do not have access to traditional insurance and are excluded from social insurance programs. According to Brown (2009) the motives are: the loss protection of poor clients, reduction of own exposure to credit risk that stems from approved loans and the possibility for the achievement of additional profit (p. 171). From the point of view of insurance companies micro insurance is essentially business model innovation that provide them with access to people that previously have not been served. The tremendous potential of this market segment is evident and that is particularly important for insurance companies that operate in mature markets.

One of the business model innovations that appeared during the previous decade was enterprise risk management (ERM). The idea of ERM is that companies, especially insurance companies, manage aggregate level of risk. Basically, ERM menas to holistically manage all risks that insurance company is faced with. Insurers have traditionally managed insurance risks and that is their core business activity. However, insurance companies are not exposed only to insurance risks, or risks that they accept from insureds. They are exposed to many other risks such as market, credit and operational risks. Insurance companies firstly started to apply the ALM concept that meant simultaneous management of assets and liabilities. The main problem, however, was the fact that risks were managed individually in „silos“, that is, in isolation from one another. Then the concept of ERM appeared. The key intention is that the solvency position of insurance companies is better protected if risks are managed integrally, with all their interdependences. This concept provides adequate information for management decision making that seeks to optimise business operations through minimisation of expenses and thus profit maximisation at the given level of agregate risk, or in other words, to minimise agregate risk at the given level of capital (Njegomir, 2007a). The concept or ERM is now preferred by rating agencies and Solvency II, new solvency regulation within the EU.

Marketing is the basic preposition for the development of insurance and reinsurance. One of the most famous management gurus of the twentieth century, Peter Drucker (1973) emphasised that enterprises basically have only two functions, marketing and innovation, and he concluded that only „marketing and innovation produce results all the rest are costs.“ (p. 61). Marketing consists of individual and organisational activities that facilitate trade in dynamic environment through creation, distribution, promotion and valuation of goods, services and ideas (Njegomir, 2006). Although product, price and promotion are important, the most creative applications and the most of the innovations in insurance has been done in the distribution of insurance services. It is because the distribution channels are instrument that create value of the place, ie. they facilitate the availability of insurance services at the time and place where customers want them (Njegomir, 2007b).

Insurers usually use a mix of distribution channels. Traditionally they have used their own representative offices as well as agents and brokers. They have also developed bancassurance and e-business. The basic idea of bancassurance is to provide access to greater number of potential customers through established network of bank branches. The idea of bancassurance has emerged in 1965 and has been utilised

successfully mainly in continental Europe, particularly in France, Italy, Portugal and Spain. In these countries bancassurance facilitated insurance penetration and density and improved the structure of insurance giving the impetus for the increased share of life insurance. Although the idea is relatively old it is new in Serbia and it represents a striking example of how old idea can represent innovation when it is not previously applied in a specific company or market. Insurance companies in Serbia only recently, in the last decade, have started to utilise bancassurance and insurance companies has signed long-term contracts with banks, such as insurance company DDOR Novi Sad with Razvojna banka Vojvodine (Development bank of Vojvodian), Delta Generali with Intesa bank, Basler with OTP bank, etc.

Although bancassurance has been innovation for the Serbian insurance market, the most influential has been the utilisation of internet in insurance. Insurance companies presence on internet at first has been based on their static web site presentations. Later e-commerce has developed. It represents revolutionary accomplishment in the area of insurance sales and it provided insurance companies with ever greater access to potential customers, the improvement of sales services by providing insurance protection when and where customers want it, multimediality and interactivity. Later, the concept of e-business in insurance emerged. It is sophisticated concept that understand not only sale of insurance but full transition to the virtual business. Most recently insurers has been developing mobile internet access and social media presence. Mobile internet access provides potential customers and insureds with online services that are available through mobile phones. Now insureds, potential and existing, can quote, pay bills and report claims through their mobile phones. Also, social media presence of insurers, especially in the US is increasing. Social networks such as Facebook or Twitter have increasing impact for the marketing of insurance companies as they serve as special kind of „word of mouth“ promotion.

Product innovations are also very important for insurers but also for insureds and society as they provide coverage for risks that was not covered before, offer more affordable coverage through innovative uses of bonuses, maluses and deductibles and improve the customer satisfaction through services such as guaranties, assistance and property replacements. One of the most prominent product innovations recently has been index insurance, the alternative mechanism to traditional indemnity based insurance. Hellmuth et al (2009) indicate that index insurance offers significant opportunities as a climate-risk management tool in developing countries. According to Skees (2008) index insurance provide payments that are based upon „an objective and independent *index* that serves as a *proxy* for significant losses to crops, livestock, or other property“ (p. 1). In order to determine payouts that may be due to drought or flood, index insurance uses index such as rainfall instead of possible weather consequences such as crop failure. In contrast to traditional indemnity based insurance where in the case of loss insurance company loss adjusters need to visit individual insureds in the case of index insurance for the loss payment insurance company only needs to know if index has reached earlier agreed threshold. Because used indices are usually publicly available the process of payment of losses is simplified and thus more cost effective.

3. INVESTMENT FUNDS INNOVATIONS

The one and the only thing that is certain is innovation, but it is hard to predict their form and the intensity of changes. Investor's demands are changing, regulation are passed, new technology has become available and in such investment environment investment funds are seeking for new profit opportunities and adjust themselves to market changes. Innovations can also emerge without considerable changes in external market. Particular innovations happen as a response to the impact of non-market factors, such as changes in tax policy. Unlike innovative products and services in the real economic sectors, output of innovations in the business of institutional investors depends on timing and market environment.

Since 1980, investment innovations have realised in five distinct clusters: new asset classes, new asset allocation techniques, new risk and returns enhancing tools, new theme funds and new business models. Considering the value delivered by some kind of innovation, the most valuable innovations are: emerging market equities, emerging market bonds, high yield bonds, liability-driven investing and exchange traded funds (ETFs). At the same time, innovations that deliver the least value are: leverage, structured products, portable alpha, currency funds (Rajan, 2011, p. 6).

In the past period the most popular innovations in investment funds industry were index funds and lifecycle funds which have similarity in terms of automatic portfolio allocation, then socially responsible funds, funds of funds and one of the largest and most successful innovation are ETFs (exchange traded funds), as a new type of investment company.

ETFs are similar to index funds, because they are also passively managed with main purpose to achieve return above the stock market index (Tkac, 2007, p. 6). But the main difference is that ETF units can be purchased only through the stock market, like shares. ETFs provide individual investors access to diversified portfolios of assets that was previously been reserved for institutional investors. ETFs reduce transaction costs and increase efficiency. Disadvantage of investing in ETFs is realized when their investors become unintentionally more exposed to risk because of increasing participation of particular stock in index, based on rising stock prices and market capitalization.

Additional type of innovation in mutual funds industry is improvement in providing financial information needed by current and potential investors in order to help them in decision making. There are lot of companies indirectly connected to investment funds industry in terms of preparing, processing and presentation of financial information about performances of investment funds (Tkac, 2007, p. 8). Individual and institutional investors, but financial advisors and portfolio managers too, are seeking for basic as well as for more complex and sophisticated information for planning, decision making and analysis. Investors need objective, relevant and easy understandable information about fund performances. Acquiring needed financial information should also be time and money efficient. Companies that support investment funds industry by providing needed financial information innovate their own business too, by implementing new types of rating, new funds' types, new methodologies, computer modelling and automated tools for decision making of their clients.

By investing in funds of funds investors acquire investment units in other mutual funds, not just in one fund and through this type of investment they diversify more their portfolio and reduce risk. The worlds most famous fund families such as Vanguard and Fidelity offer „fund supermarkets“ to their investors. In the term „fund supermarket“ investors are „consumers“, mutual funds are „producers“ and brokerage firm provides location for this special type of „supermarket“ and also access to different mutual funds from various fund families. The main advantage of fund supermarket is possibility for investors to buy units of different funds in „families“ and get common financial report for all funds together.

Accelerated development of information technology, internet and modern web tools cause innovation and changes in traditional investment fund portfolio management. Investment fund families, financial advisors, information intermediaries, insurance companies and other related companies increasingly compete to satisfy changing demands of current and potential investors. Through continued education of financial advisers, portfolio managers and investors should be found the way of adjustment of non-traditional investment strategies to traditional fund portfolios.

Investment funds strategies and core portfolio are also exposed to changes and innovation in terms of choosing developed or emerging markets, taking long or short position, dollar vs. non-dollar investments. Considering new assets classes and asset allocation techniques, it is obvious that in the last decade has been more popular investing in emerging markets, in bonds, as well as in real assets and infrastructure. One of new asset allocation technique is GTAA (global tactical asset allocation), as a top-down investment strategy based on utilization of short-term mispricing among global set of assets. For example until the global financial crisis, many of the innovations included greater leverage, which has proved itself as a dangerous in terms of crisis. Beside the leverage and using of hedging and derivatives new enhancing tools that are also applied are shorting and portable alpha. Global trend of achieving sustainable economic development has influence on increasing interest of capital owners for investing in companies and projects in the fields of renewable energy, water, and environment. It can be noticed that all innovations, regarding new business models, enhancing tools, fields of investments and asset allocation techniques are represented in the financial market of USA, as the world's most developed financial market. Financial markets of Asian countries as huge emerging markets are also interested for implementing innovation in mutual funds industry.

In the modern financial era very popular innovations are credit-default swaps (CDS), interest-rate swaps (IRS), high frequency trading (HFT) and social-impact bonds. Financial innovation is the creation of new capital structures that align the interests of lots of different parties. By creating CDS as a securitisation instrument risk is transferred to the underwriting institution, most frequently insurance company. The borrower pays a premium to transfer risk. CDS protection may similarly blunt the incentives for creditors to be careful when they approve or extend credit. Securitization that has been used for decades allows banks to free up capital, enabling them to approve more credit, and helps portfolio diversification. If everything was on banks' balance-sheets and capital there would not be enough credits for needed purposes. For example, India has recently allowed using CDS, as an instrument that will attract new creditors and support developing

of India's bond market. Also, when CDS are used inappropriately or greedily, by taking on exposures that it should not, or without transferring risks, or by adding complexity in order to increase profit margins rather than to solve problems, they show their negative aspects. Unlike CDS, interest-rate swaps are useful and big innovation based on betting and hedging against future changes and trends in interest rates.

Social-impact bonds are based on the concept of risk transfer from the government to financial investors who will get paid only if the social scheme is successful. By using social impact bonds cash flows are created according to the needs of the sponsor, the provider and the investor. The main difference between the social-impact bonds and other financial instruments is that this type of bond has been created explicitly for the social purposes (Palmer, 2012).

High-frequency trading (HFT) means using of sophisticated technological tools in trading securities. It is characteristic that an investment position is hold very shortly (an average holding period is about 11 seconds). HFTs now account for over 60% of equity trading. Average investment periods for shares have shortened from around 7 years to 7 months since 1940. HFT may damage the process of long term capital accumulation and allocation and cause problems of potential market manipulation.

In the terms of global financial crisis and in the years after that, mutual funds have faced challenge to be as efficient as possible, because of decreased amounts of assets under management and tighter profit margins. At the same time was noticed that risk management systems of mutual funds had to be more flexible and to adjust to the terms of crisis.

4. INNOVATION RELATIONSHIPS BETWEEN INSURANCE COMPANIES AND INVESTMENT FUNDS

The number of natural and man-made catastrophe events (Enz et al, 2008) and their financial impact (NatCatSERVICE, 2007) is constantly rising on a global level. This rise is influenced by the impact of the trend of climate change and concentration of people and material values (Njegomir, 2011c). As (re)insurers have been traditionally regarded as being in a stronger financial position to pay the losses than the insureds (Rejda, 2005), they are at the forefront of the catastrophe trends impact.

Insurers and reinsurers have traditionally managed their exposures to insurance-related risks on the basis of the application of central limit theorem and the law of large numbers. Anything above their retention levels, determined on the basis of their available capital, was transferred to reinsurance or, in the case of reinsurers, to retrocession market. However, due to increased frequency and severity of catastrophe events it became obvious that the underwriting capacity of global insurance and reinsurance market is limited, especially for risks with catastrophe potential. The solution for additional capacity has been found in transfer of insurance risks to capital markets (see Figure 2).

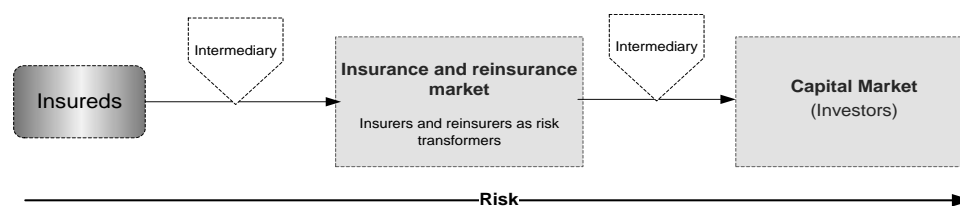


Figure 1: Insurance risk transfer to capital market

Source: Njegomir (2008).

For the development of alternative risk transfer solutions that provide insurance risk transfer to capital market in addition to insurance and reinsurance companies' demand the interest from institutional capital market investors, above all insurance and reinsurance companies and investment funds, especially hedge funds, was critical. The interest from investment management community for investments in insurance risk stemmed from the fact that these investments are uncorrelated with other risks in investor's portfolio, offered relatively high returns and absence of exposure to other risks of insurance companies (Njegomir & Maksimović, 2009). Although alternative risk transfer solutions emerged under conditions of the hard reinsurance/retrocession market the continuation of (re)insurers interest for their application during the soft reinsurance/retrocession market and investors interest despite the financial crisis lead us to the conclusion that they are sustainable solution for managing exposures to catastrophes. Additionally, having factored in the continuation of the trend of increased frequency and severity of catastrophic events and ever increasing

demand for additional underwriting capacity, it is reasonable to expect the increased future usage of alternative risk transfer as a complementary solution to traditional risk transfer.

Another innovation that links insurance companies and investment funds is unit linked insurance. This is special type of life insurance that provide insureds with the option to have risk protection together with the opportunity for investment in investment units, similarly as is the case with the investments in investment funds. There is usually a guaranteed sum assured but returns beyond are determined by cyclical movements of the unit values. Basically, the actual returns are determined by the investment managers' abilities. These investments are considered riskier than ordinary life insurance but less risky than investments in investment funds. Developed countries have developed this type of life insurance during sixties. In the region this type of insurance is applied relatively recently in the region, only in Slovenia and Croatia. This innovation is still undeployed in Serbia.

5. CONCLUSION

Innovations have always been of paramount importance in human history, in all human activities but especially in business. They are also recognised as crucial for the success of insurance companies and investment funds, which on the other hand have great influence in facilitation of innovations in other industries.

Although innovations are crucial not only for the success but for the long-term survival of insurance companies, especially those that are market oriented, traditionally they were reluctant to drastic innovations. However, the increased pace of changes in the external environment has changed insurers behavior towards the recognition of more importance of innovations. The most intensified innovation in insurance industry regards processes, marketing and products while organizational changes are slower and less represented. Incremental innovation has been the specific of insurance industry but this will have to change if insurance companies want to successfully cope with growing pressures such as increased competitions from other industries and changing customer preferences.

Insurers are not absolutely free in innovation as they always need to consider limits of insurability and other basic premises of insurance business as well as regulatory constraints. Solvency, price and product regulation in insurance can hamper innovation. This is especially the case in countries with product regulation where innovation regarding product can be allowed only if all insurance companies have adopted that particular product, which in turn hamper individual insurers' innovation efforts as they cannot gain competitive advantage.

In the aftermath of the financial crisis of 2008 investors faced to negative aspects of some financial innovations. Asymmetry of information and knowledge between users of financial services and producers is obvious and increasing. Although some financial innovations have no general economic benefit, individuals and institutions which innovate can earn the large returns. Most financial innovation is deliberately designed to conceal risk and reduce transparency. Efficiency and transparency is not consistent with the high profit margins on the stock markets. Financial products usually need to be blurred and priced inefficiently to produce excessive profits.

The innovations by investment funds and insurance companies presented in the paper are present globally but not sufficiently and in many cases not used at all. Additionally, despite the scientific research results and economic development evidence, the innovation benefits are still not fully recognized by many countries, especially in developing world (e.g., Juma, C. & Yee-Cheong, L., 2005 and Bolay, et al, 2012). Thus the aim of the paper was to review recent progress in innovation activities of investment funds and insurance companies and their relationship with long-term success in order to foster innovation activities among domestic insurance companies and investment funds and facilitate the recognition of innovation importance by governments that will result with the creation of innovation friendly environment. The results presented in the paper suggest that with greater innovation of insurance companies and investment funds there is possibility for cheaper financing, more efficient risk management, greater availability of insurance coverage and thus economic growth. Additionally, research results could provide insurance companies and investment funds a useful comparison of globally available innovations and provokes them to try to implement already available solutions that are not developed within domestic markets but also to start to develop their own innovation approaches.

The limitation of our study is that it is focused on review of main globally available innovations in insurance and investment fund industry. It does not, however, precisely determine the influences of the innovation applications on specific national markets and individual companies. Thus, it gives the basis for a number of future research studies as all mentioned innovations can be a basis for separate quantitative studies for micro as well as macro economic impact.

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INNOVATIVE VALUES OF MANAGERS WITHIN THEIR ENVIRONMENTS WITH BUSINESS PERFORMANCE

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Abstract: *Values are the base for understanding attitudes, perception, personality and motivation of individuals affecting their behavior. The system of values determines individual's priority in accordance with their relative importance.*

We should consider that the individual tends through his/her life to keep and preserve the values acquired at his/her early age. It is about attitudes to values of what is right and what isn't, what is moral and what isn't. The attitudes of values are tightly related to the age, or to the period of individual's growing up and his/her creation as a person.

This could be a kind of explanation why older generations of employees have different attitude to proper work than the younger generations. All of this could be of help for managers to predict the attitudes of values according to the age, and these attitudes should be mainly focused on the way the work is done. They should also be able to direct these attitudes to more general issues related to the company's operations acquiring support from their employees. Unless the managers fail to implement this in their daily work, the undertaken activities will not be favourable. The system of values for managers is comprised of their personal values, some of which acquired and some of which could be by birth with the tendency to follow them. Personal values determine the person himself, his/her capacity, characteristics, moral and authority. The values, throughout the system of values, could describe anything that the managers are trying to achieve through their work and their attitude of behavior at work.

Key words: *environment, managers and values, instrumental and terminal values, interviewed employees and managers, success, professional activities and tasks*

1. TERMINAL AND INSTRUMENTAL VALUES WITH BUSINESS PERFORMANCES

One of the most famous social scientist researching values is Milton Rokeach. He defined a value as "an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" and a values system as "an enduring organization of beliefs concerning preferable modes of conduct or end-state of existence along a continuum of relative importance" (Rokeach, 1973, p.5). Milton Rokeach made a classification value system based on the results of survey that proposed a list including two sets of values, the terminal and instrumental ones. Terminal values refer to desirable end-states of existence; the goals that a person would like to achieve during their lifetime and may vary among different groups of people in different cultures. Instrumental values refer to preferable modes of behavior. These are preferable modes of behavior, or means of achieving the terminal values. Sorting the terminal values from 1 (the most important guiding principle) to 18 (at least important guiding principle), then sorting the instrumental values on the same basis, from the persons that are interviewed can be made a clear picture of their systems of values trying to achieve in lifetime and need to be addressed. Everyone can well understand their own values grading first the terminal values, then instrumental ones.

Several of the terminal values listed in Table 1 are particularly important for managers - such as a sense of achievement (lasting contribution), equality (brotherhood, equal opportunity for all) and self esteem. Also, the instrumental values are expected by all managers.

Table 1. Terminal and instrumental values

Terminal values	Instrumental values
A world at peace (free of war and conflict)	Ambitious (hard-working, aspiring)
Family security (taking care of loved ones)	Broadminded (open-minded)
Freedom (independence, free choice)	Capable (competent, effective)
Equality (brotherhood, equal opportunities for all)	Cheerful (lighthearted, joyful)
Self-respect (self esteem)	Clean (neat, tidy)
Happiness (contentedness)	Courageous (standing up for your beliefs)
Wisdom (a mature understanding of life)	Forgiving (willing to pardon others)
National security (protection from attack)	Helpful (working for the welfare of others)
Salvation (saved, eternal life)	Honest (sincere, truthful)
True friendship (close companionship)	Imaginative (daring, creative)
A sense of accomplishment (a lasting contribution)	Independent (self-reliant, self sufficient)
Inner harmony (freedom from inner conflict)	Intellectual (intelligent, reflective)
A comfortable life (a prosperous life)	Logical (consistent, rational)
Mature love (sexual and spiritual intimacy)	Loving (affectionate, tender)
A world of beauty (beauty of nature and the arts)	Obedient (dutiful, respectful)
Pleasure (an enjoyable leisurely life)	Polite (courteous, well-mannered)
Social recognition (respect, admiration)	Responsible (dependable, reliable)
An exciting life (a stimulating active life)	Self-controlled (restrained, self discipline)

Source: Milton Rokeach, "The Nature of Human Values", New York, Free Press, 1973, p.112

Managers who believe that the feeling of achievement is important, can focus on achieving a lasting contribution for the enterprise such as creating a new product line that reflects the innovative management or opening new foreign subsidiary that will be the bearer of innovation management (Noe, Hollenbeck, Gerhart, & Wright, 2006, p.255). Manager who thinks that equality is the most important value could be a leader and will put the efforts of the company in providing equal opportunities for all employees, as well as finding innovative modified work force.

Some managers believe that values such as a comfortable life (a prosperous life), an exciting life (stimulating, active life), freedom (independence, freedom of choice) and social recognition (respect, admiration) are the most important for the company (Mathis & Jackson, 2007, p.235). The relative importance that managers give to each terminal value helps to explain what actually managers are trying to achieve within their company and on to focus their efforts. Some of the instrumental values listed in Table 1 are important components of the behavior of managers: being ambitious (hard work, aspiration), broadminded (open-minded), capable (skilled, effective), responsible (reliable) and self-controlled (self-discipline, restraint).

In addition, the relative importance of human resource managers put before these and other instrumental values may be an important commitment to their behavior in the workplace. For example, the manager who considers that value to a fantasy (creative, dare) is the most important tool to be innovative can take more risks than the manager who thinks it is not as important. Managers who believe that honesty is the most important value will put in the foreground task the required steps so that all members of the department or company to behave ethically. Managers who believe that the feeling of achievement is important, can focus on achieving a lasting contribution for the company such as creating a new production line or opening new foreign subsidiary (Gibson, Ivancevic, Donelly, 1999, p. 73). That is the new link that leads up to an innovative management. Manager who thinks that equality is the most important value could be leader and will put the efforts of the company in providing equal opportunities for all employees and will find modified work force according to the new business performance.

Considering the merits of over 55 million Chinese working outside China, managing trade and investment throughout East Asia are now expanding beyond Asia to Europe and USA. Often called "Chinese people by the sea", they are prominent in business and real estate investments in countries such as Singapore and Malaysia (Dessler, 2008, p. 118). They are successful in what they do, so successful that some of them now run multi-billion dollar companies. U.C. Njang is founder and chairman of Formosa Plastics Group, based in Taiwan, which built a factory of 2.1 billion dollars for the production of plastics and petrochemicals in Point Comfort Texas in 1994. Tzu-Cheng Tong, manager of real estate in Hong Kong, owns a chain of hotels and Stouffer Renaissance in the U.S., and has control over some real estate properties of Donald Trump in New

York City President Enterprises. A typical feature of “Chinese people by the sea”, whether managing a bank in Hong Kong or truly global organization, is their values such as: hard work, ambition, strong family ties, family safety, responsibility, self control and expertise. Billionaire U.C. Njang had never taken a day off, and Kao Chin-Dzen, Vice President of Enterprises, said he will be sick if there is no work. Many businesses that are operated and owned by Chinese families, work to provide as much needed education and experience in order to preserve the important positions in their companies. Many Chinese are disciplined and very responsible and their professional management success can be seen worldwide. They also consider that the most important principles are to dare to take many things and be creative, and that can be seen from their billions investments activities. In Taiwan, U.C. Njang built one of the largest production facilities in the world with a value of more than 9 billion \$.

For these managers and entrepreneurs important values are: respect, admiration and social recognition, the features of an innovative management. Many business deals between companies that are owned and are run by “Chinese people by the sea” stretch through a network of managers who have close ties of mutual trust and respect for decades. The true relationships built on respect and admiration is called “guandzhi” and is an operation mode for many “Chinese people by the sea”. Similarly “dzhinidzong” means having a good reputation and good credit rating, and that is the most important asset for many Chinese managers. It can be seen through (Dessler, 2008, p. 118):

- The manner that affect interpersonal relationships in which the manager is seen by the other individuals and groups;
- Decisions and solutions of the problems that are occurring;
- Perception of the situation and problems;
- Limits for determining what is or what is not an ethical behavior;
- The size of what individuals accept or oppose in achieving the goals and taking the pressures in companies;
- The perception of the individual organizational success or achieved results.

Individuals can be categorized according to personal values and attitudes within the business performance in several levels:

- First level - Reaction. Individuals who are not unaware of themselves or others as human beings and react based on physiological needs. This is characteristic of newborns.
- Second level - Tribal. Individuals who are characterized by high dependence on tradition and the power of authority.
- Third level - Self-centered. Individuals who believe the harsh individualism and are aggressive, selfish and do not react to power.
- Fourth level - Conformist. Individuals with low tolerance and hard-accepted views of the people whose values are different from their own and want others to accept their values and attitudes.
- Fifth level - Manipulative. Individuals who seek to achieve their goals by manipulating people through the work. They are materialists who aspire for higher status and recognition.
- Sixth level – Socio-centered. Individuals who have that attitude want to be loved and they agree with others rather to go on forward. They are taking a negative approach to materialism, manipulation and conformity.
- Seventh level - Existentialist. Individuals with a high degree of tolerance for people with different value judgments and diversity in general. They directly and openly oppose the inflexibility of the restrictive status policy and the arbitrary implementation of power.

When making categorization of the employees according to value positions can help managers to perceive the values of individuals in relation to those values that are dominant and popular in enterprises. For example, an individual who is characterized as egocentric is hard to fit in enterprises in which employees require conformity.

2. ANALYSIS OF THE EMPLOYEES AND MANAGERS VALUES IN R. MACEDONIA

The research was conducted in various towns of the R. Macedonia in the beginning of 2012. The aim of the research was to explore small and medium-size company managers and owner’s perception and attitudes towards ethical values and their importance in business decision-making process and actions. The research

was used as a exploratory study to explore how managers and owners of small and medium-size enterprises manage to bring their personal moral values into harmony with the company's interests.

Small and medium-size companies were defined by the number of employees. For the purpose of the research, respondents were companies with fewer than 50 employees selected from the following business sectors: industry, trade, service sector, public and state authorities, non-profit organizations, counsellor and education organizations. Respondents were selected by stratified random sampling to make sure that the companies operating in all sectors would be involved in the research. From the list of about 150 selected and contacted companies, 63 filled questionnaires were obtained, of which 12 questionnaires were obtained from companies that had more than 50 employees and thus were not included into the analysis.

The data was collected by personal interviews using a standardized structured questionnaire. The interviews were hold only with persons from the top management responsible for business decisions and actions, i.e. with the company's owner, director or manager (exceptionally with manager assistant). The questionnaire was designed in the way to cover various areas of business ethics, such as perception and evaluation of the business ethics in the R. Macedonia, ethical values, ethical/unethical behavior, and attitudes towards unethical behavior, its perception and the role of success. In questions focusing on personal and company's ethical values, pre-defined categories of values were used to measure their importance in the process of decision-making. As a starting point for the analysis of categorical variables, percentage frequency tables were used to describe the importance of personal and company ethical values. Results were considered to be statistically significant at significance level equal or lower than 0.05.

Owners and managers of SMEs are not just business people. They are also human being. They have their personal values that are deeply rooted and that are unlikely to change in a short period of time. To explore the owners' and managers' personal values importance, 20 so called target values (values focused on the objective that one would like to achieve) were selected from different areas of value system. Respondents were asked to choose and tick five the most important and five the least important values. The frequency of selected values in descending order from the most important to the least important value is shown in Table 2.

Table 2. The most important personal values

Values	Percentage of all the answers
Health	85,7
Family	76,2
Reliability	51
Integrity, honesty	41,9
Trust, reliance	40
Responsibility	34,3
Money, financial success (prosperity)	30,5
Education	28,6
Security, assurance	23,8
Relationships, team work, co-operation	22,4
Success	19
Work (job)	18,6
Tolerance	15,7
Respect, acknowledgement	13,3
Flexibility	12,9
Credibility, trustworthiness	9,5
Openness, frankness	8,6
Discipline	6,2
Individualism	3,3
Commitment	1,9

Similar to the personal value system, the importance of values in term of corporate management and culture was examined by the research. Respondents were asked to mark five values that they consider to be the most important values in their business decision-making process and business activities. At the same time, they were asked to tick five the least important values in managing their business. Table 3. presents the frequency of stated answers.

Table 3. The most important values in company's management

Values	Percentage of all the answers	
	most important	least important
Professionalism	65,2	4,3
Quality	65,2	2,9
Reliability	52,9	2,9
Relationships, co-operation, team work	51,4	5,2
Integrity, honesty	36,2	7,1
Responsibility	35,2	6,2
Focus on success, profit, prosperity	31,9	20,5
Flexibility	30	18,1
Image, reputation	27,6	24,3
Education, professional development	26,2	15,7
Trust, reliance	25,2	4,3
Credibility, trustworthiness	18,6	16,7
Commitment, assertive power	13,3	41,9
Friendliness, willingness	13,3	25,2
Creativity	10,5	41,4
Respect, acknowledgement, justice, fairness	7,1	19,5
Discipline	5,7	40,5
Openness, frankness	5,2	45,7
Tolerance	2,9	33,3
Individualism	2,4	77,6

Findings of the research on ethical values in small and medium-size enterprises show that the most important personal values are health, family, reliability, integrity and honesty, trust and reliance, responsibility, and money and financial success. As far as business values are concerned, the most important values are professionalism, quality, reliability, relationships, co-operation and team work, integrity and honesty, responsibility and focus on success, profit and prosperity. Out of the top seven values both, personal and business ones, four values - reliability, integrity and honesty, responsibility and focus on money, profit, financial success were common for both categories. This can be considered as a relatively good concurrence of the personal and business values importance.

However, the agreement among personal and business value importance does not necessarily mean that ethical values are implemented in practice. More than half of all respondents agreed that it is difficult to act according to their personal values because it is not possible to fulfill expectations of many people in the company, conditions in the market does not support ethical actions, company would lose its competitive advantage or position in the market or generally, there are no ethical principles and regulations especially in smaller companies (up to 20 employees) that would improve ethical actions and outcomes.

As far as the willingness of respondents to break their personal values was concerned, about one third would break their personal values if they could increase profit and economic success of their company. However, almost three quarters of respondents would break their personal values in order to save their companies from bankruptcy. The proportion of respondents that would break their personal values to save the company was significantly higher (about 84 percent) in case of companies' owners.

CONCLUSION

The relative importance that managers give to each terminal value helps to explain what actually managers are trying to achieve within their company and on to focus their efforts. Some of the instrumental values listed in Table 1 are important components of the behavior of managers, such as being ambitious (hard work, aspiration), wide-view (open), capable (skilled, effective), responsible (on whom you can rely) and has self-control (self-discipline, restraint).

When making categorization of the employees according to their present values positions can help managers to perceive the values of individuals in relation to those values that are dominant and popular in enterprises.

The survey held in Macedonian market shows that the most important personal values are health, family, reliability, integrity and honesty, trust and reliance, responsibility, and money and financial success. As far as business values are concerned, the most important values are professionalism, quality, reliability, relationships, co-operation and team work, integrity and honesty, responsibility and focus on success, profit and prosperity. Out of the top seven values both, personal and business ones, four values - reliability, integrity and honesty, responsibility and focus on money, profit, financial success were common for both categories.

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EFFECTIVENESS OF THE EU PROGRAMMES FOR SERBIAN SMES

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Abstract: *For several years Serbia has gained access to and is integrated into the main EU support programmes for research, innovation and competitiveness such as the Competitiveness and Innovation Programme (CIP), Enterprise Europe Network (EEN) and Seventh Framework Programme (FP7). Meantime, Serbia has successfully set up the infrastructure to manage EU-based programmes. In this paper we are discussing the effectiveness of these programmes on improving technology transfer and linkages between the R&D sector and SMEs, as crucial components of a national innovation system in Serbia.*

Keywords: *national innovation system, EU programme, FP7, EEN, evaluation*

1. INTRODUCTION

Technological development is a result of a complex interaction between business organizations, R&D institutes, universities, professional associations, educational and information infrastructure, financial institutions and public agencies. This network represents the National Innovation System (NIS) (Lundvall, B. A. (ed.) 1992). According to Porter, Furman and Stern, National Innovativeness Capacity (NIC) is capability of nation to produce and commercialize new technologies in long term. NIC includes developed innovativeness infrastructure, developed innovativeness environment in industrial clusters, and relationship between those two. According to that, one of the most important strategic goals of economic development in Serbia should be creating positive environment for encouraging and developing stronger interaction between organizations' development and scientific-research development (SRD).

In economies in transition, the creation of these complex networks is more complicated than in developed, because a lot of the aforementioned elements of the network are undeveloped or do not exist. Therefore, scientific and technological policies for developing countries must be different from those for developed countries (Kutlača D. 2008). The main tasks and objectives of national innovation system of Serbia are technology development as a main condition for overall economic and social development and creation of framework for building of knowledge based economy and society (Kutlača Đ. and Semenčenko D. 2004).

2. PROGRAMMES SUPPORTING TECHNOLOGICAL DEVELOPMENT IN SERBIA

In recent years there is considerable breakthrough in promotion of innovation as a main driven factor of the economy and society with intention to Serbia become a knowledge based society. The policy frame is set by the Serbian Law on Innovation Activity, last amended in March 2010¹ and implemented by MoES/MoSTD. The Law on Innovation Activity regulates basic principles, goals and organization of application of scientific knowledge and inventiveness, for the purpose of creation and realization of new and improved products, processes and services to serve as a driving force for the development of the Republic of Serbia. Based on the legal frame, the government has developed the Strategy for Scientific and Technological Development of the Republic of Serbia for the period 2010-2015.

The Strategy for the Development of Competitive and Innovative Enterprises was adopted in 2008 and implemented by the MoERD; it is a strategic policy document for development of small and medium-sized enterprises and entrepreneurship, which defines key priorities and the way they will be implemented. The Strategy is based on five pillars, further developed in modules and measures, corresponding to the priorities in SME development and aimed to contribute to improving the performance of the entrepreneurs through all stages of start-up, growth and development of SMEs.

Specific support to technological development and innovation through national programmes is provided both, by the Ministry of Education and Science and the Ministry of Economy and Regional Development, as well as government of Autonomous Province Vojvodina. Currently are in progress the following programs:

1. "Programme supporting Basic Research for the Research Cycle 2011-2014" ("BR Programme")
2. Programme supporting Research in the Field of Technological Development for the Research Cycle 2011-2014 (TD Programme)
3. Programme of Co-Funding of Integrated and Interdisciplinary Research for the Research Cycle 2011-2014" ("IIR Programme")
4. "Programme of Providing and Maintaining Scientific Research Equipment and Scientific Research Facilities for the Research Cycle 2011-2014" ("SREF Programme")
5. Mini Grants financing Program
6. Matching Grants Program
7. Financing Of Short-Term Projects With A Special Interest For Sustainable Development in Vojvodina
8. "RIGHT" at the first chance
9. Plants for application of new technologies in AP Vojvodina
10. SMEE Competitiveness Support Programme
11. Programme for Innovative Cluster Development
12. SME Innovation Support Program.

For several years Serbia has gained access to and is integrated into the main EU support programmes for research, innovation and competitiveness such as the Competitiveness and Innovation Programme (CIP), the Enterprise Europe Network (EEN) and the Seventh Framework Programme (FP7). Meantime, Serbia has successfully set the infrastructure up to manage EU-based programmes.

The Serbian government's strategy for development of SME Sector was defined as a short-term priority within the National Programme for the Integration of the Republic of Serbia in EU with reference to the "Small Business Act". The EU framework, guiding entrepreneurship support and promotion, has been taken into account in developing the Serbian SME strategy. In total nine innovation support programmes and measures, targeting for improved competitiveness of the SME sector, were assessed to measure the programmes' impacts.

3. EFFECTIVENESS OF THE EU PROGRAMESS SUPPORTING INNOVATIVENESS IN SERBIA

Between the other, the Improved SME Competitiveness and Innovation Project (ICIP), financed by the EU aims at improving the competitiveness of Serbian SMEs and increasing levels of innovation in SMEs. The project also envisages related needs to strengthen the institutional capacity and support framework for increased level of innovation in enterprises, upgrade of innovation support services, build of capacities of innovation stakeholders and strengthen links between education, research institutes and business.

To support these aims ICIP has undertaken an in-depth analysis of the innovation and competitiveness support programmes in Serbia to raise awareness for strong policy coordination among main stakeholders to further adapt the support tools in accordance with needs of enterprises and innovation service providers (ICIP, 2011). In total nine SME innovation and competitiveness support programmes have been evaluated that are implemented by the Government of Serbia and managed by the Ministry of Economy and Regional Development (MoERD), Ministry of Science and Technological Development (MoSTD) – since March 2011 integrated within the Ministry of Education and Science (MoES) – and the National Agency for Regional Development (NARD). The assessment of the innovation and competitiveness support programmes is done against the government strategy for development of competitive and innovative small and medium-sized enterprises and the related policy aims and expected intermediate results. Detailed reports are produced by a team of experts for each assessment result.

The following programmes were assessed by ICIP under the activity 2.1 "Assessment of Innovation Support Programmes": Project for Supporting SMEs to Invest in Innovation, Project for Supporting the Development of Competitiveness of SMEs and Innovation, Project EEN - Enterprise Europe Network - in Serbia 2009-2010, CIP/EIP Programme in Serbia 2009-2010, Competition for Best Technology Innovation, EU FP7 Programme, Business Incubator Network, Innovation Fairs, Innovation Projects.

Reports were produced on each of the assessed programme and support activity, including main findings and recommendations. The assessment of the programmes consists of two approaches: firstly, sample groups of enterprises, which have participated in innovation support programmes and received grants for the purpose of the improvement or development of new products/ services/ processes were given questionnaires; secondly qualified interviews were held with persons from the MoERD, MoES, NARD and other government organizations responsible for managing the programmes.

In further discussion will be analyzed in detail effectiveness of programmes EEN - Enterprise Europe Network and FP 7 EU programme in Serbia. The main findings are results of research that was conducted within Improved SME Competiveness and Innovation project (ICIP), in which the experts from Mihajlo Pupin Institute were included⁴.

4. ENTERPRISE EUROPE NETWORK (EEN)

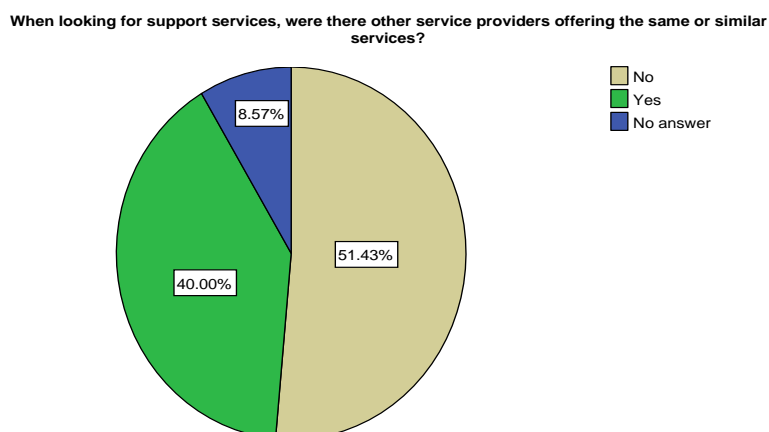
EEN project have started in Serbia in 2009. Within EU, national EENs were heritage of the former Innovation Relay Centers (IRC) and Euro Information Centers (EIC), and resulted from their merge, inside the frame of EEN project in the beginning of 2008 (2011, Semencenko, Mosurovic). The main purpose of the project in Serbia is internationalization of Serbian businesses and R&D results, and increase of the competitiveness of SME sector through greater access to information and business and technology connection at the EU level. Enterprise Europe Network became one of the basic tools for encouraging innovativeness of small and medium enterprises in Serbia. The staff of the EEN consortium in Serbia is highly professional, with previous background partly in academia sector involved in different kind of NIS research, and the other from public institutions who are dealing with administrative, technical and other kind of service support to SMEs. Being in that way trained and skilled, they can come out to meet demand of clients at all times. One significant advantage of EEN services is that they are free of charge to all interested companies. By establishing EEN in Serbia, it would be possible to motivate companies to think about improving innovation through new forms of business and technological cooperation as well as advisory services, not only through financial support from government and other funds.

More than 40 experts within EEN project in Serbia are engaged in order to help Serbian SMEs to identify their needs and potential. The main task of EEN project is to improve competitiveness of Serbian SMEs :

- To develop their business in new markets
- Source or license new technologies
- Access EU finance and EU funding.

According to the survey that Mihajlo Pupin Institute conducted in 2010, the services of EEN are recognized among Serbian SMEs (Semenčenko D. and Mosurović M. 2011). The main purpose of survey was to see how clients who received services from EEN in Serbia evaluate it. The statistical analysis of the survey was reflecting awareness of SMEs in Serbia about Enterprise Europe Network services and their satisfaction with those services. More than half respondents (51.43%) couldn't find other service providers offering the same or similar services as EEN in Serbia; 40.00% could, while 8.57% did not express any opinion on this issue (picture 1).

Picture 1. EEN and other service providers offering the same or similar services

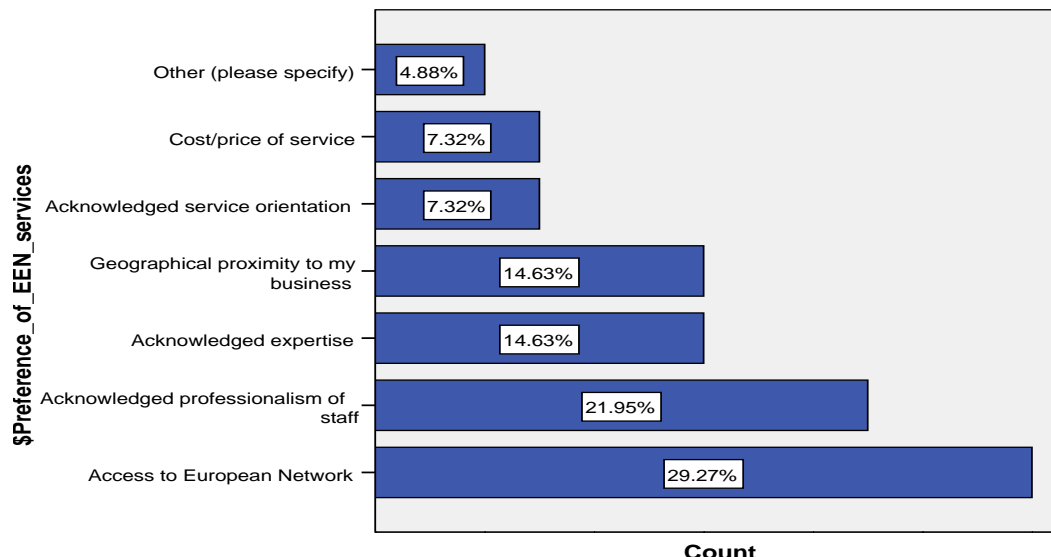


Source: Semenčenko D. and Mosurović M. (2011).

⁴ Detailed reports are produced for each assessment result by a team of experts in ICIP project, SE Prof. Dr Djuro Kutlaca and JE Sanja Popovic-Pantic, M.Sc, as well as team members, Dusica Semencenko Ph.D, as MPI expert and technical support of Marija Mosurovic M.Sc. and Zorica Mitrovic (ICIP, 2011).

Respondents preferred the Enterprise Europe Network's services more than services of other providers who were offering the same or similar services, primarily because of the possibility of access to European Network (29.27%), as well as the acknowledged professionalism of staff (25.7%) (picture 2.).

Picture 2. The reasons companies preferred the Enterprise Europe Network's Services



Source: Semenčenko D. and Mosurović M. (2011).

Only (4.88%) respondents listed other reasons besides those mentioned in the question:

All respondents (100%) were aware that the Enterprise Europe Network was an initiative of the European Commission and is supported by European Union budget. Almost 90% of enterprises reported that the Programmes met their expectations. 25% of enterprises have applied an innovation strategy for the first time with the support of the Programmes. The survey found strong evidence of increased technical and non-technical innovations in enterprises; 68% claimed that the participation in the Programmes provided the basis for contribution to organizational changes and development of their business model and 65% reported that the Programmes allowed them to focus on their innovation capacities based on their own resources and supported by innovation collaboration with external partners.

The Programmes contributed significantly to the cooperation between research and economic entities. Almost 70% of enterprises have established innovative partnership through the Programmes, although only 12% organized it with R&D institutions or universities (28%) while the majority (43%) cooperated with consulting firms. The majority of them (65%) evaluated the cooperation as very good or excellent; consequently, 75% of enterprises will develop in the future new innovative activities in cooperation with external partners. Regarding future plans, 90% of enterprises reported to plan investments in innovation also for the coming years.

The technical and non-technical innovation effects are likely to increase based on the positive evaluation of enterprises, but could be positively influenced by availability of a central database with all eligible R&D institutions, university departments, consulting firms and laboratories acting as Business and Innovation Support Organizations (BISOs) for SMEs, which is under development.

By establishing EEN in Serbia, the direct and indirect users are in position to gain information about the requirements for entering and conducting business operations in EU (relevant legislation, directives, etc.), export opportunities, public procurement possibilities, innovative technologies, potential innovative partners, EU RTD possibilities and programs, and gain access to the innovative technologies in one place (one-stop-shop). Right information and right innovative solutions to the problems of SMEs contribute to the business development of Serbian SMEs and their survivability on today's dynamic and open markets. Also, the EEN can provide evaluations of company's financial situation and help in order to find the best possible source for funding support.

The main recommendations and proposed corresponding actions are:

1. EEN consortium and policy makers should promote the activities of EEN in Serbia with higher intensity among enterprises in Serbia in order to improve their innovation capacity.
2. It is clear that Enterprise Europe Network must continue its work with more joint efforts and must create an even larger client base in order to reach its goal and become a stronger support to SMEs and Serbian economy.
3. It is recommended to establish robust monitoring, evaluation and impact assessment Monitoring and Evaluation (M&E) system for this Programme support
4. In order to make SMEs motivated to be more responsive on the EEN activities, it is important to organize meetings where the achieved results will be promoted. Presentation of "Best practice in EEN Serbia: How to use access to EU market at your doorstep" might be appropriate form to get
5. SMEs together and keep them informed on the regular basis on the benefits EEN can provide to them.

5. THE SEVENTH FRAMEWORK PROGRAMME FOR RESEARCH AND TECHNOLOGICAL DEVELOPMENT - FP7

The Seventh Framework Programme for Research and Technological Development (FP7) has the main aim to improve scientific and technological basis at EU level. There is intension to encourage SMEs, research centers and universities in their research and technological development activities.

The integration of Serbia's R&D system into the European Research Area (ERA) system is a need, desire and the destiny of the vast majority of researchers in Serbia. The results of survey present the facts why it is good that the creative sector of Serbia becomes part of the European Research Area and thus contribute to the development of national economy and society as a whole. This good spirit and motivation of national science can, and should be used as a motivational factor for the faster integration into European Union and all other sectors and countries as a whole.

Process of integration of National innovation and research system (NIRS) of Serbia in the ERA is primarily a process of people, working together - local researchers with their counterparts from the EU. Serbian participation in EU projects should be improved. The number of FP7 projects where Serbia was included as a coordinator is too low, but in general number of projects is in increase (table 1), comparing with other countries the number is similar with the new EU member countries.

Table 1. The success rate of Serbian projects in FP7

		Number of Applicants (main listed)	Number of Proposals (main listed)	Sum of Number of Applicants:	Sum of Number of Proposals:	Success rate (based in main listed proposals)
Capacities	Activities of International Cooperation	8	4	33	20	24.24 %
	Regions of Knowledge	1	1	21	6	4.76 %
	Research for the benefit of SMEs	4	3	66	39	6.06 %
	Research Infrastructures	11	10	29	26	37.93 %
	Research Potential	22	18	238	216	9.24 %
	Science in Society	7	7	47	45	14.89 %
	Support for the coherent development of research policies	1	1	4	3	25.00 %
Capacities	Sum:	54	44	438	355	
Cooperation	Energy	10	8	44	31	22.73 %
	Environment (including Climate Change)	11	9	67	53	16.42 %
	Food, Agriculture and Fisheries, and Biotechnology	16	11	80	65	20.00 %
	Health	3	3	78	67	3.85 %
	Information and Communication Technologies	27	20	164	129	16.46 %
	Nan sciences, Nanotechnologies, Materials and new Production Technologies - NMP	3	3	9	9	33.33 %
	Security	1	1	14	12	7.14 %
	Socio-economic sciences and Humanities	1	1	98	81	1.02 %

	Space			7	3	0.00 %
	Transport (including Aeronautics)	6	6	41	33	14.63 %
Cooperation	Sum:	78	62	603	484	
EURATOM	Nuclear Fission and Radiation Protection			2	2	0.00 %
EURATOM	Sum:			2	2	
Ideas	ERC	1	1	8	8	12.50 %
Ideas	Sum:	1	1	8	8	
People	Marie-Curie Actions	12	9	77	60	15.58 %
People	Sum:	12	9	77	60	
	NA			2	1	0.00 %
	SP2-ICT PSP (ICT Policy Support Programme)	2	2	2	2	100.00 %
	Sum:	2	2	4	3	
TOTAL FP7 (20. 12.2010)		147	118	1,132	912	12.99 %

Source: Kutlača Đ., Semenčenko D., Nedović V., Kolić J. (2011).

The best evidence of Serbian soaring involvement in EU support programmes is the opinion of managers of teams from Serbia in FP6 and FP7 projects, collected in the survey conducted during the Jun of 2009. (Kutlača Đ., Semenčenko D., Nedović V., Kolić J. 2011).

The project effects have fulfilled the expectations of their project managers. Almost three quarters of respondent were evaluated project effect as excellent. But, some of them 37.5% didn't want to be involved again in FP7 as coordinator. The main reasons for negative attitude are:

- Complexity of administrative procedures, too much time is spent on management (especially at faculties which structure are not sufficiently organized)
- As a first I need experience as a work package leader in one or two projects, and then I will be able to take over coordination of the project. Beside that there are a lot of practical obstacles in money transfer from Serbia to partners in EU.
- Insufficient resources (human and material resources),
- Adminstrating projects is too much demanding,
- Too much obligations, especially administrative, currently I'm a project coordinator and next time I'll gladly give it to someone else.

But, there is still missing one important link in the chain of technology transfer processes – SMEs. Facts about low participation of SMEs from Serbia in FP projects urged on action. The problem is recognized within Ministry for Science and Technology Development, Department for international cooperation and European integration and National Contact Point (NCP) system, but still stays unsolved.

By the end of 2009, in total, 107 Serbian organizations and enterprises participated in the FP6/7 programme, which is evaluated as a good result. The number of SMEs benefiting from FP7 is given by the CORDIS database as 8 (5 from the thematic field of ICT and 3 from Knowledge Based BIO-Economy). None of those companies is project leader.

The main recommendations and proposed corresponding actions are:

1. Interaction with other stakeholders within national innovation infrastructure is recommended
2. Promotion of building partnerships between R&D institutions and SMEs is desirable. In this context, dissemination of the information about FP7 among SMEs should be intensified.
3. Linkages between NCPs and Enterprise Europe Network Serbia should be more developed and encouraged.
4. It is recommended to establish robust monitoring, evaluation and impact assessment (Monitoring and Evaluation - M&E) system for this Programme support.
5. To inter-connect all relevant EU funded projects to support innovation of
6. SMEs in Serbia with the aim to make final beneficiaries (SMEs) familiar with them. As a first step, set up of the links toward the relevant web sites of the mentioned programs are recommended. Link toward the FP7 should be set up on i.e. the website of the MoERD.

5. CONCLUSIONS

The initial aim of this paper was to examine importance of EU programs as a support for SMEs innovativeness in Serbia. Our survey indicates that participation in all supporting Programmes is evident for developing innovation culture and innovation management capabilities in enterprises for both SME owners and innovation project managers.

Also, our intention for analysis of the innovation and competitiveness support programmes in Serbia was in order to raise awareness for strong policy coordination among main stakeholders.

The evaluation of innovation support programmes is done irregularly and does not follow a harmonised approach. It is proposed to undertake an impact assessment of programmes supporting innovation and competitiveness in Serbia.

The approach should make a distinction between:

- Evaluation of the programme performance against programme objectives on the basis of clearly defined, measurable key performance indicators (e.g. quantified jobs ensured or created);
- Assessment of the cost effectiveness of the programmes in terms of policy aims, expenditure which results in the engagement of business, and the take-up of programmes.
- Strengths and logic of programme linkages, though causal chains that show the relationships and pathways between different implementation measures and programmes, in order to identify both strengths and weaknesses, as well as unanticipated consequences of the measures
- Direct impact on business activities and practices and business performance (e.g. new products initiated, profitability of business or penetration of new markets), as well as indirect wider spill-over effects (including Strategic Added Value) through the involvement of research partners and stakeholders; and
- Socio-economic impact assessment, measuring the gross and net economic impacts (e.g. employment, business creation, local multiplier effects, and Gross Value Added) at national and regional levels.

It is further proposed that an impact assessment system and methodology should be established allowing the respective authorities to undertake regular evaluation of socio-economic impacts of such programmes on a comparative basis, which will also ensure that both national and regional disparities in access, take-up and impact can be clearly monitored and assessed.

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USING CROSS-INDUSTRY LEARNING FOR ORGANIZATIONAL TRANSFORMATION

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Abstract: *Organisational management is in crisis and increasing competitiveness forces for new innovation paradigm and vision – focus on self and own industry has exhausted growth and change drivers and doesn't derivate vital success ideas and transformational levers. At the times when environment transformation is highly unpredictable and quick, self paced reinvention is lagging behind needs, so companies have to look for other sources of development. This paper provides an analysis of cross-industry and cross-sectors learning and knowledge transfers as an instrument of gaining competitive advantage through internal improvements aimed to embed practices and knowhow of external champions – what Formula 1 can bring to team work and learning agility in pharmaceutical industry, or how far social trends in IT shape brand development in automotive industry.*

Through methodological research of worlds' leading organizations best practice examples, literature and case studies review, we have discovered that an industry specific framework cannot always generate the most effective solutions and that answers lie somewhere else. Internal improvements based on own models are reaching the ceiling and tangible gains are largely exhausted; additional investments in existing models simply do not result in required revenue (efficiency, effectiveness, savings, etc.) Finding and transferring right model from other industry or sector is becoming the key factor in the organisational transformation – learning from champions in their narrow sphere of expertise and adapting such knowhow to own infrastructure.

Keywords: *cross-industry learning, best practices, HR role, innovation, creative solutions*

1. INTRODUCTION

We have witness historical trends of industrial revolutions. From industrial revolution in 18th century, through 19th century of automatisisation and mass production until increased pace of IT developments throughout 20th century, each of phases was driven by a different set of levers which led towards strong improvements and challenged existing practices. Development of new technologies has marked number of evolutionary steps that different industries have made. Examples of such transformation are well known and documented – we are clear on development pathways, driving forces and enablers which helped change. Once competitors have reached similar level of technological advancement, exploration of new drivers of differentiation and competitiveness entered a “soft orbit”. Companies started paying additional attention to innovation and talents over the last 20 years – these were recognised as the “War for talent”.

Although successful companies focus were in developing human capital and innovation strategies, return of such investments was not always coming quickly enough to keep the competitiveness in a comfort zone and new explorations were launched to look beyond existing transformational arsenal. Companies have to remain mobile and agile in search for its future structure (Survivors are the most adaptive, not the most advanced – C. Darwin). This invites for continuous transformations against and beyond known and predictable trends. However capable thinkers we can have in our organisations, pace and speed of developments and increasing number of variables which could place an impact to the organisation, require additional stretch and organisation learning in no-traditional manner.

2. NEW CHAPTER IN THE ORGANIZATIONAL DEVELOPMENT PRACTICE

New chapter in the book of organisational development goes into direction of cross-industry sharing of best practices, which are driving the need to remain competitive and demonstrate organisational ability to convert and develop own future. Getting a licence for existence and stakeholders support simply means remaining agile, flexible and driven at the path of constant improvement. Phase of self-reinvention can not generate

required level of change and competitiveness, and small, gradual self-paced improvements in own business models within an industry should be replaced by cross-industry learning and clever transfer of successful business models. Such companies are open to listen and watch others and are actively exploring beyond the industry fence. Richard Branson of Virgin has a simple look over such process - "I have no regrets trying to break the mould and taking a different approach. That has resulted in Virgin being one of the best known brands in the world".

2.1. "Smart copying"

Regardless of the industry in focus, if an organisation would look at range of other industries there are perhaps dozens of examples and ideas which could be copied. Yet, simple copying would bring the risk of inapplicability. Therefore "smart copying" is actually relaying on extrapolation of successful examples under your organisation operational circumstances and framework. Having said that, the pathway could look too easy, and too simple. We could say that many businesses across different industries face similar issues and similar business functions. Common roles which should be interchangeable are in finance, planning, human resources and sales. But in each of those functions there is something in other industries which could be beneficial and add value to your practices, processes, standards and business model.

Car manufacturers have an excellent history of developing and implementing business-improvement methodologies such as "lean manufacturing" or "just in time", but they have not always got the people bit right. Other industry sectors also have much to offer in this area and if an industry can capture this best practice and apply it within sectors such as the E&P industry, it can stand on the shoulders of those who have already done the hard work for us.

In a period when there is an on-going war for talent, selecting and attracting right people for the business can be extremely challenging. Beside regular human resources elements (salary, compensation packages, managing professional success, awarding and relations with employees, etc.), talents of today are very sensitive on industry perception – would I like to work in such business, is a typical question raised. This poses strong challenge to the industry and calls for an immediate investment – why would someone considered a talent work as salesmen in car industry, for example. Looking at benefits, the industry should be able to provide parity to other sector which is traditionally considered as better off. The evolution which automotive industry has passed through offers something potentially attractive and this change of viewpoint is starting to manifest itself in improved recruitment levels and staff retention. Driving force for introduction of new technologies and IT which have transformed an industry perceived as old fashioned and mechanical into state of the art IT based sector. And while promoting such transformation the industry attracted fresh brains, which in return provided new ideas and innovation.

This scenario is, clearly, not unique to the automotive industry. A number of sectors might be perceived as undesirable to potential employees – it's a mandatory in transformation to educate those who might be potential employees and, importantly, provide them with sound management and clear direction to retain them. Some industries have been more successful in throwing off past perceptions and are now perceived as attractive. "Fast-moving consumer goods" companies, selling items such as foodstuffs and general consumables in a retail environment or supermarket chains are now recognised to provide good prospects and world-class training and development for their staff. Some organisations may not been in position to transform far in that direction due to internal limitations (NPR limited investment capacity, small operating margin, etc.) but have recognised that something else should be offered to employees, like a fulfilling working environment and prospects for future development and progression. It is so easy to take for granted the existing workforce and lose skilled and very valuable people to other organizations and industries through neglect, a lack of clear direction, poor management, or a combination of factors. Still, while carefully browsing successful human resources strategies in other sectors, leaders can recognise pieces of mosaic which could be transferred and extrapolated into their own organisation – having right instinct and sound judgement about transferability are impact full skills of capable leaders.

In a typical retail scenario, a customer has various options ranging from the regular store format to the web based sales. Retailers try hard to ensure that they map and track the customer through targeting and segmentation, as a single entity no matter the kind of format customer uses. This has been at large copied by banks, which have many offerings in their portfolio and might require extensive modification in their customer relationship services to map and track a customer. They can benchmark the retail industry to understand the process to provide an improved service to a customer.

3. THE BEST PRACTICE MODELS

In a search for best practice models and champions in other industries, organisations are *de facto* focusing on own competitiveness. This imposes a capacity to benchmark and judge transferability – while in previous decades product benchmarking was a cornerstone of strategy developments, present era has required evolution of comparison models in a new field - benchmarking of functions, processes, strategies and performance. Understanding forces and value behind, ability to follow right variables and create systems which are prone to errors in comparisons, are becoming key assets for organisational transformation based on cross-industry transfers.

An IT manufacturer in US had a practice that orders received by 1pm are processed within the same day, while orders after 1pm are processed during the next day (Day, 1993.) In a highly competitive industry this can be a factor leading to company default, as any competitors with good customer insight and ability to look over the fence into practices of FMCG company or service call centre in air transport or courier industry would quickly can massive advantage and overtake customer pool.

One of the globalisation effects is that customers are better informed and have very high expectations, whatever is the industry in scope. Such increasing customer expectations are forcing organisations to be highly competitive and innovative when improving their services and operations. Consequently benchmarking of today requires an agile and flexible learning process, close monitoring of competitors' activities or best-in-the class organisation in the industry. Cross industry benchmarking increases opportunities to acquire innovative but transferable ideas from players across wide range of industries.

In the early 1990's, HP was studying best practices as well as doing the analytical legwork around what the best push/pull boundary would be. The first decision to deploy a postponement model was based on financial modelling to assess what the right model for HP would be. Benetton served as a good case study for HP in arriving at the Postponement Strategy. Each season, Benetton dyed yarn, knit sweaters, and then shipped the sweaters to retail stores. It was never clear until well into each season which colours would sell best. By reversing the process and getting rapid online feedback from retail outlets, they realized a huge return. Instead of dying the yarn first, Benetton knit the plain wool into sweaters and postponed colouring the entire inventory. This is the cornerstone of supply chain management practice that Hewlett-Packard is using today to improve their operations. HP manufactured printers in the U.S. and distributed finished products globally through three distribution centres in Europe, the U.S. and the Far East with each region having different requirements. HP began to investigate the benefits of a product and process redesign where a generic printer would be produced at the factory and shipped to the DC's for final customization with the power supply and the manual. The printer itself had to be redesigned for these requirements and the results from the DC localization at HP were positive inventory costs reduced while customer service measure such as fill rate improved (Feitzinger, 2006.).

Above examples are informing our thinking on the importance of knowledge transfer across the organisations – being more precise, we focus on tacit (implicit) knowledge. Rationale lays in transferability – while explicit knowledge is based on sound structure and learning process, it requires systematic and usually gradual learning process. Starts with basics and then develops in depth and breadths, through specialisations. On the other side, implicit knowledge is personal, based on individual's perception, is informal and easily communicates across peers and colleagues within the organisation. As such it's more difficult to capture and formalise. But at the same time we see value for the organisation if decisions are based on judgement, expertise, set of values and perceptions, which are all components of tacit knowledge. This in return speaks how important it is for organisations to nurture people developments and assure cultural framework based on agreed set of values and behaviours. Once this is established, organisational learning gets the momentum and derivates innovation and learning – out of which an important part is coming from other industries in cross-learning process. Successful organisational learning is critically dependent on collaborative environment, trust and openness, which is properly articulated and promoted; such environment would encourage organizational development based on learning. As the business conditions become more complex, so do human capital requirements.

4. HR REQUIRES NEW COMPETENCIES

Advances in formal organizational design and global human resource practices are essential. Future challenge for global organizations will be to develop and enhance their capacity to informally but tangibly link the elements of their employees and talents to the key elements of their global strategies. As organizations

rely more on informal and shared philosophies and understanding about strategic goals and resources, the bond that holds them together stretch around *decisions* about talent, rather than in rules, hierarchies, human resource practices or job descriptions. Yet, the dominant models of global HRM continue to focus on improving HRM *practices* applied to the global workforce, though with increasing attention to the distinctions of country, culture and local market variations (Bloom, Milkovich & Mitra, 2002).

Inevitably, organisational agenda based on learning for development requires investment in human resources and introduction of new standards for workers in 21st century. These skills cut across industries, functions and actual job titles, presenting a new golden standard. As this implies new thresholds for self-development, it equally well informs students or aspirants in career development on areas for improvement, either through education, on-job learning or exposure in circumstance which enable required development. We consider that critical set includes:

- Adaptability skills – critical thinking and problem solving, time management, flexibility and lifelong learning. Worker which are fixed to their job description, rigid and slow in adapting would face serious difficulties in remaining competitive in ever-changing labour market;
- Information management and communication – ability to quickly and selectively collect data, analyse, understand, and select information of critical importance and impact for transfer into forms appropriate for range of potential audiences. Cultural sensitivity and effective negotiation are of additional importance;
- Business skills – finance and project management, matrix and network management, as well as product marketing and management;
- Science, technology, engineering and math (STEM) – advance knowledge of STEM and quick adaptability to new requirements followed with capacity to immediately apply;
- Interdisciplinary skills – combining technical skills with business acumen.

In order to maximize advantage from cross-industry learning, organization has to have capacity to absorb new knowledge and flexibility to quickly adapt to the new procedures/practices. This is where the power of HR lays. The HR function creates tangible value in organizations by focusing primarily on delivery of HR practices (staffing, development, compensation, labor relations, etc.), based on professional and often research-based principles. These practices are important, and research indicates that when they are done well they add tangible value to the organization. However, professional practices alone do not systematically address the increasing sophistication and importance of talent markets and decisions to today's competitive challenges. HR department should develop own competencies required for molding and shaping talents. The new HR role is to know how to create the innovative profile of an organization; how to stimulate creative experience and actions; how to increase employee satisfaction rate (because this is in close relationship with the attraction and retention of employees); how to control the workforce stability (this represents the biggest threat to intellectual capital drain, since unwanted departure of best performing employees and talents significantly influence competitiveness of the organization), how to attract and retain experienced employees that create new approaches, services, products or processes based on their experience, etc.

A key supplier of global markets, New Jersey has a vibrant TLD industry. The industry is critical for the state's economy, providing thousands of well-paying jobs. In 2009, TLD supported over 390,000 jobs in the state, and over 30,000 workers were hired each quarter to fill new and replacement jobs at wages significantly higher than wages in other industries. Key workforce challenges facing TLD in New Jersey are a high level of turnover among new hires who fail to meet performance expectations or job requirements and current workers who fail to upgrade their skills and obtain the training they need to move into higher positions (New Jersey state job portal, 2012).

5. THE VALUE OF TALENT SELECTION

In addition of investment in in-house talents and promoting vertical development, organisations can opt for double win – recruiting talents from other industries. If properly targeted and carefully deployed within the organisations, talents could provide many benefits for new employer – strategic mindset, unique skills, fresh perspective, innovation, new visions and then invigorate present management structures and decision making. At the same time they need to learn new industry intricacies, business complexity and driving forces in order to properly utilise their previous experience, expertise and skills. Again, if done just in too bluntly manner, staff takeover can harm organisational performance – for example, by HBR review, more than 40% of CEO taken from different industries remained just 12-18 months at the post (Harvard Business Review, February Edition, 2012). So the mastery is not just in making a copy-paste, but doing this in a way that adds

value to the operational and organisational context – well thought on benefits, systematically planned, culturally and value-sensitive, and with clear transformational objectives.

In order to succeed, cross-industry talents must possess a number of specific characteristics, like:

- Ability to interact at all levels, including back-of-the house employees;
- Excellent relationship builder;
- Superb communication skills and a great active listener;
- Passion for new industry, customer service and the team;
- Ability to drive change while respecting the past.

IT executives frequently migrate to restaurant companies from other industries. While they certainly have a learning curve with respect to the management and development of point-of-sale systems and the need for tools that can provide timely information, a smooth transition is actually quite achievable, especially for executives with retail backgrounds who are comfortable with multi-unit operations. "Multi-location experience is both beneficial and transferable," says Panda Restaurant Group's Liu. More than a quarter of new vice presidents of HR (26 percent) are from outside the industry, according to Korn/Ferry research. One outstanding example is Wendy's Cava, who previously worked at Nike. The restaurant industry can benefit greatly from cross-industry HR talent, particularly if they recruit from organizations where HR is a true business partner, such as Pepsi-Cola and Kraft (Damon, Hansen & Von Der Ahe, 2005.)

The new function of HR requires more than knowing the business; it requires extending the traditional service paradigm to become accountable for great decisions about talent, wherever they are made, and where they matter most. This requires building decision frameworks that logically connect decisions about talent to strategic success, and provide the language that HR leaders use to collaborate with, have deeper conversations with, and teach their colleagues to find new answers to strategic questions - answers that reflect a unique perspective based on human behavior and the principles of talent markets.

6. CONCLUSION

Developing of sustainable organisation in 21st century requires moves beyond traditional business boundaries. Relying on single strategy, slow implementation of changes, lack of transformational discipline or slow organisational learning are among typical factors of failure – dynamics of market evolution and increasing number of variables impacting operational ambience are requesting different approach than what has been historical answer to transformation. Today and tomorrow, organisations need to nimbly introduce transformation within its core business processes – improved business operations, constant innovation and supreme talent management have to go hand-in-hand. A cross-cutting element, aligning actions across such transformational pillars is organisational learning – part of which needs to be seriously based on out of industry learning. In our research we have been exploring attempts and models of cross-organisational and cross-industry learning as a factor of sustainable organisational development and have presented number of successful cases which have been dismantled to the level of success factors and elements. These strongly point that solutions for sustainable transformation and development largely lay out of industry – its becoming critically important to look for best practice models and positive experience in range of non-traditional partners across variety of industries, academia and NGOs, and explore transferability of practices which create added value for sustainable growth.

Upstream collaboration with suppliers can involve formal collaborative practices, such as formal supplier requirements and audits, and informal practices, such as sponsoring meetings and working groups to share best practices. Downstream collaboration with customers and consumers organizations may entail activities such as involving customers in the product design process, educating users on appropriate practices. And working with non-governmental organizations as well as the academic, scientific, and regulatory communities can encourage the development of sustainable solutions that are advantageous to both the business and the broader society. There are unlimited opportunities and pathways in exploring cross-industry learning and exchange and it's about organisation transformational capacity and human resources potential if these are going to be recognised and utilised. Prerequisites are among company strategy which places innovation and human capital management highly at development agenda, as these are levers to support tacit knowledge development, acquisition of best-in-class models and generation of transformational potential. Organizations which have recognised importance of these sustainability components have higher chances to survive operational environment changes and reach new operational models.

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ROLE AND IMPORTANCE OF INNOVATIVE MANAGEMENT

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Abstract: *Innovations in the field of management have been given too little attention so far. The attention has been directed towards product innovations, that is technology innovations. However, no less important field of innovations is the one in the area of managing and organization, i.e. in the field of management. Innovation in management is any decision that allows the introduction and application of changes in the existing ways of managing and organization, thereby bringing the system into a better position compared to that in the previous period. Dealing with innovative work in an organization is a must-do if we want to maintain or improve competitive advantage, or to put it in other words - if we want to survive at the market. Innovative management means a complete mental revolution and that is why certain managerial levels do not want to mention it, more precisely they make obstacles for those who want to deal with innovative work. The key of innovative activity, i.e. innovative climate, is in the role of the leader in the first place, and only then in the role of the system.*

Key words: *innovations, management, leader, creativity, motivation, growth, development*

1. INTRODUCTION

The aim of the work is to point out to the importance of dealing with innovations on all levels, especially in the field of management. All, without doubt, share the opinion that the management is perhaps one of the most revolutionary inventions of the modern age. It can be put in the same level with inventions of the wheel, fire or something similar to this. If we start from the point that the management is a process which combines available resources of the organization in the most optimal way, all in order to reach established aims, it is clear what it is all about. The aims we are setting forth are more and more demanding, considering the quality of products as well as services, price, scope, and also considering the social responsibility of those who deal with production. Let us take the example of Henry Ford, who having introduced the specialization and division of labor advanced the level of productivity to such a level that he could have produced a car which was of good quality, relatively cheap and which could have provided an adequate level of profit as well as level of income which enabled massive purchase of cars even by the workers themselves.

It is an indisputable fact that from the end of the nineteenth century till the beginning of the twentieth century, a great progress was made considering the quality of way of living. Also, no one can dispute the fact a new way of organization and managing had a leading role in that. Nevertheless, many people set the question: whether the management as a conglomerate of skills, knowledge, tools and methods which we use in order to achieve established aims through optimization of results and investments, has come to a critical phase when further improvements are not possible, or we at least do not know about them. Are innovations possible even in this field?

More and more people who deal with the issue of managing set this as a very important question. Why do a lot of them claim that the management stayed "capsuled" in the past and that innovations in this field are not possible?

Generally accepted point of view is that the human factor is the most important factor of innovating and that the lack of necessary knowledge, skills and passion is the most serious obstacle to innovations. Does existing, bureaucratic organization and on its foundations established system of managing also based on hierarchy allow enough place to people for dealing with innovations in the field of management? Does too much regulated system give enough place for people's creativity or on the other side does organizationally "dissipated" system motivate people for innovations? Does ever-lasting fight for profit leave a little place for dealing with innovations, and is a little money from profit invested into researching something new that does

not have to mean success a priori? Is dealing with innovations a privilege of a few chosen in the company or it has to be everyday task of all employees?

Those are just some of the questions that have to be answered if we want find out about the importance of innovations in the field of management. Without constant innovating there is neither growth nor development of the company, nor mere survival in very severe conditions of competitions governing the market?

2. DEFINING THE TERM INNOVATIVE MANAGEMENT

When we talk about innovativity, most frequently we think about technology innovations, that is innovations in the field of product and service production. It is rarely thought of innovations in the field of management that is social innovations. Social innovations beside technology innovations refer to those ones in fields which treat relations with stakeholders, development of new markets, development of existing and finding out new organizational forms, novelties in designing etc. That is basically a new philosophy of thinking and a new philosophy of acting. Modern, innovative management comprises a complete mental revolution. There is no inventiveness in management without a completely new approach to the process of organization and managing. The way it used to be done so far should be changed, but in a way that a new approach improves efficiency of the system. Innovations are very rarely the result of coincidence and individual thinking. They are before all carefully considered changes resulting from serious, professional and team work.

Before we start defining innovative management, it is necessary to make a clear difference between the creativity and innovations. Creativity does not have to mean innovations, whereas innovativity has to comprise creativity.

Creativity basically represents ability of constant "production" of new ideas without any obligation to apply them through a new product or service or some other new managing form. On the other hand, innovation is nothing but transformation of new ideas into new usable values. These new products and services should do nothing but provide competitive advantage resulting in prize in means of increased profit. Japanese management has gone furthest considering this. Their attitude is that the product makes profit only when it is new at the market, whereas the rest of time it "produces" costs. That is exactly why their business philosophy is a little bit different than this one we know. That is why the curve of their product life cycle has the shape of pyramid with very sharp angle, with difference to classic life cycle of product which we from this part of the world recognize and advocate.

Innovation of management is everything that in great value changes the way we do business in managing or that in great value modifies common organizational forms and that way improves organizational structure.⁵ Innovation in management is each decision by which bringing and application so-far way of organization and managing is changed and the system is put into a better position compared to the previous period. It is a very dynamic process not subject to individual, mutually not connected activities, but is a process that has to be considered in all its integrity. All the elements on which the system functioning depends have to be included in it. Innovations are changes that exceed the previous practice.

3. CHANGES AND MANAGEMENT

Where does the reason for quick changes in management lie? Are we already late with these changes? Is existing management system not enough efficient, so it demands only slight changes or adaptations or we have inevitability of revolutionary changes which basically change so-far way of working? Are we ready to go into those changes that look for many sacrifices and which final outcome is a complete mystery? There are so many more questions that make dilemmas and that can discourage us from those changes. Changes are inevitability, and the reasons we should look for in the following:

1. Competitive advantage of the company never disappeared faster before if we did not pay enough attention to necessity of following changes that were happening in the surrounding, as well as in the very company. Before all, that is a consequence of quick changes connected to the market and the necessity of constant adjustment to customers' needs. Enough is only a moment of self-satisfaction that can result in delay to market reactions to make your competitive advantage erode and that you can hardly bring it back.

⁵ Innovations. (2011). Magazine No. 3. Zagreb

2. How to motivate people to deal with innovations?⁶ How to persuade the staff that their obligation is dealing with innovations? We can do that only if we are “persuasive” enough through the system of evaluation, either material or non-material, that each employee feels satisfaction and benefit from dealing with innovative activity.

3. Globalization had as a consequence an accelerated, almost non-controlled growth of competition. In order to ensure a position at the market which will suit your interests you have to be more successful than the competition. It can be provided only by innovative activity and especially that one connected to management. In terms of constant changes of business environment, innovation management has become the essential prerequisite for maintaining competitive advantages.⁷

4. With the development of information technology access to customers is much more simplified, but the same way the access of customers to companies which are subject of their interests are also simplified, and almost unlimited. That has a consequence that the reasons for competitive advantage are constantly subject to risk that dissatisfaction of customers’ results in purchasing the same products from competitive companies. Nothing can be hidden from the customer any more.

5. Costs of communication between producer and customer, between producer and producer and costs of communication between customers are drastically decreased. It brought about the appearance of new competition which before all has a cheap product or service, whereas all other preconditions connected to the product remain the same.

6. We have already mentioned in the previous part of the work that producers themselves work on it to shorten the product life cycle. We should go even one step further. We should be working on how to shorten life cycle of adopted strategy. Strategy has to be subject to constant check-outs and should be changed when necessity comes and adjust to new conditions. Operative efficiency considering strategic determination of the company should be checked all the time.

7. People’s consciousness about the need to push the level of social responsibility higher is growing all the time. Organization International Business Leaders Forum (IBLF) thinks that social responsibility is “promoting responsible practical work which is useful for economy and society, and facilitates achieving social, economic, ecologic sustainable development maximizing positive influence of economy on the society, at the same time decreasing negative consequences to minimum.” Generally speaking, for profit they make, companies are not only responsible to shareholders, but to all other groups and individuals which are in some way influenced by that profit. Customers recognize it more and more, so you have to direct considerable sums of money for those purposes, and from the other side you have to be careful not to jeopardize profit level by which you accomplish your business objectives. According to Kerle K., when estimating the success of an organizational innovation, four parameters should be taken into consideration: culture and corporate responsibility, practice innovation, managers’ approach to innovativity and creativity as well as the approach to the strategy changes.

All those challenges, problems and changes which we have mentioned inevitably bring to the conclusion that we have to do reassessment of long-existing theory and practical application of management which is in practice nowadays. Do present skills, knowledge, present tools and techniques, people with existing knowledge and skills can meet the challenges that new time needs? If the answer is negative, then what is that that can give an adequate answer?

What is that that presents obstacles for development of innovative management in organization? We can hear most frequently that the obstacle is existing system of organization, which is inadequate, not suitable, rigid, etc. On the contrary, we are of the opinion that the problem is not in the system, but in the people, more precisely leaders. The most frequent problem is that the majority of managers think that innovating is not too important for positioning of an average manager. Unfortunately, most managers want exactly that role of mediocrity, due to the fact that it carries least risk for their career and enables continuation in career development ladder. It is slow, but it is certain. Most managers do not see themselves in the role of innovators. Maybe we could correct this statement that they want mediocrity. It is sure that they want success and benefits which this success brings. But it is also a fact that they do not want the risk of career

⁶ Clark, C. H. (1980). Idea Management: How to Motivate Creativity and Innovation. New York. AMACOM

⁷ Boutellier, Roman; Gassmann, Oliver and von Zedtwitz, Maximilian (2000). Managing Global Innovation. Berlin: Springer. pp. 30. ISBN 3-540-66832-2.

building. They prefer seeing themselves as pragmatic workers whose task is not innovating but maintaining and servicing the existing system.

The questions pops out what should be done to make innovativity the way of thinking and acting of all the employees in the company, so we can search for answers in the following:

1. Primary role in providing this way of behaviour is the role of the leader that is manager running the company. The difference between the leader and the manager must be pointed out. Manager is a person destined to run the system which is in a stable state whereas leader is a person in charge of changes.⁸
2. The thing that must be known about innovation is that that innovation is before all work, talent, creativity and imagination. It is necessary but not at all sufficient condition to become a successful innovator.
3. Innovation has to be self-obligation of all employees, every day. It is up to leader to motivate people to deal with innovations. They have to provide means as well as time for dealing with innovative work.
4. Field of innovative activity must not be a narrow one. It has to be considered from all points of view in order that each employee could find themselves in some of the fields.
5. Innovations should result in changes, either changes of people or process itself. If one of both happens is a good thing, but the best one is when both of them happen.
6. We have to provide equal possibilities for each new idea. Only that way we will create the attitude among employees that their dealing with innovative work has equal possibilities to succeed as ideas of other people.
7. Provide adequate system of giving prizes. Apply the principle" bigger the contribution, bigger the reward". Stimulate people to contribute more even through system of non-material rewarding.
8. Each innovation is full of unpredictability. However, it is wrongly formed the opinion that innovators are risk-takers. Exactly due to this high dose of unpredictability , success is not granted. More precisely, innovators are people who try to decrease level of risk to the lowest level possible in the conditions when level of unpredictability is very expressed.
9. Persuade people that even failure is an integral part of business and that failure should not disappoint and discourage you from taking part in dealing with innovations in your organization. Create trust, suppress fear! Bigger number of attempts, bigger possibility of mistakes, but also bigger chances for success.
10. Enable people to use part of their work time for experiments. Those experiments must be frequent and must be sufficiently financially supported and justified. It is better to enable, especially in the beginning, more frequent but cheaper experiments.
11. Encourage differences because only competition of ideas can result in ideas. Leader must never ever be scared of different ideas. Those people should be encouraged because in plenty of different ideas, the solution is often hidden.
12. Enable provoking authorities. Let yourself as an authority be asked even unpleasant questions. Not just let it, but provoke associates to ask you challenging questions. This way you will reach abundance of useful information.
13. Avoid building authorities by leaders. Authorities should be built vice versa, down-upside, in other words authority must be promoted by colleagues and associates.

⁸ Kemiči, O. (1995). *Kako razmišlja strateg. (How Does a Strategist Think). Privredni pregled, Beograd*

In all these presented views, how to stimulate dealing with innovative work is determined by the role of leader. Leaders can communicate through language and in the way that will enable those whom they lead to understand the importance of the work they do, before all reaching higher cause. In the work we have already mentioned that for not dealing with innovative work the leader should be blamed for, not the system. But, who can be a leader and does leader promotion have to follow traditional way (promotion by higher hierarchy levels) or something else? We share the opinion that the other way, that is promotion by the employees, has to prevail.

What should be a necessary pre-condition that has to be met in order to become a leader? Before all, it is possession of adequate knowledge and professionalism. Beside these qualities leader has to be someone who can make associate "interested" in doing the things the leader wants them to do. And leader by rule wants to work in the interest of the organization, not neglected the personal interests of those taking part in the process. Very interesting are points of view made by eminent professor Velimir Srica, professor at Faculty of Economy in Zagreb, where he in one interview given for magazine "Dialogue", says: "in stable situations, when there are no challenges and no conflicts and everything is clear to everybody, it is almost all the same who is leading us..." (...). How come the critical situations in the organizations? Taking into account the influence of exterior factor that we can influence just a bit or not at all, we come to the point of view that for bringing the organization into non-stable position is responsible the person who is running it. And who runs the organization then? Managers do this - managers who also had the role of leaders in those times. That is exactly why we think that leaders are necessary even in the period when system is in a stable position, in order not to bring the system into a critical state due to possible interior failures and not-recognizing possible exterior factors that can influence the system.

Dilemma is also whether a leader was born, destined to be a leader, or it is the consequence of permanent education and work "on themselves". John Lock's thesis that a man is "tabula rasa", blank board where life is writing the pages all the time, is only partly true. Besides these genetic assumptions, each man has to work "on themselves" all the time. There are no universal leaders. Each situation demands different approach and different profile of leadership.

Why do we mention this and why do we talk about this? We talk about this because leader is a basic creator of innovative climate in organization, and innovations are basic triggers of development. Leader has to encourage innovative activities and has to support people who dare to express their ideas notwithstanding the result of the same ideas. Leader has to pay special attention to people who stand out from standards that is clichés. Hamel considers that innovations almost always come from "haters", that is people who are almost always contrary to other. Good innovators must be people with passion, and people we have already mentioned as "haters" or "people contrary to others" are exactly those ones who are creative, innovative and with adventurous spirit.⁹

Furthermore, leaders must have followers who will go towards the fulfilment of the objectives leader, that is group, wants. Leaders must show to managers and all employees the importance of higher causes. The most important aim of the organization is to reach competitive advantage that has to base on innovations, and especially those innovations in the field of management.

4. WHAT SHOULD AN INNOVATIVE ORGANIZATION POSSESS?

Organization that wants to base its survival, growth and development on innovativity, must redesign considerably its standard system of mutual connections and relations and subsystems. That organization must to:¹⁰

1. Considerately decrease the depth of hierarchical structure, that is reduce the number of indirect relations between higher and lower organizational levels. Networking is necessary but the network integration is the key factor for the complex innovative issues to be successfully solved.
2. Establish lattice organizational structure, particularly strengthening the knot points.
3. Strengthen and simplify considerably mutual system of communication on all levels with special aim to raise level of responsibility to level of self-responsibility, but not base it on the level of fear and

⁹ www.quantum21.net – Interview with professor Velimir Srica. Faculty of Economy in Zagreb

¹⁰ Gari, H. (2010). Budućnost menadžmenta (Future of Management). ASSEE, Novi Sad

power. The same way develop the climate in organization that duty becomes self-duty, not at all task given from "above".

4. There is no innovating without experimenting, and there is no experimenting without money. Possibility for all employees to deal with innovating should be provided, as well as part of means they can spend for those purposes. It must not be allowed that costs depress innovations. It is certain that organization cannot and must not allow uncontrolled waste of either time or money for experiments, especially those ones which chances for success are not very high.
5. Establish also adequate system for appraising connected to results. Basic principle must be: better the results, higher the prizes. The difference between prizes must be established: prizes for those whose contribution is bigger in difference to those whose contribution is more moderate.
6. Leader must be "produced" by a group, not at all by formal structure.
7. Provide support by all stakeholders, shareholders, because it is their money that is spent. This is particularly important in big corporations where there is a big dispersion of ownership and where managers as well as leaders are frequently devoid of adequate control by owners from many different reasons.
8. Cherish the cult of difference.

Those are some of the features that organization which wants to have the attribute of innovative one should or must possess. Without innovations there is neither growth nor development, and very survival is put into jeopardy. However, the innovation management means the process of making decisions or taking some actions going all the way from creating an idea to its realisation with the aim of achieving business excellence.

5. CONCLUSION

Based on what we elaborated in the work, it is clear that innovating is something we should cherish, and it must be incorporate part of behaviour in each organization. Only those organizations that understood innovations as issue of gaining and maintaining competitive advantage as well as mere survival at the market, have chances to succeed. Innovations must not be a privilege of only a narrow circle of people in organization. Opinion that only people who are imaginative and especially gifted can deal with innovations is particularly present. Innovating is before all work and knowledge, and only after them other elements come. Many organizations have seen that if they understand their gained leadership position for granted and something that will last forever, make a mistake and see their competitive advantage erodes quickly. It is lost mainly to the fact that they neglected the need of constant innovating and the fact that innovating is not an act, but an ever-lasting process. Probably the time comes when we will talk less about long-life of companies, but more about the results they had. It is a matter of time when employees in their working life would survive the company and when we will talk about this. Companies will appear, fulfil their mission and disappear. Time interval for all this will certainly shorten. Innovations promote the need for constant changes. They influence all business aspects and often include the changes of the companies' business models.

We have to point out that among managers of middle level there is still very present the thesis that the system should be blamed for organization's failure. No, people are exclusive factors for failure that is leaders who did not want or did not know how to run the company. It is an undisputable fact that there is resistance among managers in organizations towards changes. Changes can show incapability of managerial staff to adjust to those changes, more precisely to uncover their inabilities and jeopardize their easy position in the company.

Further research should be directed towards defining the leaders' role in creating and implementing the innovative atmosphere in companies. How should the employees be encouraged to accept the fact that the leaders are not elected according to the hierarchy but they are promoted by the people they work with and the organization they work in? It should also be clearly stated what exactly an organization expects from its leader, since the leader is expected to be the key figure of all changes that the organization goes through from the state it was found in to the state it intends to achieve. Such changes, which do not necessarily guarantee the success of the organization, require time, patience and money. How to make the proper conditions so that the environment could promote its leaders as well as the leaders could create the

environment capable of maintaining innovativity of the organization? This is not an easy task and it requires the engagement of all the employees and particularly that of the leader.

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THE GENERAL MODEL OF ATTITUDE ADJUSTMENT AMONG SUBJECTS WITHIN THE ORGANISATIONS IN THE PROCESS OF FINDING AND REALISATION OF ORGANISATION INTEREST

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Summary: *Functioning of any organisation without agreed actions of its subjects is utterly inconceivable. However, the ground of adjustment, as a necessary process that takes place in almost all organisations, is not addressed in the modern literature. To understand the process of adjustment, as well as its phases and stage, one needs to be well acquainted with the process of organising and organisation.*

Key Words: *adjustment, harmonization, organisation, achievement, directions of action, to achieve*

INTRODUCTION

Finding the interest of the organisation is not just a simple product of thinking, a decision about what the organisation needs at one time and what could be the most beneficial on a long term basis, what and how to do it at some point. Namely, in order to come to any conclusion about the interest one must never overlook the fact that there are numerous entities involved in this process and that they are the bearers of different interests. Interests relating to various matters, and may be realised according to different subjects. Some interests are obviously internal, while others are external. In the process of finding the interests of the organisation a lot of adjustment and harmonization is required during its various stages and phases. Due to the specific needs and interests of the organisation's functioning, the subjects of an organisation adjust and harmonize goals and directions of an action to achieve those goals.

1. THE MEANING OF ADJUSTMENT

In order to explain the general pattern of compromise more effectively, we must point out the general meaning of the term compliance first. In Serbian, the word adjustment means aligned, to reconcile, agreement (with something), to agree. To conform to each other means to reconcile, to agree. Coherence is a property, the condition of what is consistent, harmonized, ie. harmonious.¹¹

To agree means to bring each other in agreement. In addition, *to agree* means *to balance* and *to conform*.¹² There is the appearance of Equalization concepts of alignment and harmonization which is the case with the sources and everyday practice,. Although seemingly similar, and often explained in reference books, these concepts differ significantly.

It is similar to English. Most of English dictionaries explain the word adjustment as tuning, in order to align, to adjust, adapting, or harmonization, acts in the process of harmonization, etc. The second term in English which is used is *to tune* and it means adjustment, alignment and harmonization, and primarily relates to the harmonization of legislation, harmonization of prices, etc. Also, to confirm that we have the translation of English word *compatibility* (compatibility) which means consistent, harmony, to agree, etc.

However, there is a clear distinction between harmonization and alignment, and the two terms can not be considered synonymous. The reasons for this are numerous. The difference between the concepts of alignment and harmonization, in terms of methodology, reflected in the fact that reconciliation is possible only in the first stage of harmonization, it is not a synonym. Synchronization, in essence, means the elimination of barriers to the implementation of a decision. Also, it can be argued that harmonization is only one of the harmonization of procedures, ie. part of the harmonization process.

¹¹ Dictionary of Serbian literary language, Matica Srpska, Novi Sad, 2007 pp. 1412.

¹² Ibid

Alignment assumes operational behavior – action while it limits the harmonization of intellectual action. Thus, the concept of alignment is defined as the process of achieving certain goals, ie. achieving a certain behavior that meets agreed standards. Alignment is, therefore, the actual behavior in accordance with agreed standards. This definition emphasizes that harmonization is a process, and the effect of this process is the alignment of a number of subjects.

Subjects of compliance can be a powerful and obedient executor of orders, or equal entities. By convention, alignment, for example, includes not only the order and the powerful but obedient executor of the previous, actual consent, not imposed. Such is the interdependence of subjects depends on alignment and strong influence of each of the subjects in the process. The award arises here as a material incentive, or penalty for non-compliance.

2. GOALS OF ATTITUDES HARMONIZATION IN THE PROCESS OF FINDING ORGANISATIONS INTEREST

Each goal is a reasonable definition of a desirable or a possible situation. The existence of objective precondition for the emergence of a new organisational system, through the system the individual and society achieve articulated goals.

Therefore, the characteristics and importance of each specific target are based on certain principles that should be adapted to structure and functioning of the system in order to achieve a specific goal.¹³

In the process of achieving the goals of an organisation, there are two key moments of interest i.e. the organisation and its implementation.¹⁴

This is confirmed by the fact that the interest must be:

1. identified;
2. classified;
3. selection;
4. articulation of the interests of such organisations;
5. approval to collect the relevant subjects to be proclaimed as the interests of the organisation;

The interests of the organisation is to move from the sphere of thought in the realm of facts and actions, so that the organisation seeks to achieve its collective power of ideas about their interests.¹⁵

Alignment refers to the behavior of entities acting within the organisation, as well as subjects with the organisation:

- communities;
- organisations;
- institutions;
- individual stakeholders in order to achieve the organisation's interests.

Alignment prior to harmonization of positions, ie the achievement of mental, psychological, emotional and rational consensus on:

- problems;
- solutions (problem solving);

The objectives of harmonization need to overcome initial differences in attitudes and behaviors among entities that make up the organisation and to ensure their common functional activity. This is one reason why they can not be classified as general goals.

It is entirely appropriate to classify them, according to the areas concerned and in order of their realization. It also aims to be divided into levels: strategic goals, operational goals and concrete (instrumental) goals.

¹³ Kukoleca S.,(1972) Basic Theory of Organisational Systems, FON, Belgrade.

¹⁴ Term "Interest" derived from latin word interesum, interesse, means takes part in something, to be engaged in something, search extensively: Small political encyclopaedia,(1966), Moder administration, Belgrade, pp. 390.

¹⁵ About interests in general and interest on political field look widely:Termiz Dz., Milosavljevic S. (2000), Handbook for politicology of methodology , Sarajevo, pp 20-21.

The ultimate goal of implementation of the harmonization process is overcoming differences in attitudes and actions of entities of the organisation. This creates a precondition for ensuring certain level of competence that is essential to organisations able to respond to current and future challenges, increase efficiency, effectiveness, cost, and enable efficient use of resources, and to provide flexibility and adaptability of the system, as well as the harmonization of its developmental components with the overall development of society.

3. GENERAL MODEL OF ADJUSTMENT

The model is based on the adjustment for the harmonization of social reality in the daily coordination of behavior and actions of various entities aimed at achieving certain aims and objectives. Therefore, the alignment model is the product of the application of modeling methods that have been allocated to the necessary observations, the typical process of adjustment factors in the dynamics of social practice.

Adjustment is a social process of interaction of two or more participants, according to established rules or provisions of the decision. Therefore, the alignment of behavior and actions necessarily require prior awareness of the need and purpose of alignment and the need to establish certain relationships. These relations are, as a rule, essentially hierarchical, although they might be their various manifestations.

Given that the adjustment of social process, the development of a model we are using to engage the general model of an ideal case study of social phenomena. The essential factors of this model are:

Social situation which in itself includes a natural component of the impact of social processes;

The basic setting you take from this part of the above models can be formulated: what is happening on planet Earth, takes place in a situation that is necessarily complex. Accordingly, the adjustment takes place in a situation, a situation is a complex and subject to adjustment.

3.1 The subjects-actors in a social situation;

It is undisputed that no social situation without contributions, activities and acting social subjects - people, whether their behavior and actions are conscious, rational or instinctive. For this component we take the setting of rational behavior and acting companies organisations, because the alignment occurs as a rational action that is reasonable and willing subjects in relation to each other dependencies.

3.2 The needs, interests and goals

The needs, interests and goals are the third component of the model from which we take the needs of companies setting organisations to target, purposeful activity meet specific needs. Commitment to align the behavior and actions are necessary to target and willing to at least double sense:

1. each type of work involving more subjects, it must be played in a certain order, according to a schedule and space, coordinated and synchronized - aimed at achieving the goal. The first instance aim here is to achieve harmony in the behavior and acting subjects;
2. Second collateral, ie. basic aim is to conduct concerted action is appropriate and intended, that the results of that kind of behavior and action of water reach the achievement of desired and intended, defined as an action target.

3.3 Activities

Their interests and goals are achieved primarily by agents of the organisation by its meaningful, purposeful psychophysical, rational, timely activity or omission of some activities. This setting model as a whole relates to compliance. As a process, reconciliation is taking place at various levels of the organisation. It is essential, permanent feature that can not be maintained without a certain degree of harmonization in important areas of functioning of the organisation.

3.4 Methods and techniques of action

Human society, from individuals to organisations or institutions, in the action use (use) a variety of methods and techniques of action (various instruments and procedures). This point applies to the model approximation. So we can conclude the existence of regulations, information and communication, presentation and counter-thesis (antithesis), presenting arguments, debate, draw inferences, evaluation, compliance, consent orders and so on. In various direct and indirect manifestations.

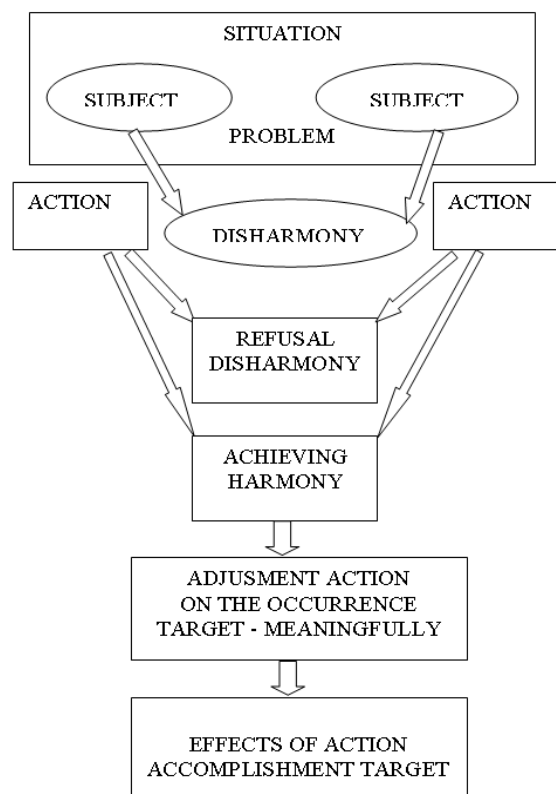
3.5 The effects of adjustments

All of these methods and tools help to achieve various degrees of effects, and effects of a two-sphere and sphere to sphere and compliance effects of concerted action.

Starting from the above we can conclude that an essential factor model of action and compliance behavior in principle equal partners as follows:

1. taking note of the need for adjustments in a given situation;
2. identification and articulation of such non-compliance issues and compliance cases;
3. initiative to begin the process of harmonization and notification of it;
4. consultation on the initiative;
5. official schedule of the approximation: the time and place, participants, and the problem closer to the subject, deadlines and procedures;
6. methods and means in the work on harmonization; mismatch detection, establishment of relations between the odds, the distribution of roles; resistance (content, format);

Planning the effects and recognize - effects assessment.



Picture: The general model adjustments process

Motives in the harmonization process are certainly benefits and damages suffered by the subjects and compliance with respect to those who suffer the damage and what the consequences or the damage they can use: individual, collective, general. The main relationship in the process of harmonization are certainly interdependent entities.

The subject of harmonization can be represented through the answers to several questions including: what? (Refers to what is being harmonized, ie. The strengths and assets) how much? (Refers to how much of which coordinates) when? (Referring to the time ordered for the alignment of object alignment); what? (Refers to funds that are needed to harmonize certain committed).

As is characteristic of each process, and the matching process includes specific phases:

- phase of informing and explaining;
- phase of agreement on a plan of execution;
- stages of completion;
- social effects of the execution phase.

Basis adjustments can be classified into four groups and to harmonize:

- adjustment based on reconciliation (by agreement, by mutual agreement);
- adjustment based on the order;
- alignment using the power and violence;
- combined.

Which of these groups, adjustments will be applied, depends on the structure alignment of entities and their relationships. The quality of decisions depends on the contribution of information and ideas harmonizing entities, their communication skills, prediction, reasoning, the degree to which the discussion focused on the problem and how to resolve certain inconsistencies and confusion.¹⁶

In each of these groups of adjustment, it is desirable that the subjects have some ability to negotiate for the purpose of negotiating and reaching a mutual agreement. Negotiation capabilities allow operators to harmonize the best way to communicate a problem, they laid his proposed solutions and the subsequent controversy with subjects, provide consent for the development and implementation plan for the solution of the problem.¹⁷

4. CONCLUSION

Opting for the treatment of this subject, we were aware that we can, within this study include all issues of this complex process of harmonization, let alone adequately resolved by science. So we started from the basic, scientifically validated and generally accepted knowledge. The complexity of this process is reflected in the fact that it is influenced by many factors and environmental conditions as well as the numerous parties involved in it.

We conclude that the purpose of compromise among the subjects of an organisation and operation of their achievement to overcome initial differences in attitudes and behaviors among subjects of a system. Also, the matching process relates to the conduct, acting within the system, as well as with other systems in society, and it precedes the true harmonization of positions, i.e. the achievement of mental, psychological, emotional and rational consensus on problems and solutions, which is the way of solving problems.

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INNOVATION, MANAGEMENT AND BUSINESS SUCCESS

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Abstract: New global world has developed new paradigm of success that includes need for constant change, knowledge based society and a paradigm of innovation as a part of it. The paper focuses on innovation paradigm and analyzes possible connection of innovation and business success. It is based on the research done among US business leaders of Serbian descent followed by structural and qualitative analysis of their life stories and biographies and autobiographies of more than fifty American business leaders of the 20th and 21st century. As a result of a search for the structure and success patterns in gathered material, the Scheme of Success is developed. The Scheme defines success as a process and gives the patterns/elements of that process one should follow in order to be successful. Innovation, any form of pioneering undertaking, is shown to be one of those defined, inevitable elements of any process of big business success.

By analyzing business leaders narratives and biographies, the paper deals with the topic of leadership and innovation using newest leadership study methodology flows which include more qualitative methodology in leadership studies.

Key words: innovation, business leaders, leadership, elements of success, scheme of success.

1. INTRODUCTION

Success is a concept that attracts attention and is desired by most people, although the meaning of this term is relative. While the term success is often identified with wealth and prosperity, its meaning can be different for different people and connected with achieving a certain goal. Wealth and prosperity usually come as a result of achieving a set of professional and personal goals. In this paper success is understood in the same way as it is used in the American myth of success that is, gaining wealth and climbing the social ladder from the lower to the highest social level.

How to be successful in achieving an objective has always been concern of human societies. Most of the research related to business success was conducted as a part of management and leadership in organization studies, having effectiveness of a manager in its focus. Global market and technology and continuous education led to need for innovation as the key success factor. And vice-versa, an ever-growing need for innovation and diversification led to the creation of a new kind of global competition and the need of continuous education of workforce in order to track the constant changes that this kind of technological environment and competition brings. A new paradigm of success has been developed that includes need for constant change and development of organizations and of people meaning knowledge based society and a paradigm of innovation as a part of it.

The author gathered and analyzed autobiographical stories of six American business leaders of Serbian origin and more than fifty other US business leaders' autobiographies and biographies. The autobiographies and biographies gave the corpus of facts which was then structurally analyzed for patterns and themes that are repeating.

The themes that were repeatedly present in every narrative were: 1. Hard work, long working hours 2) Personality traits that helped them succeed 3) Other people and institutions help that leaders had during their business career and how it was beneficial to their success. 4) Innovation, pioneering endeavor and novelties that leader introduced, 5) Crisis and risk, critical situations in which leaders found themselves in during their career 6) Circumstances and taking the opportunities. (Draskovic, 2010)

2. THE SCHEME OF SUCCESS

By grouping together the themes in the narratives one more theme was also recognized: Unacceptance of the existing situation and decision to act. All of these themes make elements of the Success Scheme. (Draskovic, 2010, 2011) We will describe briefly each of the Success Scheme elements and the Scheme

itself before we focus on one of success elements – Innovation - and analyze its place at the Scheme and it's relation to success.

(1) **Unacceptance of the situation** they found themselves, decision to change that, and **action** is the starting point of business leader's narratives of their business success. Determination to confront the situation and eventually leave their home is starting point for both Serbian Americans and other American leaders. They are not satisfied with conditions of their life, even revolt against it and very often leave their homes in search of better future.

(2) **Hard work** is the main element of the success scheme of US business leaders. Serbian Americans start to work very early, practically from their childhood. They work from dusk to dawn, work hard and sacrifice personal and family life. The same was found in the US business leaders biographies like Clarence Vulu, DeBartolo and others who started working when they were ten, twelve, fifteen, just like their poor ancestors in 19th century.

(3) **Innovation and pioneering undertaking** is another common element of the US business leaders success stories. Each and every one of them, including US business leaders of Serbian descent was an innovator and a pioneer in their fields of business. This element of success will be discussed more in the next chapter.

(4) **Personality** that is required according to both Serbian American leaders narratives and their US colleges biographies is the following: High ambitions and a need to prove oneself combined with perseverance, diligence and strong will. Hard and disciplined work is as important as good communication, honesty, team work, partnership, and respect for others and the community. It is also important to have vision and creativity and a strong moral code.

(5) **Circumstances** are recognized to have role in success stories in contemporary America. Even since 1939, in biographies of the American business leaders one can find the idea that it was not only hard work that contributed to success but also luck or circumstances. It was Henry Ford who said that he succeeded because he was in the right place at the right time. (Mayo, Nohria 2005.) But it is up to an individual to recognize opportunities. The circumstances that affect success are shown by the following diagram (Przulj, Draskovic, 2012):

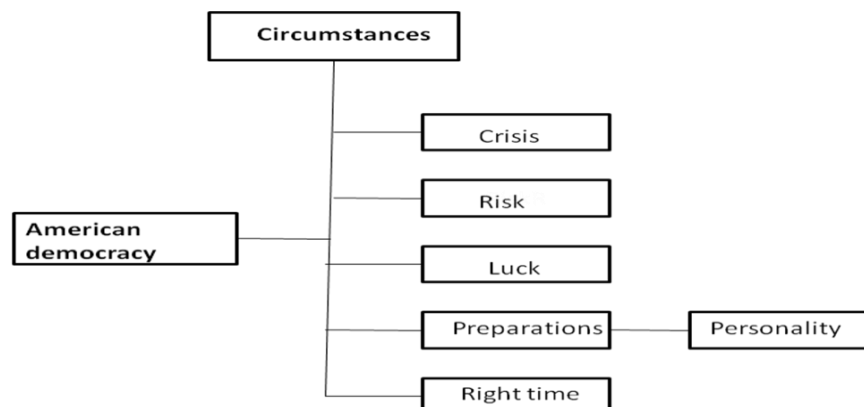


Figure 1: Impact of circumstances on success (Draskovic, 2012)

(6) **Crises** are not only part of the circumstances, but have their own impact on success. The individual narratives show several crises during the career, with at least one major crisis. Successful people are motivated by crisis, the crisis represents a challenge that influences change and helps them to advance in their career.

(7) No one has succeeded alone. All successful people have received **help** of some sort. An important principle to gain help is that it must have been deserved, with business leaders previous records, previous behavior that develops trust and respect, etc. The following diagram shows usual sources of help.

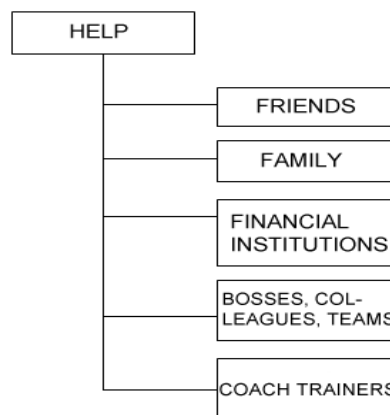


Figure 2: Sources of Help (Przulj, Draskovic, 2012)

Finally, there is a change of situation at some point resulting from all of the previous: hard work, loans, crisis, not giving up i.e. persistence, several attempts, help from others. Elements of success are graphically shown in the scheme on Figure 3:

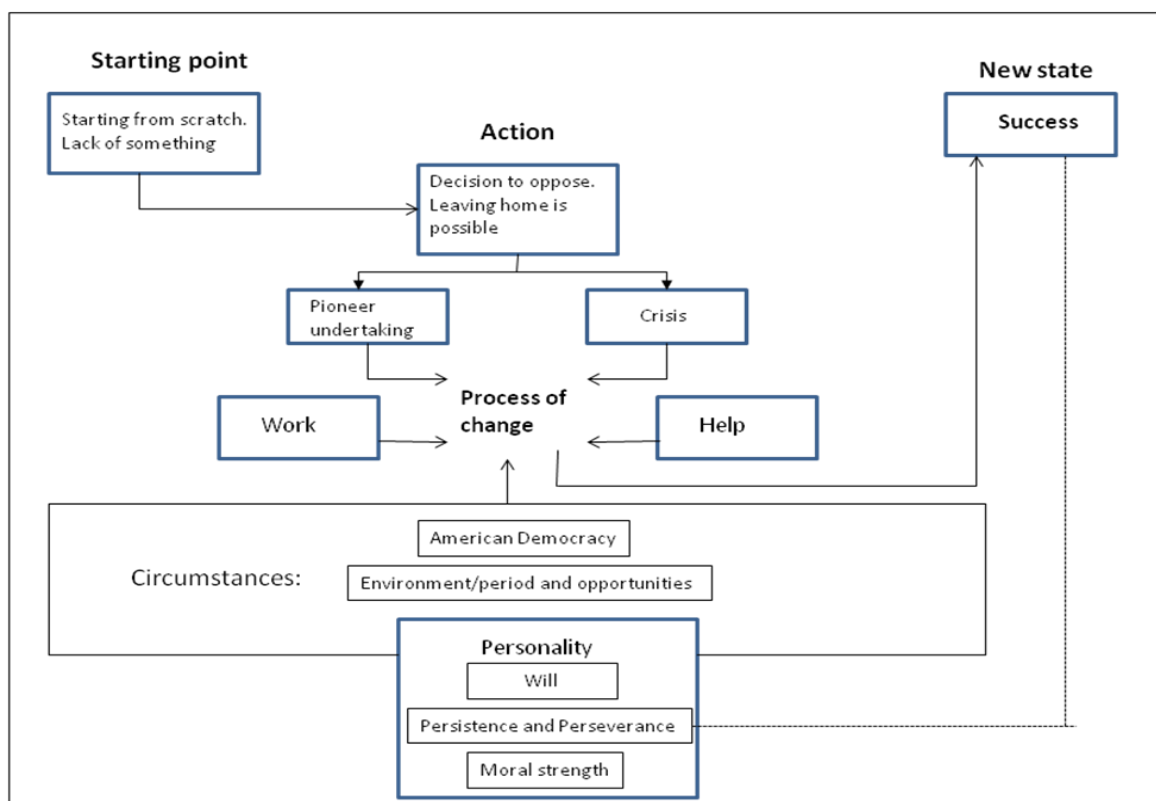


Figure 3: Success Scheme (Draskovic, 2010)

The scheme shows starting position as unfavorable in relation to later status. This position represents the lack of something, situation that needs to be changed. An action is connected with innovation of some sort (pioneer undertaking), inevitable crisis and risks. They initiate change, but for the change to happen two more elements are needed: hard work and help from others. Finally, the whole process is followed by circumstances needed to climb to the next level. These are social-economic system that supports success (American democracy), new areas of business, new environment, but also of the person and her readiness to recognize and take chances. Not until all of these elements are combined together can a higher level change occur.

3. INOVATION, MANAGEMENT AND SUCCESS

The environment is increasingly dynamic and competitive. There is a need to have people at every level who are oriented toward learning and continuous improvement. Organizational learning involves acquiring and using new knowledge. Learning Organization is the term for organizations that learn rapidly and use knowledge to become more effective. (Chawla, 1995) This kind of organization has embedded values of learning, innovation, experimentation, flexibility and initiative. Knowledge is diffused through the organization as they nurture ideas and support changes initiated by people at lower levels. Concept of learning organization is connected with the experimenting, risk acceptance and right to make mistakes.

Among different types of organizational change there is the organizational approach: organization can change and develop as it improves human capability, commitment, and creativity by increasing individual and organizational learning, strengthening cultural values that support flexibility and innovation. (Yukl, 2010) This type of development encourage appreciation for flexibility and innovation, set innovation goals, encourage and facilitate learning by individuals and teams, help people improve their mental models, leverage learning from surprises and failures, encourage and facilitate sharing of knowledge and ideas and Reward entrepreneurial behavior.

How leaders influence organizational performance (effectiveness) is one of the most important questions in strategic leadership. It is seen as dependant of three types of performance determinants: Efficiency and process reliability, Innovation and adaptation and Human resources and relations. (Yukl, 2010) The focus of this paper is on Innovation as the performance determinant.

Global environment changes the character and the essence of the innovation process. Innovations become inseparable part of business success and of competitiveness. Too many commodities and services at the global market and too many information urge need for new and different. There for the innovations get critical importance.

In addition, we are arguing that innovation was always important for business success. Looking into the way US business leaders earned their fortune, there is one pattern striking for our attention: repeating in each and every biography that each of leaders has been inovator in his field of work, and has given something new to the business and the community. Whenever we find a wealthy and succesfull manager, we can find pioneering business undertaking including new ideas, new products or new ways of selling, new way of advertising etc. From Carnegie in steel industry and Ford in the automobile industry to new Silicon Valley richmen, all has built their empire on a new and innovative businesses. The same is with the Serbian Diaspora US business leaders. In every narrative we found the story of a pioneering undertaking of a particular business leader. (Draskovic, 2010, 2011) Each of them has been pioneer in his fields of work: Michael Djordjevic has made a *Capital Guaranty* corporation that has for the first time connected banking and insurance business; Mandaric and Selak introduced new technologies, one in ICT industry in Silicon Valley, the other in offset print in Chicago Illinois; Mijušković has introduced at the time new multilevel sale model into Avon, US corporation etc. I have always been promoted on the basis of innovations I was introducing, says Mijuskovic. (Draskovic, 2010).

Alex Machaskee introduced new way of dealing with workers unions as well as new way of combatting with the competition; (Draskovic, 2010) Martin Selak, another US business leader of Serbian descent, has been pioneer in one of the sectors that emerged in late 60s – offset printing. He has today fourteen patents for the offset machine which made him and his company wealthy; Milan Mandaric was one of the pioneers in Silicon Valley inventing new technology use for the electronics of the developing PC industry; Vukovic has been one of the first to recognize the potential of the mobile home business becoming the King of the Mobile Parks in the US, etc. (Draskovic 2010)

Innovation is part of every US leader's business success. We have already mentioned pioneers undertaking at automobile industry which helped Henry Ford to become an icon of a self-made man. He began life as a farmer's son and quickly became rich and famous. His main innovation is the design of the Model T for the masses, but he also installed first mechanized assembly line to make production cheaper and faster. In steel industry Carnegie made his fortune with his innovations. One of his two great innovations was in the cheap and efficient mass production of steel by adopting and adapting the Bessemer process. The steel price dropped as a direct result. Carnegie's second invention was in his vertical integration of all suppliers of raw materials. Every other leader has in one way or another being part of some new and pioneering business. We will mention just few more examples: Famous Ball Brothers made a fortune within a few years

after added glass production to the business and, in 1884, produced their first fruit jar made of glass replacing wood jars; Frank Phillips, petroleum magnat was a pioneer in natural gas production and fuel for emerging avioindustry; Clarence Saunders has developed the first modern retail sales model of self service. His ideas have had a massive influence on the development of the modern supermarket. He was introducing innovations for most of his life trying to develop a truly automated store, developing Piggly Wiggly, Keedoozle, and Foodelectric store concepts; Juan Trippe has been the first to offer aircraft service to distant regions in US and also first to offer international air flights by his Pan Am company. He was also first to introduced three motor aircrafts which were able to exercise post as well as passenger service. (Mejo, Noria 2010)

Margaret Ratkin was first to produce what is today known as an organic food and Edward DeBartolo developed shopping malls, and was first to invent what will become shopping boulevards and consumption transformed into a social experience, place for not only clots buying but meeting friend, relaxing, going out with kinds, have a meal etc.

The same importance and connection of innovative management and success can be found in IT businesses. One example can be Dell Corporation. Dell started an informal business putting together and selling upgrade kits for personal computers. He made a fortune introducing innovation of selling PCs directly to customers which had enormous advantages over the conventional indirect retail channel. Dell Corporation introduced other innovations to industry first offering one month refund guarantee and was also first to offer industrial service at the buyer location. And everybody knows software interface that Bill Gates invented which revolutionized computer usage, etc.

These men and women have changed the way we work and live. Great successes are rarely won by playing safe. On the contrary, the biggest fortunes have been won by those willing to step outside the box and change the way the game is played. They are business innovators. For example, Jack Welch is perhaps most famous for streamlining GE, reducing management from 29 levels to only six, Steve Jobs, co-founder of Apple and chairman of Pixar is responsible for changing the way the world works and plays, and at the end of his autobiography, Sam Walton wrote that the most important rule in business is to break all the rules, which he did by his innovative and daring approach to business.

4. CONCLUSION

Invention as an element of success is not only part of the biographies and autobiographies of business leaders of this and previous century, but also a part of other contemporary narratives of success like popular literature which has made the success one of its subjects. But, in addition to that, innovation is also, nowadays, inevitable part of academic management literature. New trends in management recognize innovation to be not only element of successful management and managers, but of the organization effectiveness. As discussed earlier, in the world of globalization and constant change, innovation is not only seen as an element of success and effectiveness, but as a key element of effective management. At the beginning of the 21st century, we are witnessing the rule of innovation paradigm that puts innovation and new knowledge in a center of development of individuals, organizations and communities as a whole.

Although innovation as an element of success is underlined by modern global world demands and today's management practice and theories, its importance for achieving success has already been known for centuries. In traditional narrative forms, like fairy tales and myths, we can find pioneering undertaking and necessity of new in order to achieve goals. These traditional stories describe the ways in which a hero reaches the objectives and achieves set goals. Heroes' actions are usually something that he is doing for the first time, and he will be the one to do it for the first time in his community, thus setting a new standard of behavior. Opposing an enemy for the first time, or in a new way, never before being imposed to such a challenges and obstacles, all can be found in traditional stories. (Draskovic,2010) So, by seeing innovation as a part of the organizational development in a new and different perspective today is in a way reinventing innovation as an element of success. Successful Americans, including ones of Serbian origin, confirm that and teach us, based on their own experience, that innovation is inevitable part of any effective management and of any big business success.

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INNOVATIVE MANAGEMENT AND OPERATIONS (BUSINESS) PERFORMANCE

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To my granddaughter Mia Tauzović for her first birthday

Abstract *Using the principles of the Systems Management Theory, the definition of modern (innovative) management as a process of an effective and efficient union of (contemporary) operations (organizational) functions and (contemporary) management functions is specified in this work. For its determination it was possible to use the **innovative** (systems) methodology of **management** called **Tauzović's General Continuum (TGC)**, which can be applied on both theoretical and practical levels. By using the TGC, analysis of management concepts can be performed and a synthesis of those concepts can be given, which made it possible to determine the **performance** of the strategic and operational management parts first, followed by the organizational (operations) **performance system**, in a more detailed way. Since competitiveness (the **why**), quality (the **what**) and flexible efficiency (the **how**) are the main performance indicators, it is possible to give a brief conclusion as to **why** modern organizations exist - to be competitive and innovative, which means that they provide the right things (**what** - quality / in a timely and effective manner/) and in the right way (**how** - profitably /flexibly and efficiently/). This innovative management approach ensures **customer (consumes) satisfaction** and **manager (employee) loyalty**. Therefore, the contents of this work are focused on them, in order to test, accept, use and further research areas where they belong to.*

Keywords management, performance, operation, system, Tauzović's General Continuum (TGC)

1. INTDODUCTORY CONSOLIDATIONS

Continuous modern management improvement, as an all-embracing process of universal (and modular) goal setting and achieving, leads not only to new innovative management concepts and contemporary explanations of its procedures, but also to the detailed procedures regarding how to achieve those goals. By applying the principles of Modern Total Quality Management (MTQM), modern management research becomes easier to both understand and use. In order for a modern system to achieve, use, maintain and develop its (overall) capacity and provide opportunities for its further improvement (i.e. be competitive), the practice of successful organizations (systems) is to invest significant resources into specific systems prerequisites for management processes improvement. The most important structural prerequisites for these purposes may include: 1. (investing in) research and development, 2. integration resources (people and facilities), 3. finding modern management methodologies that enable innovation, and 4. continuous improvement through a comprehensive system.

Systems Management Theory is an all-embracing management process (as a **practical theory which first "raises" real data, through information and knowledge, to the level of theory, and then "transforms" it into concepts**) as its basis. It divides a system into: (i) natural, (ii) technical, (iii) organizational and (iv) social components. The systems approach defines systems as sets of interrelated elements, components or subsystems (with their mutual relations) that, if functioning harmoniously, can provide synergistic outputs. In the systems approach, systems are open (in that they have permissive borders), as opposed to analytical systems where are considered to be closed. Open systems are influenced by their environments, which may be there:

1. General environment (economic, technical, financial, informational, political, social, etc. – as being parts of the general market), or macro-environment and
2. Working (determined) environment (competitors, suppliers, collaborators, customers – as being parts of the goal /market/ markets), or micro-environment.

Starting from the general and working environments, modern management should be performed at all levels of management, namely: 1) the institutional level (or level of planning /PL/), 2) the strategic level (or level of organizing /OR/), 3) the operational level (or level of directing /DI/) and 4) the control level (or level of controlling /CO/), or its separate parts - (1) strategic (s - levels of planning and organizing) and (2) operational (o - levels of directing and controlling) (Taufzović, J. T. 2009). Since design and improvement of a system can be considered modern methodologies inherent in modifying a system, design and improvement of modern systems are performed on the strategic part, while the design is done because of more significant and complete environmental impact, and the improvement is mainly done due to lower or increased influence ("requirements") of the operational management part.

Using MTQM, as a modern systems management approach aimed at continuously improving the value of products (goods, information, management and services) through design and (systems) processes improvements it is possible for management to not only to achieve their goals, but also make their procedures more acceptable and understandable for managers (employees) and customers (consumers) of the products. This modern strategy, among other things, represents a very good basis for all-embracing innovative management processes of design (redesign), improvement and all-embracing (research and management /in the narrow sense/) modern systems management. Among such innovative methodologies, modern methodologies (of research and) of management, based on an overall development of business (as a special type of organizational) systems, starting from work unit (as a basic organizational system), i.e. the main systems unit of business organization itself, to the system of its direct (working - as goal /market/ markets or business activity market) and indirect (general - as other markets or business market) environment, important role. In these considerations, the existence of (modern) operations systems as extensions (or upgrading) of operational system parts such as marketing (MA), resources (RE), operations (understood in a narrower /or production/ sense - OP) and finances (FI) stands out. By conducting contemporary research into the general traditional hierarchy of systems, the existence of operations systems, was also proven, which was crucial for the establishment of new methodologies for their, management. For contemporary research, operations systems can be defined as mutually interrelated sets of extended (or upgraded) systems operations.

Determining the necessity of operations systems (Taufzović, J. T. 1998) is of particular importance for all economic activities, i.e. what people do in the absence of all-embracing resources to overcome shortages. As an extension (or upgrade) of the system operations which are used for management determining and achieving, **operations systems are basic and major parts of the wider business system (organization), which have to participate in (preparing and) making all management decisions, because only they can understand, accept, design, further improve and implement the decisions.** As these operations system features are of **vital importance for business organization**, the **business performances** refer to **operations performances**. Therefore, modern management operations systems are subsystems for business systems (organizations), and they have production systems consisting of work units (as organizational units' /systems/ consisting of people and facilities) as their subsystems.

2. TAUZOVIĆ'S GENERAL CONTINUUM (TGC)

Modern systems approach and analysis of results obtained through all-embracing research carried out within the research project "Modern Management of Operations Systems" (Taufzović, J. T. 1998), may lead to systems synthesis so that components (or functions) of operations systems may be globally (theoretically and practically) shown, and studied in terms of certain areas of activity (processes), namely: 1.P - Activities of preparations (1.1.Pe - External and 1.2.Pi - Internal), 2.A - Activities of analysis, 3.S - Activities of synthesis and 4.C - Activities of control. Further analysis of such relations leads to consideration of what kinds of relations may be used for theoretical and practical needs (of management) through:

{ → 1.P - Activities of preparations (1.1.Pe - Activities of /total/ needs /or requirements/ for the system existence ← → 1.2.Pi - Activities of system policies /opportunities or strategies/) →
→ 2. A - Activities of system support (or inputs) →
→ 3. S - Activities of system supply (or transformation of inputs into outputs) →
→ 4. C - Activities of system assessment (/improvement/ or outputs)→} (Figures 1 and 2).

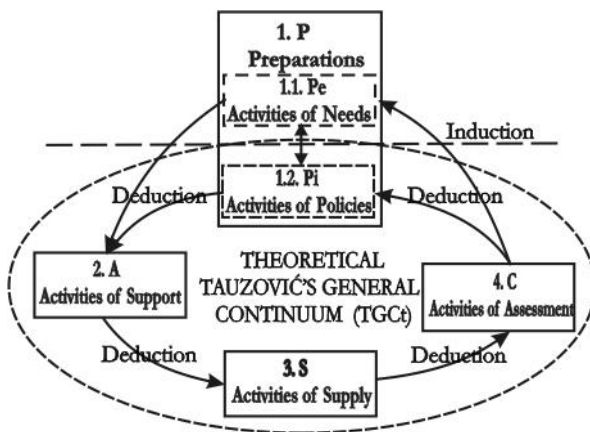


Figure 1 – Theoretical Tazovici's General Continuum (TGCT)

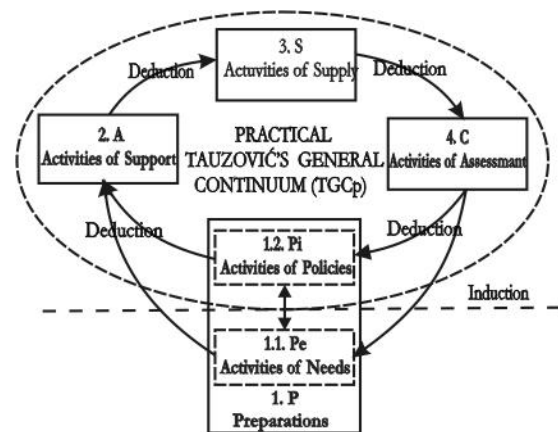


Figure 2 – Practical Tazovici's General Continuum (TGCP)

Using this **innovative** (modern systems) **methodology**, called **Tazovici's General Continuum (TGC)**, it is possible to resolve problems of the system and all-embracing management, through subsequent use of the continuum of four sets: (i) cyclical, (ii) iterative, (iii) continuous and (iv) spiral activities in TGC, based on modern model of operations systems management consisting, apart from the level of the working /and general/ environment, also of four levels: /1/ institutional (planning), /2/ strategic (organizing), /3/ operational (directing) and /4/ control (controlling) (Tazovici, J. T. 1998). Such a management methodology can be divided into two parts:

- (i) **inductive part** – consisting of 1.P – Activities of preparations (1.1.Pe – Activities of /overall/ needs /or requirements/ and 1.2.Pi – Activities of policies /opportunities or strategies/ ($\rightarrow 1.P \rightarrow 1.1.Pe \leftarrow \rightarrow 1.2.Pi \rightarrow$), and
- (ii) **deductive part** – consisting of 2.A – Activities of support, 3.S – Activities of supply and 4.C – Activities of improvement (/assessment/ $\rightarrow 2.A \rightarrow 3.S \rightarrow 4.C \rightarrow$) (Figures 1 and 2).

Through the application of the TGC, it is possible to conditionally display it as a modern (i) theoretical, social-organizational or strategic application, mostly directed to "soft" systems (social and organizational – **TGCT**) (Figure 1) and (ii) practical, modern natural-technical or operational application, primarily referring to modern (supplied with organizational /operations/ functions) traditionally called "hard" systems (known as natural and technical – **TGCP**) (Figure 2). Various forms of the TGC model (TGCT and TGCP) are directed to a more acceptable understanding and monitoring of their use in all-embracing management (research and management) of various types of modern systems or system parts, as well as their internal levels. Such forms of systems management offer a good foundation for further initiation and general development of not only future management methodologies, but also business organization **performance** standards.

When considering an all-embracing management approach, the TGC application may be used, both when looking at specific contexts and the overall "picture". It is applicable both at a strategic or theoretical (TGCT) level and at an operational or practical (TGCP) level, for each part or management level separately, and is even applicable to certain parts (activities) of each management level. In all cases of TGC application, the prior procedure refers to **why** and **what** should be done (as induction), and the subsequent one to **how** it should be done (as deduction), which again becomes **why** and **what** should be done, etc.

3. MODERN (INNOVATIVE) MANAGEMENT

The application of the TGC not only confirmed many existing solutions and solved some existing operational issues, but it also uncovered the absence of earlier, traditional and advanced methodologies, not only in business systems, but also in other economic, and theoretical assumptions (Tazovici, J. T. 2009). A particularly important result obtained by using the TGC is the determination of the value of an operations system's existence (originally defined as sets of upgraded operations of organizational functions). The need for operations system existence also meant that there was a need to redefine and modernize the (traditional) hierarchy of (business) organizational systems (Tazovici, J. T. 2009). Modern organizational systems hierarchy, instead of the traditional eight levels, has nine, with the additional level being the **operations**

system. This consideration is based on the first six hierarchical levels (systems), as follows: 1. work unit (as the basic organizational unit /system/ consisting of technical and human resources intended for the performance /safety/ of one /specific/ type of product), 2. production system (as an organized group of /related/ work units intended for the performance /production/ of specific products /goods, information, management and services/), **3. operations system** (as an organized set of all /designed/ work units /or production systems/), 4. organization (as an organizational system specified for meeting specific needs /working and general/ environment), 5. markets of certain business activities (as goal /market/ markets /working environment/) and 6. business market (as general market /general environment/). The first four hierarchical levels (systems) belong to the organization, while the last two are its environment (Taufzović, J. T. 1998).

Defining (modern /innovative/) management (Taufzović, J. T. 2006), as a process of the effective and efficient union of: (1) marketing (MA□), for purposes of planning (□ PL), (2) resources organizing (OR□ □ RE), (3) operations directing (DI□ □ OP), and (4) finances controlling (CO□ □ FI), activities of (modern) management can be presented through the activities of Taufzović's General Continuum (TGC) – 1. Preparations (P), 2. Analysis (A), 3. Synthesis (S) and 4. Control (C), and in that way organizational (operations), determined by customers, and management functions, determined by managers, are effectively and efficiently united, for security needs from users of the product in question. Therefore, organizational functions (the **why** and the **what**) should, through management, be effectively and efficiently brought into unison in order to determine the **how** to proceed.

For modern operations systems (research and) management, as well as for development, "considerations" are usually based on the achievement of a definite (general /strategic, designed/ and individual or specific /operational, production/) quality of future products of the system, which would be the basis for the system to enable competitiveness in its environment. A detailed systems analysis led to the conclusion that the level of: (i) controlling must use **real (practical) data**, (ii) directing – **information** (obtained from real data), (iii) organizing – **knowledge** (extended by information of the real data) and (iv) planning – **theory** (supplemented by the knowledge determined on the organizing level) (Taufzović, J. T. 1998), while for the environment (especially working) management, **concepts** (as distinct ideas and views based on relevant theory and practice /experience/) are used (Taufzović, J. T. 2009).

As a single unit, the strategic and operational management of (organizational /operations/) system – with its constituent parts, constitutes a mutually cyclical, iterative, continuous and spiral continuum. The management of each part gives a unique contribution to all-embracing decision-making and implementation.

Since the modern management in general, can be divided into strategic (**s**) and operational (**o**) factors, management parts can be further divided into two levels each, namely: (1) strategic – (i) planning (PL, as strategic policies /1.2. Psi/ – which takes into consideration the strategic preparation of planning, i.e. strategic need, as general strategic marketing /Mas/ – 1.Pse) (Figure 3) and (ii) organizing (OR – strategic support /2.As/, strategic supply /3.Ss/ and strategic improvement /4.Cs/ and (2) operational – (iii) directing (DI - including its external preparation /1.1. Poe/, i.e. operational need, as an individual operational marketing is a part of/ strategic management /Mao/) and (iv) controlling (CO – operational support /2.Ao/, operational supply /3.So/ and operational improvement /4.Co/) (Figure 3). Planning (PL), based on marketing, and the design (including improvement), i.e. organizing of operations (OO) are achieved by the use of strategic management, while operational management is used for contracting, i.e. directing (CN) and performing, i.e. controlling operations (PR), thus, using already organized (designed and improved) operations. While designing (redesigning) the operations (organization) (for needs of general environment or business market, as general market) the goal (market) markets (working environment or business activity market) are chosen. While improving, the already designed organization is adjusted to better goals achievement (of working environment) (as much as possible). Since through management, goal markets are determined from general one, it has goal markets as its basis.

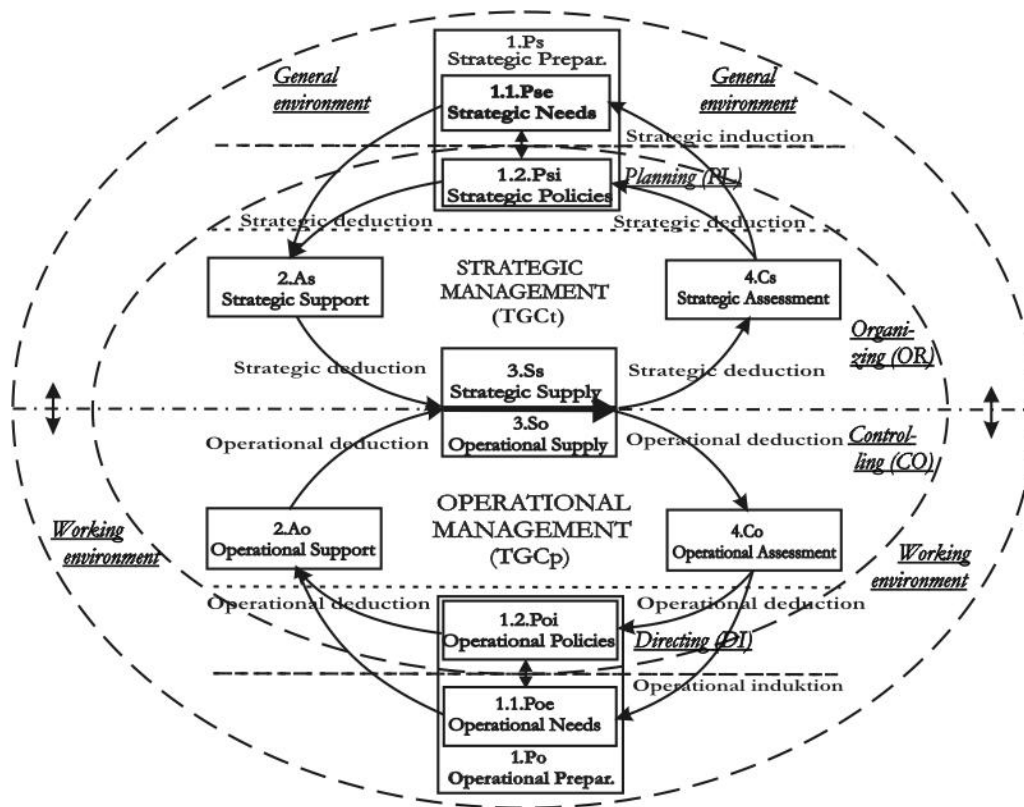


Figure 3 – Modern (innovative) management of (business) organization
(according to Tazović, J.T. 2012b)

While establishing business organizations, in addition to strategic (i) preparations (strategic external and internal) activities, strategic (ii) support activities (as strategic inputs), (iii) supply activities (as strategic transformations of inputs into outputs) and (iv) improvement activities (as strategic outputs) are determined. Determining the strategic (activities) supply as a synthesis of strategic management – designing (and improving) operations (organization) (3.Ss) (Figure 3), i.e. an all-embracing supply for which the (business) organization is designed, is of particular significance. Considering such a supply as a strategic one, it can be viewed as **(all-embracing) basic (operations) organization supply**. By analogous consideration of performance of (business) operations operational (activities) supply, presented through its synthesis – the transformation of (production) inputs into outputs (3.So) (Figure 3) can be viewed as operational supply or production system supply, as **supported (productive) organization supply**. Since organizations can operationally supply (i.e. produce), the maximum of what it has been strategically supplied (determined by design and improvement), operational supply (as production - 3.So) can therefore be considered as "subsystem" of strategic supply (which can provide designed and improved operations – 3.Ss). By establishing the direct connection of these two supplies – as a **whole organizational (business) supply** – it is possible to more easily view the (all-embracing innovative) organization (system) management as well. The division of (all-embracing) (business) organizational management into strategic (s) and operational (o) parts can be displayed by the Tazović's General Continuum (TGCT and TGCp) organization (Figure 3). By using TGCT with the strategic management, (business) organization (its operations systems) is designed, while, using TGCp with operational management, the use of already designed (and improved) operations systems as production systems is determined. In this way, it is determined **what** can be done at strategic part, while operational part enables **how** it should be done in order to "satisfy" **why** (business) organization does that. Strategic management (as integrated management /satisfies the contemporary definition/) is done through the process:

{ □ Ps □ As □ Ss □ Cs □ }

of organizations (operations) design (and improvement), while operational management (as integrated management /since it satisfies the contemporary definition too/) is done through the process:

{ □ Po □ Ao □ So □ Co □ }

of product production (using operations system) (Figure 3). Although these two management parts can be viewed separately, (business) organizations management is done through the all-embracing process:

$$\{\square \text{ Ps } \square \text{ As } \square \text{ Ss } (\square \text{ Cs } \square \text{ Ps } \square \text{ As } \square \text{ Ss}) \square \\ \square (\text{So } \square \text{ Co } \square \text{ Po } \square \text{ Ao}) \text{ So } \square \text{ Co } \square \text{ Po } \square \}$$

(Figure 3), where the needs to control specific management parts is indicated in (round) brackets.

Symbolically viewing, incorporating strategic management supply (3.Ss) and operational management supply (3.So) capabilities of operations and production system are brought into direct connection, as a unified whole (system) which can be viewed as a **static** (a determined structure) in the first case, and as **dynamic** (using process through structure) whole (the system), in the second case.

4. OPERATIONS (BUSINESS) PERFORMANCE

Considering that (business) organization represents what its performance (as a process of assessing how well its operations can produce and improve their products) shows, if it wants to be competitive the market, it must design and employ systems (of measurement results) performance, which provide feedback from its activities, which are needed not only to control, but also to improve its processes. Since one can manage only what can be measured, operations performance is assessed through the results of their measurements. Because of that, an organization must first define exactly what the units of measure used to evaluate their performance. The general rule must be as more general as necessary and as more specific as possible.

In organizations, their operations systems have the greatest impact on productivity, and hence profitability. However, since the role of operations is to achieve the defined objectives as effectively and efficiently as possible, this means that operations systems are responsible not only for achieving the productivity, and thus the profitability of the organization (as interior operations performances), but also for achieving its competitiveness (as external operations performances). Although advance management could have accepted the possibility for both strategic and operational management to use the same performance systems (of evaluation and improvement measures) in modern (innovative) management, different, mutually harmonized (analogue) performance systems are used (Tauzović, J. T. 2012a), namely:

- 1) for the strategic part, **strategic system of operations performances** should be implemented as design of the organization (operations systems) {→ 1. (1.1. General competitiveness (as operations) ← → 1.2. General quality (as operations) → 2. Productivity (directed to incomes /by choosing more appropriate markets/) → 3. Efficiency → 4. Effectiveness →} (Tauzović, J. T. 2008) and
- 2) for operational part, **operational system of operations performances** should be implemented as usage of operations systems for production of (certain /individual/) products { → 1. (1.1. Individual /products/ competitiveness → ← 1.2. Individual /products/ quality) → 2. (Products) Costs → 3. (Products) Production flexibility → 4. Timeliness of product arrival (to goal market) →} (Tauzović, J. T. 1998).

For determining the optimal strategic measures (of evaluation and improvement) systems operations performances, quality (intellectual) simulation is used (which uses a small number of data to determine /relatively/ much information) (according to Tauzović, J. T. 2009), and for determining the optimal operational measures (of evaluation and improvement) systems performances, quantity (technical) simulation is used (which uses a great number of data to determine /relatively/ little information). Having strategic and operational system performance as the basis, **organizational (business) system of operations performances** is defined. It is {→ 1. (1.1. Competitiveness ← → 1.2. Quality) → 2. Profitability (based on productivity) → 3. Flexible Efficiency → 4. Timeliness Effectiveness →}. For all-embracing preparations {→ 1.(1.1. Competitiveness ← → 1.2 Quality) →}, thus, for **sufficient competitiveness necessary quality** should be determined. For determining individual measures (of evaluation and improvement) of performance: (1.1.) Competitiveness requires **concepts**, (1.2.) Quality – **/real/ data**, (2) Profitability (based on productivity) – **information**, (3) Flexible efficiency – **knowledge** and (4) Timeliness effectiveness – **theory**.

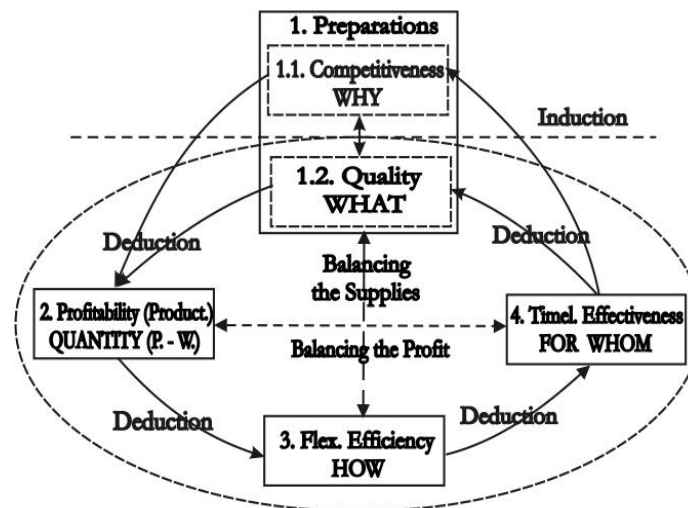


Figure 4 – Tazovici's General Continuum of the balancing supplies and profit

By 1.1 Competitiveness, the **why** of participating in the market will have been determined, with what being determined by 1.2. the **quality**. Furthermore, the **quantity (where /place/ and when)** will be revealed by 2. Profitability, the **how** becoming evident by 3. Flexible Efficiently, and lastly, the **for whom** being clarified by 4 Timeliness Effectiveness. Therefore, all factors are present for the TGC to be effective – the **why**, **what** and **how** contribute to balancing the supplies, while **quantity** and **for whom** represent profit balancing (as the difference between total incomes and total expenses) – as is represented in Figure 4. This same logic can also be applied to both strategic and operational performance measurement (in the context of a continuous improvement function).

In this way of supplies balancing, thus **1.1. Competitiveness (the way)**, **1.2. Quality (the what)** and **3. Flexible Efficiency (the how)** provides the possibility of determining the modern concept of competitiveness. It could be:

The **competitiveness of an organization** (the **why**) is considered the degree to which it can, under free and fair market conditions, provide (produce) quality products (the **what**) to suit the **customer's needs (satisfied consumers)**, in addition to maintaining and improving the **welfare of its managers (loyal employees)** (the **how**) (according to Tazovici, J. T. 1998, p. 169).

This can be considered to be systems processes of using (real) data led to the initial establishment of future concepts, which means the basis of the future (innovative) management. Therefore, modern **Systems Management Theory** should be replaced by future **Systems Management Concepts**.

5. CONCLUSION

Although it is possible to a more detailed conclusion, a concise one is sufficient, as follows: To the question **why** (modern) organizations exist, the answer would be: to be **competitive**, which means that their management is innovative and provides the right things (**what** – the quality /effectively/) in the right way (**how** – profitably /efficiently/). This means that only organizations that are competitive (**why**), effective (**what**) and efficient (**how**) can survive and continue to develop on the business activities markets, and thus on the business market too. Therefore, **innovative (business) organizations management** should provide both **satisfied customers** and **loyal managers (as modern operations /business/ performances)**, which is the essence of the content presented in this work.

Therefore, **innovative management** ensures **customers (consumers) satisfaction** and **managers (employee) loyalty**. As the contents of this work are focused on them, in order to test, accept, use, and further research areas where they belong, these modern (innovative) research of modern management and operations (business) performance may be the basis for the future ones.

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MODULAR ORGANISATION: A RISK OR A CHANCE OF NETWORK CONNECTIVITY OF COMPANIES IN MODERN BUSINESS

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Summary: *This paper analyses the effect of the modular network form, as a modern network organisation model, on the efficiency of the organisational restructuring of a company. In particular, characteristics are discussed and ways in which modular network, as a form of network connectivity, can – despite successful answers to the demands of the today's environment – carry certain risks.*

The paper tries to point out appropriate structural arrangements through which an organisation is involved in global operations, or through which it operates and successfully competes in global terms. The aim is to provide a concise way of the explanation of possible advantages and disadvantages of modular forms of organisation structure that can be used in the process of restructuring and redesigning companies in the Republic of Srpska, as well as in B&H as a whole.

For the design of modular forms of organisational structures, Michael Porter's value chain analysis is used, which in the theory of competitiveness represents a very important tool for such research.

In the today's dynamic and competitive environment, companies must design their own organisational units, so that internal and external boundaries of their organisations are more flexible and permeable. In order to increase their efficiency, companies are often forced to form strategic alliances based on the capabilities of other organisations.

Keywords: *modular organisations, risk, value chain, modern business.*

INTRODUCTION

The paper starts from the fact that the modern world, business environment and companies themselves are in constant change and turbulence. In an environment characterized by risk, sudden and radical changes, survival and success are achieved only by those organisations that adapt to new conditions successfully and on time. In such conditions, management transfers to new strategies with which companies in the process of reorganisation, (changes in external and internal organizations), gain competitive advantages. In an uncertain and high-risk environment, organisation models that in relatively stable condition were effective have now become inadequate. The business result is not influenced only by success with the customer, but also by the sum of interactions of suppliers, distributors, competitors and changes in macro environment.

One of the important characteristics of modern business is related to the efficient process of business restructuring. The main objective of restructuring is greater market positioning in the context of constant changes in business environment. With the increasing and unpredictable changes in the market environment, the management company is expected not only to adjust quickly and on time, but also to notice the possibilities of these changes and react properly.

Flexibility, innovation and continuous business improvement are the elements that become the part of a strategic approach in building of competitive advantage. Great scientific and technological achievements in recent decades have turned the world into a global village in which the production methods and techniques are becoming more uniform. Companies are facing an increasingly common problem of finding a way of adapting to the new, changing business conditions. Due to these characteristics transformation process of companies is inevitable and unstoppable. Classical forms of organisations are becoming increasingly dysfunctional under the influence of environmental factors that management should effectively respond to. Contemporary companies react to the new dynamic of market conditions and increased uncertainty with insurance strategies and risk, entering into cooperative relations with other companies creating a strategic network of stronger or weaker related companies.

In recent years, companies are beginning to apply the concept of network organisation even more, because it allows them much greater flexibility and competitiveness in the global and turbulent business environment. Although various development forms of business network organisations are around in practice for many years, the network business concept is still very important.

The previous period in the Republic of Srpska, as well as in B&H showed that privatisation was not enough for successful transformation of public companies into joint stock companies, without significant role of organisational design, but that the change of their macro and micro organisation was necessary as well. It is essential that managers create models of organisational structures that will be adequate with the environment and compatible with organisational design of company's market economy. Accumulated activities in the value chain in large companies, especially in public companies are giving importance to the study of network forms, which are formed by using the concept of value chain.

Although today the modular organisation as a form of network-affiliated companies is quite successful form of organising the network of companies, especially as it stimulates the development of new products by engaging suppliers whose talents and knowledge are often better than those of the employees in the company, and with relatively little capital and a small management team can achieve high business performance, managers must calculate the possible losses of key skills and control over suppliers as one of the potential business risks.

1. ORGANISATIONAL DESIGN: THE ELEMENT OF STRATEGIC COMPETENCE

Organisational design is an essential element of strategic competence or potential of the company that determines its strategic position. In this sense, organisational design must be aligned with the strategies as a way of achieving the objectives of business. There are no rules that determine the organisational design that is required to implement each type of strategy.

The company's management establishes its organisational structure, if business activities to be performed are known, and it determines the resources to be used and goals to be achieved within a certain period. There are situations where the structure should be changed to enable the implementation of the new strategy. However, the choice of each strategy is influenced by the reality and potential of the existing organisational structures. There is no doubt that neither the strategy nor structure can be determined independently of each other. Decisions about the organisational structure must be made in light of the strategic position of the company, because the application of the strategy will be unsuccessful if the organisational structure is not designed to fit the strategic needs and constraints.

The organisational design should be viewed as an element of strategic capability of the company. Therefore, the relationship between the company and the environment should not be regarded as a structure or strategy. In order to perceive the contribution to the successful adaptation of organisational structures and the impact on the environment, it is necessary to consider company's key dimensions in reacting to changes in business environment. Compliance of strategies and structures is the assumption of rational response of the company to changes in the environment and ensuring the more favorable strategic position. Implementation of the strategy is possible if there is a power in the company that is willing and able to implement the change.

The management company in Republic of Srpska, in both private and public sector, should initiate a reorganisation to reduce the size and "thinning" of the organisation, in order to increase efficiency and competitiveness of the market. The resistance of the reorganisation is open on many levels because it has resulted in layoffs of employees. However, the transformation is a radical change that entails sacrifice and management of large and public companies are left with no choice. Since public companies are under state control, their transformation is not just a matter of management but are also in the interests of the state and citizens who are beneficiaries of their services. Managers of large companies in the Republic of Srpska of which a number are in the public sector¹⁸ must reject the strategy known in literature as "all under its own roof" and a hierarchical organisation. Following the example of companies in other transition economies, it is necessary to adopt an organisation based on the principles of competency-based and interorganisational design which holds the interdependant companies together.

¹⁸ Good examples are: Railways RS Stock Company Doboj, Mixed Holding "Electric" Republic of Srpska, Stock company Trebinje and Public Enterprise "The forests of the Republic of Srpska" Sokolac.

Network models can serve businesses and public companies to be revitalised and to introduce the principles of the market business within larger systems, rather than introducing administrative relations. The network is a group of independent companies that specialise in particular stages in the business chain. The network consists of the central company (core) and peripheral companies. The central company takes over the role of a broker that connects the other participants in the network and coordinates their activities.

Managers in modern organisations realise that traditional hierarchical designs are often not adequate for the entire dynamic and complex environment they are facing. Responding to market demands in terms of flexibility and innovations, managers find creative ways of structuring and organizing work and creating organisations that will be able to respond better to the needs of customers, employees and other organisational factors (Twomey, 2002).

Information systems and technology have had a significant participation in the development of the company for the last two to three decades. Leavitt and Whisler were among the first to write that the IT will enable large organisations to recentralise their organisational control, predicting the impact of IT on organisations (Leavitt & Whisler 1958). The organisational and management concepts, such as centralisation versus decentralisation, span of control, functional specialisation, the balance of authority and responsibility, and administrative mechanisms for coordination and control are derived from this general set of principles that were developed in specific circumstances for a long period of time. Although these concepts are acceptable, even today, it seems that the information-technology approaches could significantly alter some of those first principles. The result is that some forms of organising can be made relatively inefficient. Professional and academic communities have strong and consistent views on how the new organisational logic should be predicted according to the capabilities that are offered by current and upcoming trends in information technology and information systems. This structure was enabled by the recent advances in inter-organisational networking of computers.

In the Republic of Srpska most companies are not concerned enough about the information technologies as an opportunity to influence the economic and organisational performance, which is a limiting factor as a new approach of introducing technical and technological basis for the implementation of organisational changes.

2. NETWORK ORGANISATION AS A FORM OF INTER-ORGANISATIONAL DESIGN

The search for high flexibility by managers resulted in the creation of new forms of organisational design which is called the network structure (Snow, Miles & Coleman, 1992). The basis of the network structure means that organisations divide the most important functions into separate companies which are connected with organisational core of the parent organization. For this structure it is significant having the presence of a strong organisational nucleus which gathers around a number of other organisations, vendors, suppliers, traders, brokers, financial organisations etc. Network organisation is a form inter-organisational design with specific goals. This specific purpose is the reason why organisations connect to the network, and because it makes the access to efficient production, distribution, marketing and other essential business functions under the contract. Network structure is inconsistent with the parts of the structure that have accentuated vertical level of the management structure and whose organizations seek to control their own development through ownership. In such organizations, research and development is carried out at headquarters, production takes place in manufacturing facilities that are owned by the company and sales and marketing is performed by their own staff. In the network structure most of the functions are performed outside the organisation and coordination are mutually connected by a computer. This provides managers with a high degree of flexibility, and organization to focus on what they know best.

The network structure corresponds to most companies such as toys manufacturers and sports shoes and clothes industries that require a high level of flexibility in order to respond quickly to frequent changes in product design. Network structure form corresponds to other companies whose manufacturing activities require cheap labour, and which can best used under a contract with foreign suppliers (Robbins, 1992).

The network organisation is the potential structural opportunity for managers who want to reduce or eliminate organisation restrictions. That is a small organisation that performs major business functions by external supply (Miles, Snow, Matthews, Miles G., & Coleman, 1997). This approach allows organisations to concentrate on what they do best and to transfer other activities onto companies who can best perform such activities. Many large organisations apply the network structure in their production. Companies such as Nike¹⁹, Reebok, and Cisco

¹⁹ Nike is primarily a development and marketing company that works with organizations to produce sports shoes for athletes.

Systems realise that they can engage in great businesses, without not being the owners of production facilities²⁰ (Reed, Reinhardt & Sains, 2002). The essence of network organisation is in the difference from the old forms of creating organisational structures that carry a certain degree of bureaucracy. Organisations are required to be both flexible and stable, and extremely efficient at the same time.

The reality of internationalisation flow and the creation of a global economy have led to growing pressure on contemporary organisations due to the appearance of so-called hyper-competition. The need for adaptation and innovation concepts of operations initiated by the wave of global economic crises are inevitable for most of the companies. In such circumstances, managers are forced to re-examine the existing and to seek the new forms of organisational structures to be able to resist the complex and continuous changes in the environment. The idea that comes from this environment is to maintain core strategic functions as its own, while the rest of the work is given to the most competent suppliers (Carpenter, Banner & Erdogan, 2009).

The ideal of the modern organisation is a model that will enable the company to deal with many complex problems. In an independent and high-risk environment the organisation models that were efficient in relatively stable conditions, have now become inapplicable. Modern companies operating in the global marketplace, characterised by constant changes, uncertainties and risks, can achieve competitive advantages by cooperating in some of the network forms, such as: modular, open and virtual (Dess, Rasheed, McLaughlin & Priem, 1995).

3. MODULAR ORGANISATION

One of the innovations in the field of organisational restructuring is the appearance of a so-called "modular corporation" (Shawn, 1993). There are many such organisations characterised by an extremely flexible structure able to respond to new market challenges, technological changes, changes in the financial markets etc. They consist of a large network of suppliers who are flexible and ready to react quickly to changing needs and tastes of consumers. These organisations enjoy a number of advantages such as lower costs, which gives them the ability to successfully create competitive advantages. Organisational effectiveness is achieved through centralised control that is focused on key areas, primarily research and development, design, market research, technology development and investment. Production and distribution in particular have been entrusted to a large network of external associates.

Modular organization is the manufacturing organization that uses external suppliers to ensure production components or modules which are then assembled into final products. An easy way to understand the modular structure is to apply the analogy of building a house (Ketchen&Hult, 2002). The same way the traditional organizational structure has fairly stable boundaries, traditional house is also an important facility that requires extra effort and longer time to build. Just as the prefabricated house parts are assembled on a separate location, and then re-assembled in a location that meets the needs of the owner, the modular organization may need to be redesigned quickly. In addition to the industry of clothing and sports footwear, car manufacturers²¹ are leading in this type of modular organization (Kerwin, 1998).

4. ADVANTAGES AND LIMITATIONS OF MODULAR NETWORK FORMS

Managers have realised that in addition to efficiency, which is made by constant contact with all the employees, continuous control and preoccupation of employees in time using is an excessive way of controlling the necessary resources. It is more economical to tie employees with a contract outside the organisation, through special agents, and use their services when needed (Ramstead, 1997).

When it comes to supplying goods and services, modular organization engages the associates for those functions that are not vital, obtaining the knowledge and the quality of the best in the industry, while retaining strategic control. External collaborators are used to produce certain parts, as well as for the direction and implementation of logistics. The value chain by Michael Porter could be useful or the design of organizational structure.

²⁰ Ericsson gave its production and even some research and development capacity to more productive contractors in New Delhi, Singapore, California and in other global locations.

²¹ For example, General Motors (GM) has a modular factory in Brazil where external suppliers provide engineering products and car parts. The modules are delivered directly to the assembly line where they are a small number of GM employees assemble them into finished cars.

The value chain can be used as a framework for identifying key primary and secondary activities that the company undertakes in order to create value. The key question is: what actions the company should perform on its own with its employees, and for which it needs to engage external collaborators? (Rossetti & Choi, 2005). Such activities transform the organization into a central point surrounded by a network of external suppliers and experts, whose parts can be added and removed (Tully, 1993).

One of the branches of production where a modular type is widely represented is the industry of clothing and footwear. Figure 1. demonstrates the value chain of modular organizational structure. The value chain provides the systematic division of the company to individual actions, and can be used to test models of grouping activities or the way that these activities could be grouped. Companies like Nike and Reebok have been able to focus their business where they can dominate, such as design and marketing of modern footwear. Nike has very limited production facilities, and Reebok does not have one factory in their ownership. These two companies hire foreign associates in Taiwan, South Korea and other countries that produce almost full range of their shoes. The companies derive significant profits from small increases in sales by avoiding large investments in fixed assets and facilities. With modular network of organizational structures Nike and Reebok keep pace with the changing demands of their customers because their suppliers are able to adapt very quickly to the manufacturing of new products.

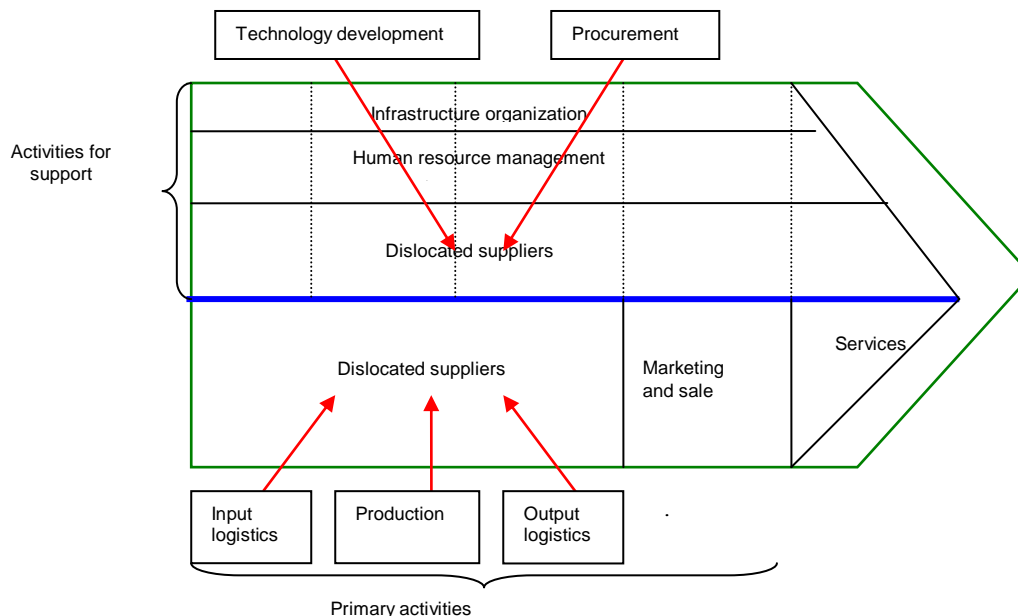


Figure 1: The value chain of modular organisation

Modular organizational structure that corresponds to the value chain will enhance the company's ability to gain and maintain competitive advantage. Company of modular network structure, with hiring of external associates to carry out non-essential operations, has the following advantages (Dess, Lumpkin & Eisner, 2007):

- ⇒ It can reduce overall costs and stimulate new product development by engaging subcontractors whose capabilities are better than those held by employees of the company.
- ⇒ It creates conditions for greater employment capacity, it achieves inventory savings and avoids the danger of using only one production technology.
- ⇒ The company may use its rare resources on areas where it has a competitive advantage by engaging the external associates. This way it creates more resources for financing research funds and development, as well as the employment of best experts and constant education of employees.
- ⇒ The company has the opportunity to make the best of knowledge and skills of its subcontractors in the supply chain, which provides accelerated learning of organisation.

The modular structure runs basic knowledge and skills through engagement of associates and is not restricted by capital. A small management team in a modular company with a relatively small capital involvement gives the opportunity to realise a lot of challenging and seemingly inaccessible strategic goals (Gottfredson, Puryear & Phillips, 2005). Since there is no need for significant capital investment especially in construction, modular company is creating a lot of opportunities for a rapid growth. To make a modular

form of organisation successful, it is essential to have certain prerequisites. Close cooperation with suppliers is necessary for the interests of all parties, while trying to find reliable vendors who are willing to protect trade secrets. Companies also need a reliable supplier in terms of commitment of financial, material and other resources to reduce costs and achieve leadership in the market as strategic objectives. Modular company must also make the selection of appropriate knowledge and competence that they will keep for themselves, meaning that they will not have to hire external associates. Modular company will not hire external collaborators for any activity that is related to one of their basic skills and knowledge and must always be cautious when making decisions about the engagement of specialists, because it could jeopardise its long-term competitive advantage.

Despite numerous advantages of modular network forms it is important for managers to recognize the possible risks of this type of organizational structure. Important strategic issues according to Quinn and Hilmer (Quinn & Hilmer, 1994) are: loss of key skills or developing the wrong skills, loss of inter-functional skills and loss of control over the supplier.

Involvement of a number of external consultants in the organisational structure may be counterproductive because it carries too much of their own knowledge neglecting requirements for maintaining their own abilities at the level necessary for the production of its basic components. Over time, the skills that once formed the basis of the organization can disappear. Knowledge and skills acquired through the interaction of individuals from different organizational units of a company are of inter-functional nature and through the cooperation of its employees it can assist in resolving problems of certain organizational units. Communication between different parts of the organization may be hampered if the company decides to hire external associates for its key functional tasks, such as production, because in this case, a company together with its employees must integrate their own activities with a brand new external supplier.

A particular disadvantage of modular forms of organization occurs when products produced by outside associates, give suppliers too much power in relation to producers. This situation is possible when a manufacturer of key components depends only on one supplier, or a few of them. In this way the manufacturer can be "captured" by a supplier that has a key role in its success. It is known that the company Nike solves this problem by regularly sending its employees to work in supplier factories, responsible for a certain product, and for bringing the highest level managers and technical team from suppliers firms to their headquarters. In this way, Nike constantly keeps track of the potential events and situations by building trust with suppliers while developing long term relationships with them.

CONCLUSION

The occurrence of modular network organisation has generated the strategy change in companies and large enterprises, which were faced with a phenomenon of rapid, often unpredictable changes in the global environment in recent years. A powerful wave of changes caused by the development of sophisticated technology, new categories of customers with high demands, marked the modern business. In such conditions, the management company chooses the new strategy that enables the company to compete in the rapidly changing and unpredictable environment. Changes in strategy imply changes in external and internal company organisation. Theoretical studies and practical examples show that the strategic changes went in the direction of network organisation, which enabled companies to achieve competitive advantage in a changing global environment. All assumptions concerning the modular organisation as the network form of organisational structure suggest that the choice of this model of organisational structures must meet several criteria and conditions. Modular organisation has significant advantages and disadvantages for the successful implementation of this structure. Management companies must reckon with the risk that accompanies the modular organisation. The presented examples of companies known in the theory and practice that successfully apply a modular form of network organisational structures can not be understood as regularity, but rather as a system of thinking in selecting the appropriate solutions. It could be argued that the theoretical assumptions presented in this paper should be a guideline for deciding on the structure for analysing problems and access to inadequate validation. In this regard, each specific organisation needs to review its structure, to study theoretical models and to ultimately make the decision that is appropriate to the specific case. Selecting a specific model should be based on the situational approach.

This means that when designing an organisation one must have in mind a set of heterogeneous organisational design variables that characterise the global business environment. The best organisational structure is considered to be the one that allows the successful achievement of company objectives, and which is at the same time, favorable to its size, technology and competitive environment.

Because large and public companies in the Republic of Srpska, as well as in B&H have massive, inefficient and expensive organisations, because the conditions are favorable for it, changing conditions must inevitably lead to changes in their organisational structure. As a possible solution for the re-design of the organisation model of the modular network forms, despite the hazards and risks, is one of the acceptable solutions. Proximity to the developed European markets is a priority for faster delivery of goods, and at the same time it also allows transfer of knowledge, technology and production. It also represents the convenience for connecting the domestic and foreign partners and the spreading of inter-organisational learning through modular form of network connectivity.

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MEASURING THE PERFORMANCE OF PUBLIC SERVICE ENTERPRISE PTT SERBIA

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Abstract: *Public Enterprise PTT Serbia is a very complex technical, technological and organizational system, with strictly defined objectives, components, processes and relationships, whose operation implies the existence of appropriate infrastructure, most important of which are the units of the postal network, in which it offers services to customers. This paper aims to show how important it is to measure the performance of the public sector and how to do it. There are several ways to measure performance, but this paper presents the application of a DEA model through a real example. It is a mathematical programming model, which is successfully used for the assessment of organizational units, particularly in nonprofit and service sectors. It is shown how to calculate the efficiency of organizational units based on input and output values. The data can be most useful to the top management of the company in order to monitor the effectiveness of certain organizational units, and in decision making.*

Key words: *performance measurement, postal service, public sector, post office, DEA method*

1. INTRODUCTION

Measuring the performance of a public company is both a complex and necessary task. It is complex because the objectives of a public company, which according to its performance ought to be assessed, are many and often conflicting. It is necessary because a rigorous and objective evaluation of performance of public company is the most obvious escape from debates which are all too often passionate. Finally, a study of good performance can be used by public managers and by public authorities as a pragmatic and pedagogical tool towards improvement in monitoring and resource usage.

Typically a public company, such as the national postal operator with no direct competitors, private or public, applies performance measurement approach which is based on the objectives of the company.

One of the most important principles in any business is the principle of efficiency which consists of achieving the highest possible economic effects. In order to create biggest possible output with less input. The problem arises in determining the efficiency of the units that have more diverse inputs and outputs, and when the inputs and outputs can't be reduced to the same unit of measurement.

The application of Data Envelopment Analysis (DEA) involves an established procedure that is to be applied properly in order to obtain valid results, and thus make accurate and precise conclusions. If the variables that exist in the model are not properly chosen, the results can be inaccurate and could give a false picture, and not realistically show the situation. So we should be alert to the fact that the DEA method compares the effectiveness of each organizational unit and therefore we should make sure that the DEA model constraints are satisfied.

2. THE PERFORMANCE ASSESSMENT

The simplest measure of performance is undoubtedly the level of profit, which is consistent with maximizing revenue and performance, as the primary objective of the owner. In the case of public sector if the economic prosperity is achieved by following the suggestions of the state (society as a whole), the main objectives are mainly multivariate, due to the many aspects of social protection. As a result, the goals, which are represented by the public managers, are also multivariate, and performance monitoring becomes more complex.

Multivariate goals usually determine the performance of public enterprises. Numerous difficulties arise when one takes into account each of them (*Perelman & Pestieau, 1993*).

1. The goals can not always be fully compatible with each other. For example, it is known that the maximum loading rate from the allocative point of view is desirable in services such as transport and communication, but in terms of distribution it can be unacceptable. Thus, in assessing the overall performance of such services, there must be a balance between these two criteria.

2. Measuring the degree to which these goals are met is quite a difficult task as it first involves the calculation of the indicators of performance for each of them, and then determining each weight coefficient. This can not be done without the subjective participation of decision-maker.

3. Excessive or insufficient production in relation to what is technically feasible can not be justified regardless of any of the above objectives (macroeconomic, allocative, redistributive). In contrast, over-employment of labor, which is inefficiency, is justified by the macroeconomic reasons of employment policy.

4. The exchange between allocative and non-allocative goals can affect control of the company. Indeed, the company may be allocatively inefficient for two reasons. It has to meet non-allocative goals and/or managers need to pursue their own goals (power, prestige and salary). Difficulties arise in separating these two sources of inefficiency, which are often arguments in favor of privatization.

Precisely because of these difficulties, most public companies opt for measuring performance based on efficiency. The reasons for this decision were manifold. First, measuring the extent to which a public company achieves its goals too ambitious. On the other hand, measurement of efficiency allows for estimates, which are consistent with the multiple objectives of the company. Measuring efficiency does not require of us to pre-determine whether or not other goals are met and to what extent. It can also be used not only when the private and public sectors are comparable, but also when public companies are operating in isolation, with an unmatched or non-competitive activities, such as postal services. Another advantage is that the efficiency depends on the data, which are easily available in most cases. Although, the efficiency is only a partial indicator of performance. However, compared to traditional indicators such as price, profitability or productivity, efficiency measurement is more difficult for business enterprises that operate in the market with variable structure.

Efficiency of public enterprises can be divided into two classes:

- allocative, includes productivity and efficiency
- non-allocative, includes equity, the balance of financial and macroeconomic policy.

Allocative efficiency means that the observed unit which is the focus of decision making process seeks to minimize the cost of a certain level of output by selecting the appropriate inputs for a given set of input prices, assuming that the considered organization is fully technically efficient. The efficiency of resource allocation is expressed as a percentage, where 100% or 1 indicates that the organization is properly using inputs to minimize production costs. An organization that is in engineering (technical) terms efficient can be allocatively inefficient, since it does not use inputs in the appropriate proportion in relation to given prices.

Non-allocative efficiency can be calculated when the technology of production is defined for all units that are to be assessed, in such way as not to limit the amount of inputs required to manufacture a certain quantity of output. An organization that operates best with respect to all other observed units is totally technically efficient and can be defined as best practice. Other units are assessed in relation to the best and their technical efficiency is expressed as a percentage of best practices. The technical efficiency is affected by the efficiency of management and operational level of the observed entity. This means that the percentage of technical efficiency is the operational measure of organizational entities without regard to price and production costs.

One of the advantages of efficiency measurement is that it relies on the physical data that are readily available in many cases and generally more reliable than financial or accounting data. Unlike most partial indicators of performance, efficiency may involve a large number of inputs and outputs, including qualitative aspects. The idea that the efficiency is independent of the other objectives assigned to the production units, especially of allocative efficiency, is disputed. The production unit can be forced to be technically inefficient if it is forced to employ too much or too little of production factors without the ability to quickly adapt its input-output vector and thus remain on the efficiency margin.

3. PERFORMANCE IN POSTAL SERVICES

There are different types of methods for measuring the efficiency of postal services. Whatever the method chosen, one should know that the measurement of efficiency is a relative category. Often used term is "best practice" of production units. It is the production unit which operates best in relation to all other observed units, and it is considered to be totally technically efficient and can be defined as best practice. For this reason, the sample of observations is crucial. It is important that they come from similar conditions. We should take into account the geographic, demographic, and time differences, which are present throughout the country. In any case, for an industry such as postal services, which in most countries have a monopoly, this kind of problem can not be completely avoided. It is necessary to introduce exogenous environmental factors, in order to cope with the spatial differences, changing trends, and with time differences.

All the proposed methods for measuring the effectiveness have a common frontier concept, which states that the efficient units are "on" the frontier of production function, while the inefficient work "under" the frontier (i.e. in the interior of their production functions). The term "frontier of best practices," which Farrell used in 1957 to originally designate production line, estimates best practice frontier from the statistic data. (*Perelman & Pestieau, 1989*). The two main alternative methodologies are available: parametric and nonparametric. The difference between them is the technique that is used to describe the formal boundaries. In the first case common is a function with constant parameters. Its parameters are estimated by statistical or other methods in such a way that the graph of the best one is defined and the observations are at or below the graph. Then, the efficiency of each observation is calculated in terms of the distance between that value and the graph of the estimated function, which is considered to be the limit of the production function.

To determine the limits of production, parametric stochastic method is used. It involves estimation of production function. First of all, it is about the data. It should be noted that there is a problem of data availability. Variables that describe the activity of sending parcels show an extremely wide range of operations, going from small to very large post offices. Also, there are different combinations of production factors. The data, which represent the input and output from postal activities, in most cases is not homogeneous. Measuring the efficiency of business would be easy if the analytical form of the production function was known. However, in practice, its shape is generally unknown and there is only data on levels of output achieved for particular input vectors of several similar organizations. Therefore, in practice "nonparametric" approach is usually used to measure efficiency. This approach requires the imposition of the analytical form of the function that defines the relationship between independent and dependent variables.

For non-parametric methodology some formal properties are the points on the production function. The data is then "enveloped", but not by the graphic of the function whose parameters are estimated, but instead it is determined whether or not each observed point can be an element of the border, under the chosen assumptions. Theoretical limit of efficiency in practice is difficult to determine because the procedure assumes that theoretically best practice in the respective areas is known, but it is difficult to calculate it for the given set of units, because usually not all the information about their business is known. In real situations usually the only known data is related to the units that are to be assessed. Based on this data we could assume which practice is the best. However, it is difficult to state with certainty that a surveyed organization is reaching best practice. It is particularly difficult to define best practices for service organizations with complex inputs where can happen that the observed points do not cover the entire range of possible combinations of input values.

Using non-parametric methodology tends to prevail in the public sector, an area in which the concept of production function is not clearly defined. The two most popular methods are nonparametric DEA (data envelopment analysis) and FDH (free disposal hull) (*Pestieau, 2007*).

4. DEA MODEL

Data envelopment analysis is introduced by Charns, Cooper and Rhodes in 1978. DEA is a tool for measuring and monitoring the efficiency of organizational performance. Organizational units are defined as units that are to be assessed - DMU (Decision Making Unit). This name was introduced to show that DEA can be used to measure the effectiveness of different types of entities that operate in a similar way. DEA was initially intended to measure the effectiveness of nonprofit organizations, for which it is difficult to measure outputs that are not necessarily expressed in the same units of measurement (e.g. for hospitals inputs can be number of successfully performed operations and the percentage of utilization of hospital beds, while profit as an economic measures expressed in monetary units is not taken into account). Therefore it is difficult to define and measure the real effectiveness of the nonprofit organization. Efficiency, as one of the operating parameters which are given special attention when assessing the performance of organizational units, can be precisely measured through the ratio of achieved outputs and inputs used to produce them. Scaling problem is solved singularly so that the efficiency is expressed as a number between 0 and 1.

Based on the data inputs and outputs, the DEA method assesses whether a unit which is evaluated is efficient or not with respect to the remaining units included in the analysis, or whether it is on the efficiency frontier. With DEA method, distribution of points is observed and line is constructed around them that surrounds them - "envelope". Thus the name of the method - data envelopment analysis (*Savić & Martić, 2009*). The limit of efficiency in economic terms is empirically derived maximum output that each unit of decision making can achieve with the given inputs and acts as an envelope for the inefficient units. The

method analyzes each decision making unit and checks if its inputs can be enveloped from below (given output can be achieved with less inputs) given the input values of the remaining units, and if it is possible to envelope its outputs from the top (greater output can be produced with a given input) based on the outputs of the remaining units. If the unit can be enveloped it is relatively inefficient, and if not, it participates in forming the boundary of efficiency, which here is equivalent to the marginal production function.

Therefore, DEA is a mathematical programming technique that allows us to determine whether the entity is efficient or not, relative to other entities involved in the analysis, based on data on its inputs and outputs. (Krčedinac, Čangalović, Kovačević- Vujčić, Martić, Vujošević, 2006) It is a non-parametric approach because it does not require *a priori* assumption about the analytical form of the production function. While the parametric approaches are focused on central tendencies, and performance assessment of an entity is based on the average performance, the DEA is a border method that consists of a series of optimizations (one for each entity included in the analysis). For each DMU maximal performance measure is calculated in relation to all other units in this group of conditions that must be at or below the extreme limit, which is called the limit of efficiency. The measure of efficiency that DEA provides is relative because it depends on which entities are included in the analysis and how many there are, as well as the number and structure of inputs and outputs.

1.1. Slacks- based measure of efficiency

A slacks-based measure of efficiency (SBM) (Tone, 2001), is non-radial and deals with input/output slacks directly. The SBM returns an efficiency measure between 0 and 1, and gives unity if and only if the DMU concerned is on the frontiers of the production possibility set with no input/ output slacks. In that respect, SBM differs from traditional radial measures of efficiency that do not take account of the existence of slacks.

$$\min \rho = \frac{1 - \frac{1}{m} \sum_{i=1}^m \frac{s_i}{x_{i0}}}{1 + \frac{1}{s} \sum_{i=1}^s \frac{s_i^+}{y_{i0}}} \quad (1)$$

subject to

$$x_0 = X\lambda + s^- \quad (2)$$

$$y_0 = Y\lambda - s^+ \quad (3)$$

$$\lambda \geq 0, s^- \geq 0, s^+ \geq 0. \quad (4)$$

1.1.1. An SBM with undesirable outputs

Suppose that there are n DMUs (decision making units) each having three factors (Tone, 2003): inputs, good outputs and bad (undesirable) outputs, as represented by three vectors $x \in R^m$, $y^g \in R^{s_1}$ and $y^b \in R^{s_2}$, respectively. Matrices X, Y^g and Y^b can be defined as follows.

$X = [x_1, \dots, x_n] \in R^{m \times n}$, $Y^g = [y_1^g, \dots, y_n^g] \in R^{s_1 \times n}$ and $Y^b = [y_1^b, \dots, y_n^b] \in R^{s_2 \times n}$. Assuming that the $X > 0, Y^g > 0$ and $Y^b > 0$.

The production possibility set (P) is defined by

$$P = \{(x, y^g, y^b) | x \geq X\lambda, y^g \leq Y^g\lambda, y^b \geq Y^b\lambda, \lambda \geq 0\} \quad (5)$$

where $\lambda \in R^n$ is intensity vector.

A $DMU_0 (x_0, y_0^g, y_0^b)$ is efficient in the presence of undesirable outputs if there is no vector $(x, y^g, y^b) \in P$ such that $x_0 \geq x, y_0^g \leq y^g$ and $y_0^b \geq y^b$ with at least one strict inequality.

$$\rho^* = \frac{1 - \frac{1}{m} \sum_{i=1}^m \frac{s_i}{x_{i0}}}{1 + \frac{1}{s_1 + s_2} \left(\sum_{r=1}^{s_1} \frac{s_r^g}{y_{r0}^g} + \sum_{r=1}^{s_2} \frac{s_r^b}{y_{r0}^b} \right)} \quad (6)$$

subject to

$$x_0 = X\lambda + s^- \quad (7)$$

$$y_0^g = Y^g\lambda - s^g \quad (8)$$

$$y_0^b = Y^b\lambda + s^b \quad (9)$$

$$s^- \geq 0, s^g \geq 0, s^b \geq 0, \lambda \geq 0. \quad (10)$$

The vectors $s^- \in R^m$ and $s^b \in R^{s_2}$ correspond to excesses in inputs and bad outputs, respectively, while $s^g \in R^{s_1}$ expresses shortages in good outputs. The objective function (6) strictly decreases with respect to $s_i^- (\forall i)$, $s_r^g (\forall r)$ and $s_r^b (\forall r)$ and the objective value satisfies $0 < \rho^* \leq 1$. Let an optimal solution of the above program be $(\lambda^*, s^{-*}, s^{g*}, s^{b*})$.

5. EXAMPLE OF DETERMINING THE EFFICIENCY OF POSTAL NETWORK UNITS

In order to illustrate the most important feature of DEA, we show an example of efficiency evaluation of thirteen units of the postal network of "Post of Serbia". Criterion for choosing a post office that will be included in this analysis was their business volume, and therefore the revenue they bring to their company. For each of them we will measure efficiency based on input (number of employees, number of counters and number of delivery districts) and output variables (total volume of services expressed in standard minutes and the total annual income). Although there are variables, which surely influence the efficiency of the postal network units, these quantities are the basis for determining the order and size of a post office. Therefore, they are most common elements of the analysis. Table 1 shows the values of input and output variables.

Postal network units are chosen based on their ranking. The rank of each unit is determined by two output (Total Annual Volume in Standard Hours and Total Annual Income). These outputs are influenced by 3 main inputs: Number of Employees, Number of Counters and Number of Districts. The fifteen postal units used in these example are the biggest postal units in Serbia and are therefor chosen for this analysis.

Table 1. Values of variable in the DEA model

	Number of Employees	Number of Counters	Number of Districts	Total Annual Volume in Standard Minutes	Total Annual Income
DMU 1	198	15	36	11.077.664,00	225.044.594,86
DMU 2	68	6	25	4.780.587,00	64.082.882,47
DMU 3	113	7	48	9.618.020,00	97.640.436,61
DMU 4	75	9	29	6.372.212,00	56.612.171,92
DMU 5	78	8	22	5.735.813,00	72.052.492,77
DMU 6	55	6	17	3.823.762,00	119.035.278,91
DMU 7	124	10	42	7.654.976,00	132.736.780,91
DMU 8	80	6	30	5.926.661,00	50.774.166,79
DMU 9	94	7	36	6.583.342,00	44.996.393,34
DMU 10	55	7	17	4.304.488,00	77.374.798,66
DMU 11	144	13	60	12.853.431,00	204.014.628,33
DMU 12	165	18	43	10.908.715,00	205.703.273,73
DMU 13	202	11	46	13.116.412,00	170.890.835,47
DMU 14	156	8	36	14.151.320,00	148.285.797,08
DMU 15	101	12	32	7.149.184,00	132.052.898,10

To calculate the efficiency we will use input-oriented DEA model, which means that the goal is minimizing the input for the current output. This model was chosen in order to minimize the input size, as the costs related to these variables, and above all, staff costs represent a major cost for the company and should be minimized. However, in this example we have one peculiarity. Output "Total Annual Volume in Standard Minutes" is undesirable output, because the goal is to minimize rather than maximize the output. That is, the goal is to minimize the time that is consumed to achieve the desired output. As this is not in accordance with the laws of the DEA model which maximize the output, it is necessary to use its specific case which observes undesirable outputs, such as the one in this example. A special case is BadOutput model, which will be described below.

5.1. Bad output model

Let us decompose the output matrix Y into (Y^g, Y^b) where Y^g and Y^b denote good (desirable) and bad (undesirable) output matrices, respectively. For a DMU (x_0, y_0) , the decomposition is denoted as (x_0, y_0^g, y_0^b) .

We consider the production possibility set defined by:

$$P = \{(x, y^g, y^b) | x \geq X\lambda, y^g \leq Y^g\lambda, L \leq e\lambda \leq U, \lambda \geq 0\} \quad (11)$$

Where λ is the intensity vector, and L and U are the lower and upper bounds of the intensity vector, respectively. We define the efficiency status in this framework as follows (Tone, 2001).

A DMU (x_0, y_0^g, y_0^b) is efficient in the presence of bad outputs, if there is no vector $(x, y^g, y^b) \in P$ such that $x_0 \geq x, y_0^g \leq y^g, y_0^b \geq y^b$ with at least one strict inequality.

$$\rho^* = \min \frac{1 - \frac{1}{m} \sum_{i=1}^m \frac{s_{i0}^-}{x_{i0}}}{1 + \frac{1}{s} \left(\sum_{r=1}^{s_1} \frac{s_r^g}{y_{r0}^g} + \sum_{r=1}^{s_2} \frac{s_r^b}{y_{r0}^b} \right)} \quad (12)$$

subject to

$$x_0 = X\lambda + s^- \quad (13)$$

$$y_0^g = Y^g\lambda - s^g \quad (14)$$

$$L \leq e\lambda \leq U \quad (16)$$

$$s^-, s^g, s^b, \lambda \geq 0 \quad (17)$$

The vectors s^- and s^b correspond to excesses in inputs and bad outputs, respectively, while s^g expresses shortages in good outputs. s_1 and s_2 denote the number of elements in s^b and s^g and $s = s_1 + s_2$. Let an optimal solution of the above program be (ρ^*, s^-, s^g, s^b) . Then we can demonstrate that the DMU x_0, y_0^g, y_0^b is efficient in the presence of undesirable outputs if and only if $\rho^* = 1$, i.e., $s^- = 0, s^g = 0, s^b = 0$. If the DMU is inefficient, i.e., $\rho^* < 1$, it can be improved and become efficient by deleting the excesses in inputs and bad outputs and augmenting the shortfalls in good outputs by the following projection.

$$\begin{aligned} x_0 &\leftarrow x_0 - \\ y_0^g &\leftarrow y_0^g + \\ y_0^b &\leftarrow y_0^b + \end{aligned}$$

There are two variants of DEA models:

- DEA model with Constant Return to Scale (CRS model)
- DEA model with Variable Return to Scale (VRS model)

Table 2. Overview of solutions in DEA solver

		CRS model		VRS model	
No.	DMU	Score	Rank	Score	Rank
1	DMU 1	0,61746	2	1	1
2	DMU 2	0,347646	10	0,542637	9
3	DMU 3	0,347268	11	0,401202	13
4	DMU 4	0,231985	14	0,378045	14
5	DMU 5	0,346246	12	0,497494	10

6	DMU 6	1	1	1	1
7	DMU 7	0,440721	8	0,496817	11
8	DMU 8	0,235249	13	0,406239	12
9	DMU 9	0,173518	15	0,314005	15
10	DMU 10	0,511077	4	0,718744	6
11	DMU 11	0,517041	3	1	1
12	DMU 12	0,511014	5	0,87827	5
13	DMU 13	0,440193	9	0,584056	7
14	DMU 14	0,491042	6	1	1
15	DMU 15	0,48425	7	0,545363	8

The difference between these two models is that in the CRS model, it is understood that inputs increase, will be the same as outputs increase. In the VRS model, it does not necessarily mean that output will increase as much as the input. Given the nature of the variables that were used in this example, it is more realistic to use VRS model, because certain level of increase in inputs does not imply the same level increase in output parameters. For our example it is more adequate to use the VRS model, because if, for example, the number of employees is reduced by 10%, it does not necessarily mean that the total annual income will be increased by 10%.

For the example shown in this paper, efficiency will be calculated using both models (Table 2). According to the result obtained using the CRS model, only one post office is efficient and that is DMU 6. Others are inefficient. DMU 6 is efficient because, regardless of the small volume of inputs in relation to other post offices, it has much smaller number of standard minutes (which is good in our case; as we have noted that output is badoutput) and also significantly higher annual income. For this reason it stood out as the only one efficient. Other DMUs (although inefficient) are ranked in comparison to DMU 6, as it represents best practice.

If VRS model is implemented, four DMU proved to be efficient because the model is considerably more flexible than the CRS model, since it allows variable return to scale. In mutual comparison, four of the units are efficient (DMU 1, DMU 6, DMU 11, DMU 14), while others aren't. The reason these units are deemed efficient, above all, is their total annual income.

According to the solution obtained by applying the DEA model with Constant Return to Scale inefficient units can become efficient by reducing the volume of input variables. DMU 13 efficiency is 44% which means it's not efficient. To become more efficient, number of employees has to be reduced to 79 (by 60.91%), number of counters to 9 (by 21.69%), number of delivery districts to 24 (i.e. by 46.94%) and total volume of services in standard minutes should be reduced to 5.489.514,44 (by 58.15%). With these changes, total annual revenue would remain unchanged.

Table 3. Overview of solutions in DEA solver for DMU 13

DMU 13	CRS model			VRS model		
Efficiency	0,440192719			0,584056464		
Employees	202	78,96	-0,61	202	124,9499334	-38,14%
Counters	11	8,61	-0,22	11	10,40244336	-5,43%
Districts	46	24,41	-0,47	46	26,29404709	-42,84%
Total Annual Volume in Standard Minutes	13116412	5489514,44	-0,58	13116412	7372083,41	-43,79%
Total Annual Income	170.890.835,5	170.890.835,47	0,00	170.890.835,5	170.890.835,5	0,00%

According to the solution obtained by applying the DEA model with Variable Return to Scale, DMU 13 would be efficient if the number of employees is decreased to 125 (by 38.14%), the number of counters reduced to 11 (by 5.43%), number of delivery districts to 26 (by 42.84%) and total annual volume of services decreased to 7,372,083.41 (by 43.79%). With these changes, the total annual income would remain unchanged.

6. CONCLUSION

In order to give an answer to the question of how to improve public sector efficiency, it is important to understand the sources of inefficiency and to distinguish two cases: the case when there is another institutional alternative and the case where service can be provided only by the public sector.

If we talk about the case when there is no competition, it is widely recognized that what leads to inefficiency is not the type of ownership, but the absence of competition or at least rival candidates. Orientation towards private ownership can really reduce inefficiencies, primarily due to the different business behavior, which is necessary in circumstances where there is competition.

The point to note is that performance measurement is possible if you can get good data. This is a relatively positive view, as opposed to those who believe that performance measurement in the social field is not possible. It is clear that the effectiveness is likely to be more convincing as a measure if it focuses on the narrow production unit - for example a unit of postal network - than the broad units, for example the entire postal system of the country. At the same time, political debate and public policy are often conducted at an aggregate level. Therefore, we believe that measuring public sector efficiency has to go through individuals and to focus on steps because of the effects of public spending. The efficiency can be seriously measured, when focusing on the manufacturing unit with well-defined technology. Studies in which performance measurement is conducted must be interpreted with caution and it is necessary to act towards improving the quality and quantity of data.

The most common method used to calculate the efficiency of units primarily in the nonprofit service sector (schools, hospitals, banks, post offices, railways...) where the outputs are not measured in monetary units, but the effectiveness depends on the quality and scope of services provided. In addition, it is characteristic of non-profit organizations that the relationship between inputs and outputs of the system is very complex and often almost impossible to describe formally.

A key result of the DEA is measure of relative efficiency which is determined for each DMU. Moreover, DEA provides information that is relevant to the further work management of efficient and inefficient units. For inefficient units DEA provides information about what to do to become efficiency, and for efficient how to work more efficiently.

The results given by the DEA method produces a quantitative basis for the allocation of resources between units that are assessed and it is one of the reasons the method is widely used in practice. The goal of redistribution program is to move some resources into units in which they will be used more efficiently.

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POSTAL ADDRESS CODE AND POSTMAN'S PRODUCTIVITY

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Abstract- *The aim of this work is to explain the way in which mail delivery operates, indicate the problems with the organization of delivery districts and, finally, offer a model for dynamic management of a mail delivery service. Taking into consideration that delivery costs for letters amount to 50.2%, whereas parcel delivery costs make up to 38.6% of the total mail delivery costs (NERA National Economic Research Associates, 2004), this aspect is of special significance for postal operators. Considering different conditions for conducting delivery (urban areas, rural areas, civil engineering construction sites and building construction sites, terrain configuration, and so on) we propose a system for managing mail delivery using the postal address code (PAC). This paper resulted from a research project funded by the Ministry of Education and Science of the Republic of Serbia, under the name of "Reengineering the operator network of the universal postal service, with the organizational synergy of governmental and economic resources" (TR36040).*

Key words: mail, area, postman, PAC, delivery, dynamics, itinerary

1. INTRODUCTION

Postal traffic is the delivery of mail from a sender to a recipient anywhere in the world. It is a universal human right to have the opportunity to send and receive mail without discrimination and regardless of residence. The very receipt of mail varies and the modalities are adjusted to the users through various access points of the postal network. The transfer of mail is also adjusted to the technological development of a postal operator and it is not a critical phase of the process. The critical phase is the delivery of mail to the home address of the recipient. This is why we have devoted special attention to the delivery of mail which represents the most complex phase in terms of organization and it also induces the highest costs for postal operators.

The quality of postal services as well as the customer satisfaction mostly depends on the organization of delivery service. It is not possible to approach the organization of delivery in urban and rural environments in the same way. Moreover, it is not possible to consider civil engineering construction sites and building construction sites in the same way. It is also not the same to deliver mail in the clustered villages situated in the plains and scattered villages typical of central Serbia.

On the other hand, the organization of mail delivery depends on the number of households and their structure, the number of legal entities and, finally, the number and kind of mails that are supposed to be delivered. However, all statistical characteristics of certain areas are not sufficient for drawing the right conclusions and organizing delivery areas rationally, but one also needs to consider the load dynamics based on various segments of the territory. It is a well-known fact that delivery service is more loaded on the days when utility bills are being delivered and less loaded on the other days. Therefore, the aim is to achieve the optimal organization of delivery service that will increase the quality of the offered services, decrease the load on postmen on extreme days and, in the end, result in the overall decrease of delivery to postal operators in the delivery phase.

One of the ways to achieve the abovementioned is to organize a model of the dynamic management of mail delivery service in the way it will be presented in this work. Unfortunately, there are almost no academic resources in this field that we can refer to, except for partial experience of foreign postal services. The key parameter for dynamic management of mail delivery, which will be discussed later on in the paper, is the introduction of PAC on behalf of the Public Enterprise of PTT Communications "Srbija". On behalf of the Universal Postal Union it was estimated as an exceptionally efficient way of improving the technological methods in postal traffic. Apart from PAC, in order to achieve the dynamic management of mail delivery, high importance must be attributed to automation and computerization of the technological processes of receipt,

processing and transportation of mail. The opportune information in the delivery post office about the quantities, kinds and distribution of mail enables the opportune decision-making process as well.

2. THE EXISTING ORGANIZATION OF MAIL DELIVERY

It is the obligation of the Public Postal Operator to organize the delivery of mail on the entire territory of the Republic of Serbia in accordance with the quality standards established by the Republic Agency for Postal Traffic. This actually means that the territory of the Republic is divided into districts where the delivery of mail is organized in three different ways: mail is delivered on each workday (this applies to places with bigger population- narrow area), twice a week (populated places in rural areas- wider area) and once a week (rural areas with low population density- the widest delivery area). Narrower delivery areas have a larger population and more postal deliveries per capita, whereas on wider and the widest delivery area the distances that are covered make up for the biggest part of work and consequently the biggest part of the costs entailed. In a wider and the widest delivery areas, where possible, postmen use different transportation means in order to reduce the time spent in unproductive travelling.

Therefore, delivery service is organized according to the districts that are covered by postmen. Districts are created on the basis of multiple parameters such as: the number of households, the number of legal entities, the number of mails, the distances that are covered and other specificities (Z.Marković & V.Savičević, 1998). However, it has been noted that in reality the districts are not equally loaded and this load is also unequal throughout the month. This creates a number of difficulties and irrationalities.

In the transportation phases, mail is sorted and transported to delivery offices. When it reaches delivery offices, the mail is further sorted into the mail that is directly handed to the recipients and the mail that is delivered to the recipients' post office box. The mail that is supposed to be delivered to home addresses is further divided according to districts and given to postmen that then sort it according to the itinerary. Therefore, when it comes to ordinary mail, it is necessary to sort the mail at least three times in the delivery office before the deliverer can start the delivery. As far as special letter-post services are concerned (registered mail, insured letter, COD (Cash on Delivery) letter, money orders,...) it is necessary to register and charge them before sorting them according to the itinerary. The major problem that postmen encounter in narrow areas is the weight of the mail on the days of high load when it is physically impossible to carry all the mail so it is necessary to divide and carry it to the delivery warehouses, if they exist. Bicycles with bags, mopeds or hand strollers can relieve this problem. However, other problems, such as safety-related problems, can occur. For example, sometimes it is necessary to deliver mail personally to an apartment building and a bicycle or a moped has to be left outside in the street. Each district has its own specific characteristics and it is impossible to find universal solutions to the whole territory of the country. This paper will not consider all the problems encountered by mail deliverers, but it will emphasize the organization of delivery area in order to achieve equalization of the load.

3. BRIEFLY ABOUT PAC

PAC- Postal Address Code is a six-digit number that is a single-valued definition of the delivery territory and it indicates: a street, a part of the street, a nameless road, an apartment building, an institution, a residential area or a part of the residential area (Marković D., Radojičić V., Petrović D. & Marković Z., 2003). The group of individual PACs offers a single-valued definition of the delivery district and the order of PACs on the travel itinerary is defined by the postman's itinerary within the districts. When PAC is used to define the part of the street then this is done to aid the delivery so it is possible to define the part of the street, its position with reference to the crossroad or it is possible to divide the segment of the territory in some other way that will present the single-valued definition of the delivery office, delivery region and the position on the itinerary.

The first two digits of the PAC define municipality or more municipalities and represent the rough territorial division. The third and the fourth digit indicate the delivery district and they are also a single-valued definition of the post office. The fifth and the sixth digit define the exact location of the recipient, that is to say, they define the region and its position within the itinerary.

The extended PAC, composed of six additional characters, defines the house number, the number of the entrance and the apartment number. The extended PAK must include twelve characters in order to address the mail, but this case will not be considered since the extended PAC has not been implemented and it can be generated from the very address itself.

The PAC enables a simpler sorting of mail because it is not necessary to read the address and know the streets (there are sometimes more streets of the same name at some locations), but the sorting is done according to the groups of digits. The first two digits are used as a single-valued definition of the processing center, the other two define the delivery office and the last two define the delivery district.

4. THE MODEL OF THE DYNAMIC MANAGEMENT OF MAIL DELIVERY

In the exposition thus far we have provided necessary information in order to comprehend all the complexities of the problem of organization of mail delivery. If we want to derive a theoretical model based on this, it is necessary to conduct certain simplifications or to observe only certain kinds of districts of similar characteristics. However, generally speaking, the abovementioned situation can be represented with the figure 1.

Each district is defined by a number of PACs and the basic distance that must be travelled in order to cover the entire district. Additional distances that need to be covered depend on the number of deliveries as well as urban characteristics. The extent to which the working hours of a postman are used efficiently depends on the distance that is covered as well as the kind and number of deliveries. In order to deliver certain kinds of mail the average norms have been defined so that each postman's productivity can be estimated separately. The productivity is estimated as follows:

$$\text{Productivity} = \left(\sum_{i=1}^i VP_i * N_i + PP \right) / VPD * 100 \quad \text{where} \quad (1)$$

VP- The number of delivered mail of i kind

N- the average norm for i kind expressed in norm minutes

PP- the total distance covered on the district

VPD- the time spend on delivery in minutes

i- the number of observed kinds of deliveries

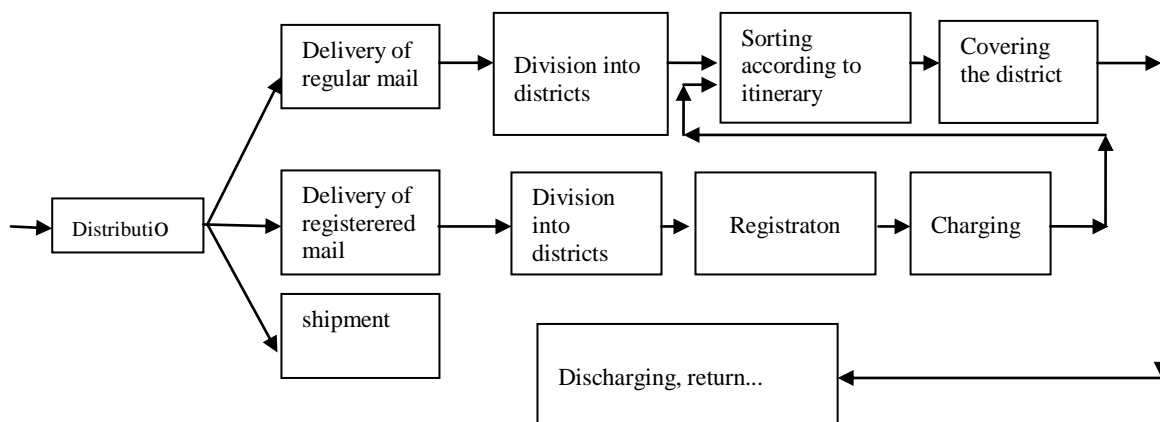


Figure 1. The simplified scheme of the business operations flow

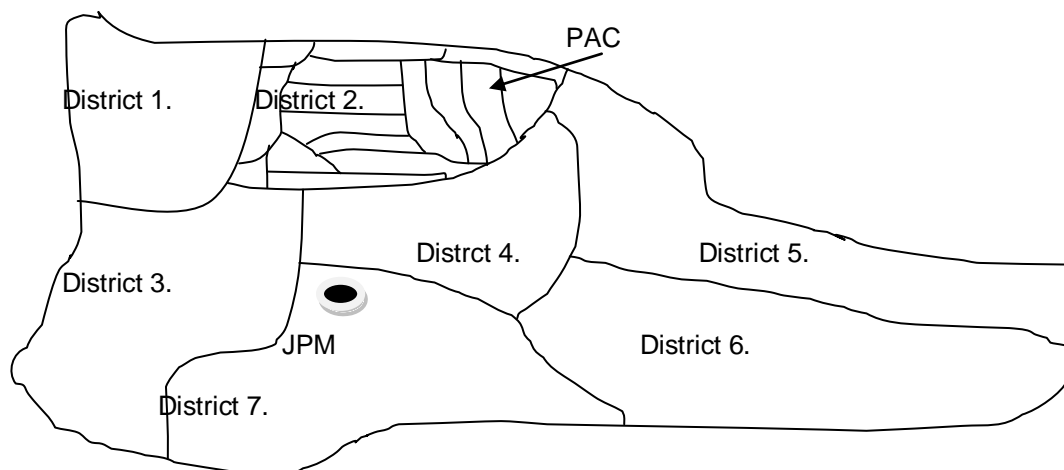


Figure 2. The division of delivery area into delivery districts

The aim is to make a postman's productivity equal throughout the districts and on all workdays. How can this be achieved?

The achievement of this goal is not simple. The equalization can be achieved if we enable the uniform influx of mail, whose volume as well as the kinds of mail that constitute it, is known in advance. Some laws can be defined using statistical measurements but this is not sufficient for an efficient and rational control of delivery service.

By considering the abovementioned problem and recording the load that postmen experience on a daily basis, within a longer time period (a month) and in accordance with the segments of PAC districts, it is possible to achieve the equalization of the load throughout all districts. Based on the same methodology we can now define the PAC productivity as follows:

$$Productivity_{PAC} = (\sum_{i=1}^i VP_i * N_i + PPP) / VPD * 100; \text{ where:} \quad (2)$$

- VP- The number of delivered mail of i kind per PAC
- N- the average norm for i kind expressed in norm minutes
- PP- the total distance covered per PAC
- VPD- the time spent on delivery in minutes
- i- The kind of delivered mail

As it is impossible to measure the time spent on the delivery per PAC, then as a result we receive the share of PAC productivity in the overall productivity of the district. This enables us to, considering all the districts in the delivery office, we organize new district division so that the deviation of the total district productivity stays within $\pm 5\%$. The simple combination of PACs will enable equalization of the load of each district within the delivery office. It is not possible to achieve this equalization on a daily level because of the unequal incoming influxes of mail for each delivery district. However, it is possible to do so on a monthly level. There are predictable laws for incoming influxes on a monthly level, which is, from the point of view of organization of delivery service, much more important.

Considering the fact that there are constant population fluctuations as well as fluctuations in the number of legal entities in the field, it is necessary to measure the deviations of the overall district productivity and intervene once the deviation crosses a certain boundary. This procedure will be made significantly easier by the automation of business procedures in the processing phase because we can get exact results of the load for each PAC, which enables the quick responsiveness in order to change the district boundaries.

In this way we achieve the equalization of the monthly load of the delivery districts but we do not solve other problems that are present during the organization of delivery. A typical problem regarding the organization of delivery service is absence from work. The lack of work force is, namely, not always possible to predict and it is therefore important to organize an uninterrupted mail delivery with the available human resources. In these cases it is the most rational option to organize teams formed by three, four, five or six employees. Actually, when a postman is absent from work, the employees who are in charge of the neighbouring districts become responsible for the workload of the absent postman. It is possible to create extended districts in advance and divide PACs in order to achieve equalization of extended regions. In the situation where we know the PAC load in advance for the specified day (delivery post office receives the notice in the morning about the receipt of the mail for each PAC) it is possible to achieve equalization only for that given day. On the following figure there is an approximate division of PACs into neighbouring districts. District1 is overtaken by districts 2 and 3 and district 4 by districts 5, 6, and 7.

In a similar way we can dynamically control the districts for a special letter-post delivery as well as organize the delivery of mail according to the separate categories. We have already mentioned that postmen are unequally loaded throughout the month and that they experience the highest workload on the days when utility bills are being delivered. This is true for 4-6 days a month and on the other days the number of deliveries is insufficient for achieving full productivity. Since utility bills are delivered each month and since their number and the way they are sorted is already known, it is possible to organize the delivery service so that more people are employed only on these tasks and that the regions are created according to the standard influxes of mail. In this way we would achieve equalization of the load throughout the month and we would not harm the quality of postal services. The delivery of utility bills is technically simpler. They are

usually sorted according to the postman's itinerary and it is not necessary to deliver them personally but they are delivered in the mail box. Therefore, the time of delivery does not need to be during the postmen's working hours and other people might be employed for this task on an outside employment contract or a temporary employment contract. The delivery fee for utility bills would be defined in advance and it would depend on the specific characteristics of PACs regarding the building typology, urban characteristics,

mailbox condition, and so on. The same principle can be applied when it comes to delivery of direct mail, information about elections, and other kind of mail which does not repeat and which is not predictable in the long run. This kind of organization of delivery means that each delivery office has a sufficient number of people that can be invited and engaged within a short time period. All of the abovementioned conditions are applicable to delivery offices that cover more than four delivery districts, whereas for smaller countryside post offices this model is not entirely applicable

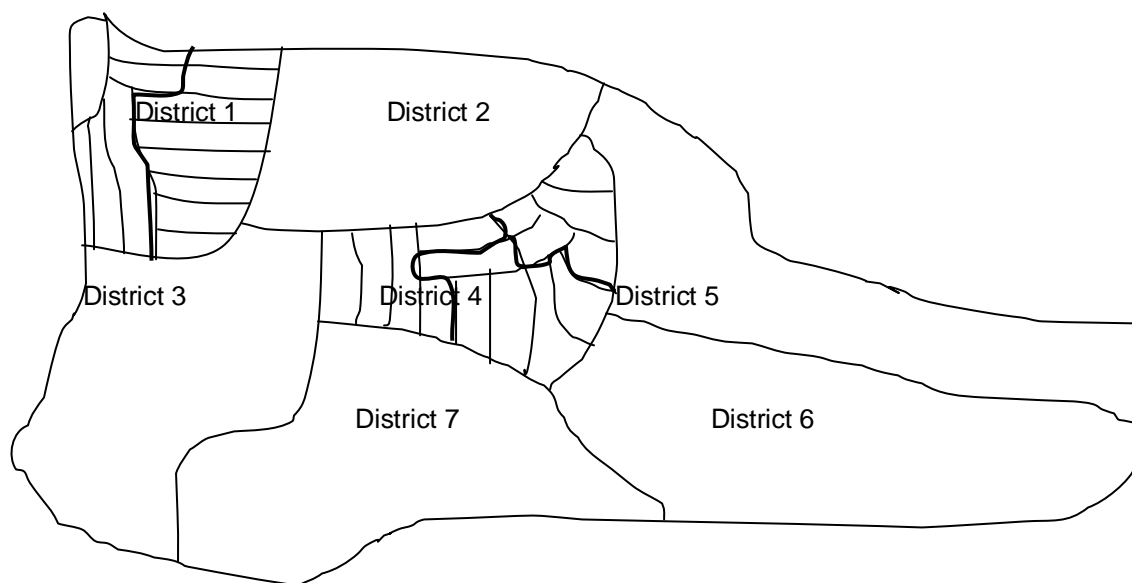


Figure 3. The example of the district division by the extension of the neighbouring districts

In rural areas a somewhat different logic can be applied. By determining wider and the widest districts we define the days of the week when delivery is conducted in these districts. Dynamic management of mail delivery service in rural areas involves the organization that takes into account the incoming influx of mail and the delivery that is organized according to the received mail. If there is too much mail for one hamlet on a certain day then the deliverer will deliver the mail on that day regardless of the fact whether the itinerary contains another district for which there is not the sufficient amount of mail. In this way the unproductive distance that is covered per mail is decreased, that is to say, the delivery costs are decreased and the quality is enhanced.

To approach the delivery service in this way, it is necessary to provide accurate and timely information about the number and kinds of mail that will arrive for delivery in delivery offices. This is possible only if a full automation of business procedures is achieved in the phases of receipt and processing (Marković Z., 2009) as well as close collaboration with customers that hand in utility bills and negotiate the delivery of a larger number of mail (direct mail, and so on).

5. CONCLUSION

The delivery of mail is a complex business procedure with a series of specificities. The quality of offered services as well as the profitability of postal services depends on the rational organization of mail delivery. Apart from that, the motivation of postmen to do their job properly also depends on good organization. It is necessary to conduct the right rationalization in order to achieve equalization of postmen's load, achieve their productivity and overcome the cases of sudden absence from work. Most of these problems can be solved by the dynamic management of mail delivery service as it has been presented in this paper.

Public Enterprise of PTT Communications "Srbija" is intensively working on creating conditions to enable all the necessary information in the delivery offices that is needed for the dynamic management of mail delivery service through automation of the processing of delivery mail and through the new corporate PosTis application that will enable the necessary information infrastructure.

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THE IMPORTANCE OF CORPORATE GOVERNANCE FOR THE SOCIO-ECONOMIC DEVELOPMENT OF SERBIA

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Abstract: *In the modern economic environment, characterized by turbulent circumstances and a future that is difficult to predict, the survival, growth and development of any business entity depends on proper management of all available resources. Limited resources, the need for rapid adaptation to changes in the business environment and the achievement of the organization's goals, requires corporate governance based on efficiency. Corporate governance is particularly important for countries in transition and their efforts to end the transition process and catch up with developed countries. This is the case with Serbia, which has been on the transition path for more than two decades. Where is Serbia today in the implementation of corporate governance and what are the problems in its implementation, are the issues addressed in this paper.*

Keywords: *corporate, management, corporate governance, privatization, public companies*

1. INTRODUCTION

Corporate governance was no part of the reality of the economy in the socialist countries. The heritage of the socialist-type of planned economy, i.e. controlled allocation of resources to certain sectors, is characteristic for all the countries in transition. It goes without saying that in such controlled economy, no market of securities existed, or was insignificant. Also, due to the non-existence or under development of the financial markets, banks neither played the role of key financial mediators, therefore did not develop in that direction. Besides, considerable lagging behind compared with the developed countries is present in the countries in transition. Hence, in order to accelerate their economic development and reduce their lagging behind the developed economies in the world, these countries must insist on professional, corporate governance. The key of successful economic transformation toward market economy is development of corporations and respective institutions of corporate governance (Babić, 2004).

2. PREREQUISITE FOR THE DEVELOPMENT OF CORPORATE GOVERNANCE IN THE COUNTRIES IN TRANSITION

Transition process requires building of a new system of the rules of conduct (organization culture), requires new institutions. Institutional framework enabling the construction of an efficient system of corporate governance rests on the following (CIPE, 2002):

- Legal regulative must take a clear position regarding private property because investors are not interested in investing in the countries where no private property rights are guaranteed;
- Legal regulative must protect the rights of suppliers, employees and creditors;
- Regulated banking sector in the way as to enable functioning of the financial market and corporate sector;
- Developed market of securities;
- Market for corporate governance where takes-over happen;
- Developed markets forcing corporation to act efficiently, effectively and economically in the fighting of competition;
- Developed mechanisms that regulate insolvency and bankruptcy so that capital may be reallocated in time;
- Proper privatization that should create adequate ownership structure and basis for the creation of corporate relations in business environment;
- Independent judicial system;

- Developed anti-corruption strategy and related construction of adequate taxation system;
- Reduction of bureaucracy and inefficiency;
- Quality financial media that will enable quality supervision of managers, investors, creditors and corporate management structures;
- Active role of all stakeholders, which should enable understanding and realizing the true relevance of corporate governance.

Key transition process is privatization process. This process makes key impact on the structure of corporate ownership, and the selected privatization method on corporate governance. The transition process in Serbia lasting over 20 years, with still unpredictable outcome, requires detailed analysis of the privatization process.

3. PRIVATIZATION PROCESS IN THE REPUBLIC OF SERBIA

Privatization process in the Republic of Serbia from 1988 – 2000

At the end of the 1980s economic development in SFRY (Socialist Federal Republic of Yugoslavia), therefore in the Republic of Serbia, as one of its federal units, pointed to the emergence of a general crisis. High and galloping inflation, drop of the size of industrial production, followed by the rise of unemployment, required implementation of adequate measures. A wider reform of the economic system was undertaken resting on the following three: liberalization, stabilization and privatization. Because of the high inflation it was the economic reforms that were first undertaken, aimed at achieving macroeconomic stabilization of the country. Liberalization implied the liberalization of prices and opening up of economy. Amendments to the Constitution in 1988 created constitutional possibilities for emergence of different forms of ownership. For the first time the analysis of the crisis clearly pointed to the anonymity of ownership i.e. social ownership, as the most important cause for the crisis. The self-management organizations of associated labour as well as their superior organization form – organizations of associated labour showed chronic accumulative incompetence. This fact had as a consequence a lack of its own means for financing modernization and development, which resulted in increased indebtedness and dependence from local and foreign loans. This resulted in determining privatization model - capitalization. It was considered that this partial privatization would lead to increased efficiency of the economy. A series of legal acts and enactments (Law on Enterprises, 1988; Law on Turnover and Management of Social Capital, 1989) defined the forms of ownership and enterprises were classified on this basis. For all that, all the companies had the same rights and responsibilities on the market, in the transfer of money and in other economic activities. These changes resulted in unwished-for outcome, therefore the reforms continued in 1990. Social capital could be transformed in any form of property. The transfer of ownership could not be carried out without compensation. The sale of companies, partial or total, had to be effected on economic principles. The transfer of ownership was based on workers' shareholding. All companies in social ownership could sell part of their capital by issuing internal shares and sell them with discount. These, internal shares, could not be put on sale on securities market. During the 1990, 1200 social companies changed their status and became mixed companies. In 1991 Serbia passed the Law on Conditions and Procedures for turning public property into other forms of ownership. Relevant characteristic of the federal and republican law which determined and directed implementation of the privatization was that privatization was not mandatory. However with emergence of hyperinflation, privatization process, under then valid laws, became interesting, again. Possibility to buy companies for insignificant Dinar amounts, through various embezzlement and manipulation by the company's management, underestimated the companies even more, so that individuals and certain groups became rich through various ungrounded and uneconomical acts. This method of financing privatization brought about drastic redistribution of social/public capital and national wealth to the benefit of individuals. Until 1993, over 51,64% of companies were privatized on the territory of Serbia. Out of the 3678 companies, which was their total in 1991, until the mentioned period 1899 of them were privatized.

Table 1: Privatized companies before 1993

Territory	Number of companies	Privatized			Privatized in %
		federal	republican	Total	
Serbia proper	2.381	670	322	992	41,67
Vojvodina	993	527	194	721	72,63
Kosovo	304	3	183	186	61,21
Total	3.678	1.200	699	1.899	51,64

Source: Sokić S., *Kapital u ekonomiji tranzicije*, Zavet, Beograd, 2005, p 479.

Privatization continued during the 1994 until July, in the same manner, when the National Parliament passed the Law on changes and amendments to the law on conditions and procedure for turning the public ownership into other forms of ownership. This law, better known as Law on Revaluation, brought about the retroactive revaluation of the social capital and the sums for which shares were bought at the time of hyperinflation. Privatization process was back at the beginning.

Next attempt at implementing reforms has been on since 1998. It was in that year that the Law on Companies and Law on basis for transfer of the public capital. It was this legislation that meant breaking-up with worker's self-managing decision making. Also introduced were assembly, managing and supervisory board, while management consisted of C.E.O., managing board and other. Privatization that was based on the already mentioned legislative regulations brought nothing new. Only a small number of companies were privatized. At the end of 2000, 350 companies entered privatization process which was completed in 18 companies only (Begović, et.al, 2000).

Privatization process in the Republic of Serbia after 2000

In July 2001 the Law on Privatization was passed. Following were main goals of this Law: creation of open economy and ownership structure, investments maximization in real sector, social and political acceptability and establishing clear ownership structure; corporative management based on ownership structure. A set of laws, regulations and enactments were passed for implementation of this law. Taking in consideration the experience of other eastern European countries in transition, as well as circumstances in Serbia, selling model was adopted as privatization model. Methods of sale are public tenders and public auctions. Larger part of the social or state capital of the company being privatized (70%) is sold to strategic investors. Between the two options, dispersive ownership and single investors, the latter model was selected as considered more convenient in terms of corporate management. As for the privatization in 2001, it is relevant to point out that legal regulative annulled voluntarism of privatization in Serbia. During 2006, after the disintegration between Serbia and Montenegro, the Constitution of Serbia was voted and confirmed. This highest legal act, is different from those dating from before in the sense that it does not contain social ownership as form of ownership. Since 2002 following results were scored concerning privatization.

Table 2: Privatization in Serbia in the period 2002-2010

	Number of sold companies (T+A+Tk)*	People employed (T+A+Tk)	Selling price (T+A+Tk) in mill. EUR	Investments	Social programme (T+A+Tk)
2002	211	37.320	318,8	320,1	145,8
2003	638	76.927	839,9	319,8	128,3
2004	237	38.808	153,9	99,6	2,6
2005	317	58.931	370,9	98,6	0
2006	281	45.962	239,9	152,2	0
2007	316	45.011	434,5	103,6	0
2008	277	27.187	253,2	62,2	0
2009	94	9.119	48,8	24,6	0
2010	34	1.634	13,3	1,4	0
Total	2.405	340.899	2.673,1	1.181,9	276,7

Source: Ministry of Finance of the Republic of Serbia: Revised memorandum on budget and economic and fiscal policy for 2011, with projections for 2012 and 2013, www.mfin.gov.rs, p 57.

Note: *T-tenders, A-auctions, Tk- capital market

According to the data available, 2405 companies have been sold since the beginning of privatization. 1682 socially owned companies were sold by tenders and auctions, while 723 have been sold on capital market (Ministry of Finance of the Republic of Serbia, 2010). Euro 669 million-worth income was made on capital, while Euro 2 billion (Ministry of Finance of the Republic of Serbia, 2010) -worth income was made on sale by tenders and auctions. Beside aforementioned, also Euro 1.22 billion-worth contracted investment, while Euro 0.28 billion was made tied with the social programme, contracted during the sale of the company. The highest total income per structure (direct sale, contracted investment, social programme) was made on sale by tender and resulted from sale of big companies. A number of the big companies went through restructuring process before the sale. 596 contracts (Ministry of Finance of the Republic of Serbia, 2010) concerning sale of companies by tender and auction were broken. Reasons for breaking of the contracts are

buyers' disrespect of their contractual obligations which were various: non-payment of installments, disrespect of investment and social programme, managing corporate property contrary to the contracts signed, etc. What is characteristic for 2009 and 2010 is drop in the sale of companies, which was consequence of the approaching end of the privatization process of the socially owned companies. In the preceding period the buyers bought up companies for which they showed interest, so that companies for which no interest was shown still remained unsold. Out of these several hundred mainly small companies, smaller number, for which the state showed interest, changed ownership structure, were transferred to state ownership. As for the remaining companies, they were liquidated for buying unattractive companies.

Privatization process of public companies

The next phase in the privatization process is privatization of public companies. Only after this process, necessary economic ambience will be created for a more efficient economy. As an important economy factor, with their activity and efficiency, they seriously influence the efficiency of economy as a whole. Thanks to their activity, a great many of these companies, have monopolistic position. There are over 500 public companies in Serbia today. They are characterized by high indebtedness, high level of liquidity, insolvency, operating with losses. Thanks to the activity they engage in, great many of these companies have monopolistic position. Their characteristic is high indebtedness, rather low current liquidity, insolvency, doing business with losses, low profit and high income per employee. In the economy of Serbia today, there exist 590 public companies, and over 550 are losers (Ilić, 2011) in what they do. Participation in management bodies of these companies is attractive today, too, and is reason for their fighting. Namely, basic characteristic of these companies is inefficiency, and the answer to the question how to raise the efficiency in these companies is privatization. However, with privatization of companies several elements have to be considered. Thanks to the activities they are engaged in, the specific features in production and services and their distribution, one part of such companies have monopolistic position, and such position is a form of state monopoly. Basic motive for creating such monopoly is protection of general interests. When privatizing these companies there is a danger of monopoly position being mistaken for private monopoly position. What motivates capital is profit, and it is not interested in the protection of general interest but in taking monopolistic position. By giving away the state monopoly position to private capital, its turning into private monopoly, would lead to redistribution of profit of the entire economy to the benefit of monopolistic companies of public sector of the economy. This would unfavourably affect economic growth, leading to unstable conditions for business that would negatively affect development, first of all investments. It is also important to determine clear conditions under which privatization will be effected, and surely special attention must be paid to:

- protection of general interest when changing prices,
- conditions of doing business, same
- level of obligatory investments,
- capitalization and increased participation of private capital in the company's total capital, etc.
-

This, further means, that this privatization phase can not be limited, in terms of time, as well as that adequate, quality solutions are required that will be supported by adequate regulative. Concerning how and at what rate this privatization will develop, it depends on economic goals the achievement of which the privatization will aspire to. One can conclude from the stated that privatization process in Serbia, has not been completed yet, not 20 years after. Corporate management that should have been implemented in the economy of Serbia, can not seriously affect the efficiency of economy i.e. either the growth or development that could reduce lagging behind the developed countries.

4. SECURITIES MARKET IN THE REPUBLIC OF SERBIA

Non-development of securities market is regular phenomenon in transition countries. Beside the small offer, the demand is low, for not too many investors who appear on the stock exchange, main reason for this being low level of trust. When talking about (non)development of the securities market in Serbia one should bear in mind that, beside the already said, it is also the consequence of:

- long transition;
- low level of economic activity;
- privatization process which takes too long and is only partially completed;
- foreign direct investments which arrived at a lesser size than expected which specially refers to so-called "greenfield" investment, which should have significantly contributed to corporate management in Serbia, first of all through transfer of knowledge and technology, etc.

5. ATTAINED LEVEL OF DEVELOPMENT AND CORPORATE GOVERNANCE PERSPECTIVE IN THE REPUBLIC OF SERBIA

On the basis of everything said so far, following two questions pose themselves:

- How far has Serbia gone in the development of corporate governance?
- What are perspectives of corporate governance in Serbia?

In order to answer the first question it is necessary to see the place and position of Serbia compared with other countries, both from immediate neighbourhood and wider. "Global Competitiveness Report" published by World Economic Forum, can be used for that purpose. The Report shows indicators that are specially important for corporate management in Serbia.

Table 3: Corporate governance indicators in Serbia

Indicator	2008/2009 (134) ¹			2009/2010 (133)			2010/2011 (139)			2011/2012 (142)			tendency of dk ²		
	rank	dk ³	pk ⁴	rank	dk	pk	rank	dk	pk	rank	dk	pk			
Ownership rights	108	3,6	4,7	111	3,4	4,5	122	3,2	4,4	126	3,1	4,3	↓	↓	↓
Protection of intellectual property	105	2,8	3,8	101	2,8	3,8	111	2,6	3,7	107	2,7	3,7	-	↓	↑
Indipendant judiciary	106	3	4,1	110	2,8	4,1	124	2,5	4	128	2,4	3,9	↓	↓	↓
Government rights	132	1,9	3,3	129	2,2	3,3	131	2,3	3,3	134	2,3	3,3	↑	↑	-
Efficiency of legal framework in settling disputes	102	3	3,8	124	2,6	3,8	132	2,6	3,8	137	2,5	3,8	↓	-	↓
Efficiency of legal framework in reconsidering regulates	-	-	-	115	2,6	3,7	125	2,7	3,7	127	2,6	3,6	↑	-	↓
Strengthening of auditing and of reporting standards	96	4,1	4,7	99	4	4,7	115	3,8	4,7	114	4,0	4,7	↓	↓	↑
Efficiency of corporate governance	119	4	4,7	120	3,9	4,6	134	3,7	4,6	136	3,7	4,5	↓	↓	-
Protection of smaller shareholders	132	3,2	4,6	128	3,1	4,4	137	2,9	4,3	140	2,8	4,3	↓	↓	↓
Local availability of research and training centre	74	3,8	4	90	3,6	4,1	100	3,5	4,1	113	3,2	4,1	↓	↓	↓
Cadre training volume	121	2,9	4	120	3	4,1	130	3	4	132	2,9	4,0	↑	-	↓
Effect of business regulations on direct foreign investment	128	3,8	4,9	120	4	4,9	131	3,8	4,8	125	3,5	4,5	↑	↓	↓
Local competition intensity	131	2,6	3,9	131	2,7	3,9	138	2,5	3,8	136	3,6	4,8	↑	↓	↑
Market dominance degree	129	2,6	4	130	2,7	4	137	2,8	4,1	139	2,5	3,8	↑	↑	↓
Anti-monopoly effects	73	3,4	3,8	97	3,7	3,6	120	2,8	3,6	137	2,8	4,0	↓	↓	-
Level and taxation effects	112	4,4	5	106	4,2	4,8	123	3,7	4,6	118	2,9	3,6	↓	↓	↓
Brain drain	111	3,8	4,5	113	3,8	4,5	135	3,4	4,4	139	1,8	3,5	-	↓	↓
Relying on professional management	118	3,6	4,6	118	3,5	4,5	128	3,3	4,4	133	3,3	4,3	↓	↓	-
Cooperation between management and employ's	131	1,9	3,5	132	1,9	3,5	136	2	3,5	136	3,6	4,4	-	↑	↑
Direct foreign investment and technology transfer	74	5,5	4,8	81	4,7	4,7	113	4	4,6	110	4,0	4,6	↓	↓	-
Cluster development level	104	2,9	3,6	117	2,7	3,6	122	2,6	3,6	128	2,5	3,6	↓	↓	↓
Competition advantages character	110	2,9	3,7	111	2,7	3,6	133	2,4	3,6	136	2,4	3,6	↓	↓	-
Willingness of trusting supervision	94	3,6	4,1	101	3,2	3,8	127	2,7	3,7	136	2,6	3,7	↓	↓	↓
Consumption of the company on research and development	97	2,7	3,4	110	2,6	3,3	108	2,6	3,2	130	2,4	3,2	↓	-	↓
Cooperation between university and industry in research and development	62	3,3	3,4	81	3,3	3,6	71	3,5	3,7	81	3,6	3,7	-	↑	↑
Availability of scientists and engineers	50	4,5	4,2	77	4	4,1	92	3,7	4,1	83	3,9	4,1	↓	↓	↑

Source: World Economic Forum, Global Competitiveness Report 2011-2012, Global Competitiveness Report 2010-2011, Global Competitiveness Report 2009-2010, Global Competitiveness Report 2008-2009

Note:

¹Number of the countries observed

²Tendency of dk represents the attained coefficient compared to the former value. Downward arrow indicates decline, while upward arrow indicates raise of the value of the coefficient.

³dk represents attained value of the coefficient in the observed period. Minimal coefficient value is 1-the worst result. maximal is 7- best possible result.

⁴pk represents average coefficient value

A general conclusion can be drawn from the presented data that over the past several years there has been a permanent deterioration of the environment necessary for corporate governance system development. In a huge majority of the presented indicators over the reported period, there has been a downward trend of the achieved coefficient. In the presented indicators, Serbia has not reached the coefficient value above the average in a single indicator. It has been mentioned earlier that a certain level of institutional framework

development is necessary for corporate governance to thrive. Institutional development level in Serbia is, according to the Report on Global Competitiveness in 2011-2012, and according to which Serbia is ranked 121st as the worst ranked country among the countries in its immediate neighbourhood. It has been mentioned earlier in this text that Serbia has only partially completed its privatization process, which is a

necessary prerequisite for the corporate governance development. The following indicators serve to describe the institutions responsible for regulation of the property and property rights' sector: Ownership Rights and Intellectual Property Protection; and the achieved values show that this area has not yet been adequately regulated to facilitate corporate governance development. The following indicators describe the management sector: Brain Drain, Professional Management Reliance Levels, Availability of Scientists and Engineers and Personnel Training Scope. Brain drain has been evident in Serbia for several decades now, so that it has become a chronic issue. Failure to overturn this process in the century that is going to be the century of grey cells will certainly have negative consequences on the future perspectives of Serbia. In addition to this, the rapid downturn of the Availability of Scientists and Engineers indicator is evident from this Table. Since the practice of commissioning professional managerial tasks is still underdeveloped in Serbia, and since the managerial staff still lack the necessary knowledge and skills, and while respecting the fact that investments in research and development have been modest only, it can safely be concluded that Serbia lacks both quality and quantity of human resources necessary for adequate corporate governance. The foreign direct investments in Serbia are expected to exert considerable influence on its economic growth and development, but also on the technology transfer, know-how and introduction of corporate governance. The following indicators describe the achieved results in this area: Foreign Direct Investments and Technology Transfer, and Legal Regulations' Influence on Foreign Direct Investments. As for the market in general, (relevant indicators: Local Competitiveness Levels, Market Domination Levels, Antimonopoly Politics Effects) it can be concluded that the market is not adequately developed and that it is a market with no significant competition, which cannot be an auspicious climate for corporate governance development. Inefficiency and lack of antimonopoly policy, weak foreign capital presence and weak business legal framework, which only insufficiently implements the instruments aimed to attract the foreign investments, all point out to the need for the relevant factors to do much more than they have so far. Quality and quantity of the local suppliers has not reached a satisfactory level either. The level of cluster development, as an indicator of the form of connections between corporations and one of the ways to reach the globalized market, has not reached the necessary or the desired level yet. The legal infrastructure indicators show that it is still far away from the level necessary for the corporate governance development (Independence in Work of Judiciary, Legal Framework Efficaciousness in Dispute Resolution, Legal Framework Efficiency in Contract Reviewing). The achieved level of Small Shareholders' Protection is especially worrying, because in 2011, just as in the previous years, only Ukraine and Bosnia and Herzegovina have been ranked worse than Serbia. Corporate reporting is an important external mechanism of corporate governance Its indicator, Auditing Strengthening and Standard Reporting, points out that it is necessary to invest much more efforts in this area in order to achieve any significant progress. Companies in Serbia are not sufficiently prepared for the corporate governance, which is corroborated by the Readiness to Commission Monitoring indicator.

Table 4 : Largest obstacles to doing business in the countries of the Western Balkans (non-Eu member states) in 2011-2012

	Serbi	Croati	BH	Macedoni	Montenegr	Albania
Corruption	2	2	3	3	3	2
State administration	1	1	2	2	2	3
Political instability	3	3	4	4	4	4
Access to finances	4	4	1	1	1	1

Source: World Economic Forum, Global Competitiveness Report 2011-2012

The issue of corruption is present and ranked high in the description of the Biggest obstacles for business in all the former SFRY countries. According to the World Bank definition corruption is the abuse of office for the purpose of personal gain. Corruption can be petty (accepting small gifts, providing different small favours), or substantial, in cases where it turns into criminal offense. Presence of corruptive practices and deep-rootedness of corruption in a society influence, among other things, the Government spending by diverting it into the less productive areas, which exerts negative influence on the economic growth.

Table5 :Ranking of the biggest obstacles to doing business in Serbia in the period 2008-2012

	2008-2009	2009-2010	2010-2011	2011-2012
Corruption	2	1	1	2
Administration inefficiency	3	4	2	1
Political instability	1	2	3	3
Access to finances	6	3	4	4

Source: World Economic Forum, Global Competitiveness Report 2011-2012, Global Competitiveness Report 2010-2011, Global Competitiveness Report 2009-2010, Global Competitiveness Report 2008-2009

Over the past years in Serbia, the problem of corruption has become more and more important and it is one of the biggest obstacles to business, coupled with the inefficient administration and political instability.

6. CONCLUSION

Conclusion about the achieved level of corporate management in Serbia can be drawn from indicator Efficiency of corporate governance, which in the observed period shows dropping tendency and ranks Serbia as 136 out of the 142 countries. Ranked behind Serbia are only: Tajikistan, East Timor, Angola, Mauritania and Libya.

From all the stated, it is clear that in building corporate governance system Serbia is at the very beginning. It is quite sure that such system cannot be constructed over night and that it takes some time for that. What can be said with certainty is that it is natural for Serbia to head to building a closed model of corporate governance (Ivković,2011). Reasons for such a choice are in the following facts:

- Financial markets in Serbia, especially those needed are not well developed and it cannot be expected to develop in relatively short time;
- Banks in Serbia's economy, as their source of financial means have central place, which is one of basic characteristics of closed model of corporate governance;
- Historically viewed, from the point of view of participation of employed in management, tradition exists concerning participation of workers in management.

In the conditions of cyclic activity of economic crisis globally, the issue of efficiency of economic system and economic subjects becomes even more tense and requires reconsideration of strategies and policy of growth and development at all levels. World economic crisis has additionally worsened the picture of the economy of Serbia so that it is today ranked 70% levels of the GNP in 1989 (EBRD,2011).

In such ambience corporate governance, understood as professional management, and its implementation in the economic system of Serbia is very important for the efficiency of the use of resources as well as growth and development of the national economy.

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PERFORMANCE BASED SUCCESS - MYTH OR REALITY

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Abstract: *The success of companies is often, but not at all times, measured by various performance indicators. However, there is no unified approach to determine neither the value nor the success of the company. This paper presents various, most commonly used approaches in setting performance-based success. Through in-depth secondary research, the reader will be provided with meaningful insights in approaches or methodologies for establishing world's best companies. The paper focuses mainly on for-profit companies and therefore does not deal with the success of NGOs, public and non-profit organizations. The findings of the paper are very interesting. They show that there is no unique success measurement system and each and every one has more or less pros and cons. However, even with these drawbacks, one must take them into account and cannot formulate economy-related research without them. The results of the paper are important to every scholar or researcher who is as a side input using some sort of company success rankings. The paper enables readers to gain critical opinion on most used rankings and to create a rational and founded starting point for their further research.*

Keywords: *performance, success, ranking, list, company*

1. INTRODUCTION

Performance management is not a new concept any more. It has been around for some time now. Companies seeking for successful managing models in an ever-changing environment have been looking into performances in order to determine strongpoints and areas for improvement. But the big question is what performances should be looked at. What are these gold letters that tells us whether our organization is on a good way or not? What is the rationale behind this question. The success of the company nowadays should be measured by the way ahead not the way behind. Therefore, how we will know what company is heading the good way and thus successful?

There is neither unique methodology nor unified set of performance that would provide us with an eye opening experience on the organizations' success. So, are we tumbling in the dark, or at least in the fog with this concept? This question could lead us back to the definition of the success of one company. What are the most successful companies and why?

There is not unique worldwide-accepted list for this either. But there are few very well recognized. This paper will present the most important listings that even with some flaws could represent the world's best.

2. LISTS

There are numerous organizations dealing with listings. As the organizations providing them, so are the lists very different. Most popular and widely accepted ones are: Forbes's Global 2000, Fortune Global 500, Financial Times Global 500 and many more. The best known and the most quoted list in Serbia, is Ekonomika Media Group's Top 300. No matter the depth of the scientific research, you cannot talk about successfulness of the company without taking into account one or more of these lists. In this paper the most used ones will be presented more into depth, explaining methodologies and/or approaches for preparing rankings. This review would be of great use in creating an insight as a base for a critical opinion regarding these lists in terms of secondary side input for research.

2.1. Forbes

Certainly most popular hence most used lists are ones published by Forbes. Forbes has been dealing with rankings of various entities for several decades now. It provides lists regarding almost every segment of living:

- Rich lists such as world's billionaires, richest people from several countries, etc.

- People lists such as top earning CEOs, top-earning dead celebrities, world's most powerful women, the celebrity 100, world's top-earning models, etc.
- Companies lists such as America's best small companies, world's most innovative companies, America's largest private companies, global high performers, global 2000 leading companies, etc.
- Money and investing lists such as best brokerage analysts, the 200 largest U.S. charities etc.
- Places lists such as best countries for business, best places for business and careers, best cities for singles, most expensive zip codes etc.
- Sports lists such as the business of baseball, basketball, football, top-paid tennis stars, etc.
- Technology lists such as tech's top deal makers, the 25 fastest-growing tech companies, etc.
- Education lists such as top colleges, best business schools, best college buys.

But what is important for us are in business widely used list of most successful or more valuable companies. Some of these lists will be presented here in order to provide readers with common understanding of what they actually represent.

2.1.1. Global 2000 – The World's Biggest Companies

The list of The World's Biggest Companies is made based on composite ranking of sales, profit, asset and market value. (DeCarlo, Global High Performers, 2011) The list is compiled using Interactive Data, Thomson Reuters Fundamentals and Worldscope databases via FactSet Research Systems for publicly traded companies. Exploitation of these databases enables search for the biggest companies considering 4 indicators: sales, profit, asset and market value. All financial numbers are consolidated, taken from last fiscal year financial data, and expressed in dollars. (DeCarlo, Methodology: How We Crunch The Numbers, 2012)

The first step in ranking is forming separate lists of top 2000 by each indicator: Sales 2000, Profit 2000, Asset 2000 and Market Value 2000. For each separate list there is minimal requirement that each company has to meet and each company must qualify in at least one of the separate lists in order to become candidate for Global 2000. The preconditions for the separate lists are for companies to have (Forbes staff, 2011):

- Sales at least 3,3 billion dollars,
- Profit at least 207,9 billion dollars,
- Assets least 6,59 billion dollars and
- Market value least 4,14 billion dollars.

Each company gets separate score for each indicator, based on the fact how it is ranked on separate 2000 list. If it does not meet some of minimal requirement, company gets zero points for that indicator. By adding this four scores equally pondered, each company gets total score number. (Forbes staff, 2011) Total score achieved then represents a key for ranking the companies.

2.1.2. Global High Performers

Global high performers are well-managed, agile companies with high growth, which enable them to become benchmark for their industry. The aim is to find companies that represent global superstar. The starting point for finding such companies is Forbes's Global 2000 list. The companies are considered to be global since they operate in America, as well on their local markets. The precondition to become candidate for Global High Performers is for company to earn in average 56% of revenue outside their country. Additionally, companies must have at least 1 billion dollars sales and positive shareholder's equity. (DeCarlo, Global High Performers, 2011)

The first step in creating list is to analyse companies from all industries, excepting trading companies, from Global 2000 list and assess them according to long-term and short-term sales growth, income growth, return on capital and total return to shareholders. Earnings projections are considered too and after these analyses, 5 companies from each industry are carefully chosen. (DeCarlo, Global High Performers, 2011)

Listed companies can be sorted according to industry, average 5 years sales growth, average 5 years net profit growth, average 5 years total revenue, projected earnings per share growth, debt ratio and country origin.

2.1.3. Platinum 400 – the Best Big Companies in America

The candidates for Platinum 400 are American and foreign corporation with significant presents in USA, which embodies about 1000 corporations with at least 1 billion dollars revenue in the last fiscal year, share price at least 5 dollars per share and positive equity. (Forbes staff, 2008)

The companies that could be ranked extremely high, but that are not suitable for platinum mark are excluded from ranking. The help in that task is achieved from Audit Integrity, witch judge risk attached to accounting practise and appearance of unwanted events such as class action litigation, financial restatements, internal control deficiencies, securities and exchange enforcement actions and stock price performance. If company gets law score with Audit Integrity, it will be expelled from further ranking process. Security analyst reports are being checked too, searching for negative news about candidates, as well as for projections regarding earnings that might indicate decline of growth rate. Audit Integrity also assesses financial condition of a company as strong, average or weak, based on a number of financial ratios, such as current and quick ratio. (Forbes staff, 2008)

Companies are divided into 26 industries, and in each industry companies are ranked according to different growth rates and value measures. The companies are chosen based on sales and earnings growth, debt ratio, earnings outlook and stock market returns. Forbes methodology ranks companies according to 1-year and 5 years data, to take into account a long-term success as well as most resent performances. The success is measured by sale and earnings growth and return to shareholders. According to this measuers and other data, including analyst reviews and accounting and governance ratings from Audit Integrity, one best-managed company is chosen from each industry. (Zajac, 2008)The ranking system also includes consensus about long-term earnings growth and debt ratio forecast. After pondering these indicators, each company gets composite number as well as overall rank within industry. (Forbes staff, 2008)

For calculating 5 years growth rate, it is necessary to have data for 6 years period. Growth rates for period shorter than 5 years are marked with footnote. When there is less than 4 years available data, the growth rate is considered unavailable. The comparisons regarding last 12 months include most resent 4 quarters and comparable 4 quarters from previous year. (Forbes staff, 2008)

For sales growth rate and earnings per share Forbes methodology uses lest squares method. This equation, adjusted for sharp fluctuations, provides result that tightly reflects average growth rate. One of lest squares method limitations is that it cannot include negative values. If earnings are negative at the beginning of the period, growth rate is calculated with the first positive year. If earnings are negative in the middle of measuring period, that year is excluded from calculation, and the rest of period with positive earning will be considered. The assumption that lies behind this is that single loss cannot be representative for long/term performances. If company has loss during more than one year and has great fluctuations in earnings, the program does not calculate 5 years growth rate and the result is meaningless. (Forbes staff, 2008)

Revenues, net income, operating and profit margins measures are from last 12 months data.Profit margin is calculated as net income divided by net sales. Revenue is taken as net sales plus other operating revenues. Operating profit is calculating as net sales minus cost of goods sold, selling, general and administrative expense and research and development costs. Data for calculating debt ratio are taken from the last Balance sheet. Debt includes long-term debt and capitalized leases. Total capital includes long-term debt, shareholders equity, minority interest, deferred taxes and investment tax credits. (Forbes staff, 2008)

400 best-ranked companies can be sorted by 5 years total revenue, sales and net income. The list can be filtered by industry too.

2.1.4. The Top 20 Small Public Companies In America

To become candidate for The Top 20 Small Public Companies In America, companies must be publicly traded for at least on year, have annual revenue between 5 million and 1 billiondollars and boast a stock price not less than 5 \$ per share. For apples-to-apples comparisons, financial institutions, REITs, utilities and limited partnerships are excluded. Ranking is based on earnings growth, sale growth and return on equity during last 12 months and last 5 years. Share performance comparing to similar companies is taken into account too. (Badenhausen, 2011)

The rank is based on:

- Sales during last 12 months,
- Five years annualized sales growth,

- Five years annualized earnings per share growth,
- Five years average return on equity.

2.1.5. America's Largest Private Companies

Forbes also provides the list of America's largest private companies based on total revenue. Most companies from the list do not have intention to change its private status. Whenever it is possible, the revenues are reduced by sales of publicly traded subsidiaries. (Murphy, 2011)

Candidates for this list must have revenue as least 2 billion dollars. Candidates cannot be companies that do not pay income tax, mutually owned companies, cooperatives, companies with less than 100 employees, companies that are more than 50% owned by another public, private or foreign company and companies with main activity in auto dealerships and real estate investment and/or management. (Murphy, 2011)

2.1.6. Asia's 200 Best Under A Billion

The companies need to have growth in both sales and earnings in order to become candidate for this list. Additionally, their yearly revenue must be between 5 million and 1 billion dollars and they have to be publicly traded during last three years. (Settimi, 2011)

The companies are ranked according to earnings growth, sales growth and return on equity during last 12 months and during the last 3 years. (Settimi, 2011)

2.1.7. Asia's Fab 50 Companies – the Best of Asia-Pacific's Biggest Listed Companies

In order to be Asia's Fab 50, the companies must have at least 3 billion dollars in revenue or market capitalisation. The ranking is based on 5 years revenue, operating earnings and return on capital, followed by consideration of recent results and share price movements. If company is has too much debt or government own at least half of shares it will be excluded from the list. (DeCarlo & Koppisch, Asia's Fab 50, 2011) The companies from the list can be sorted by country origin, market value, sales and industry.

2.2. Fortune Magazine

Magazine Fortune deals with various business and social areas, but it is also known for its annual features ranking companies, from different points of view.

2.2.1. Fortune Global 500

Fortune Global 500, created by magazine Fortune is a list of the biggest companies in the World, sorted by total revenue. Inside this list, Fortune provides specific lists such as European Top 50 made of 50 European companies with the highest revenue derived from Global 500. List can be further used to select companies from Global 500 based on specific country, industry or city. (Fortune Magazine)

Fortune considers there 500 companies in the light of top performance companies, providing insight into their rank based on chosen performances, as success indicator. These performances are: (Fortune Magazine, 2006):

- Revenue growth,
- Percentage revenue change,
- Income,
- Income growth,
- Percentage income change,
- Profit margins,
- Return on assets,
- Number of employees,
- Revenue per employee,
- Assets per employee.

2.2.2. The other lists

Fortune also creates other list of successful companies, such as (Fortune Magazine):

- 100 best companies to work for,
- 50 most profitable companies measured by income, profit margin and return on equity,
- 50 biggest companies according to market share, shareholder's equity and number of employees,
- Biggest investment companies ranked by shareholders return in the period of 1, 5 or 10 years,

- 25 top companies for leaders, based on different fact regarding management and promotion policy,
- 100 fastest-growing companies, with the most rapid growth measured by combination of earnings growth, revenue growth and total return for 3 years period,
- World's most admired companies; created according to questioner in which they asked business people about what are the companies they admire the most.

2.3. Bloomberg Businessweek: Global Top 40

Bloomberg Businessweek provides the list of 40 best companies in the world. Some of the strategies that company apply in order to get to the list are commitment to innovation, diversified portfolios, aggressive expansion, strong leadership and clear vision of future. (Deprez, 2009) The list of Top 40 creates consultant company A.T. Kearney. for Businessweek. They use Thomson Reuters methodology for ranking: the first step is to calculate median value growth rate (market capitalisation growth after deducting any capital increase) and sales growth rate for the last 50 years for about 2500 publicly listed companies around the world. (Bloomberg Businessweek) In order to become a candidate, a company must have more than 10 billion dollars in sale, with at least quarter from outside their country, positive value growth, and above average sales growth. (Deprez, 2009)

The companies are ranked according to sales growth and value creation. (Deprez, 2009) When it comes to growth, it is calculated as median value for 1 year and 5 years earnings per share growth for the group with exclusion of those that do not fall into top half. Afterwards the current ratio price-earnings for *MSCI World index* is considered and all companies with ratio under that are eliminated. (Jespersen & Kalwarski, 2009)

Bloomberg Businessweek also provides a list of 50 most innovative companies that Boston Consulting Group (BCG) creates for them based on questioner sent to senior executives around the world where they named the most innovative company outside their industry.

2.4. A.T. Kearney: Global Champions

Global Champions, list of 25 companies created by A.T. Kearney, is made of companies chosen between 2500 biggest international companies in the world that have superior performances during 5 years period. Those companies have 15% average growth rate, while the sample as a whole has this growth rate just 8%. According to the study they conducted, the best performance companies are those who combine long-term strategic planning with skilful execution. The analysis showed that the company size, nor market position are not precondition for superior growth or protection from market fluctuations. (A.T. Kearney, 2009)

2.5. Financial Times: Global 500

Global 500 is a Financial Times list of companies ranked by market capitalisation. The higher market price of company's shares, the higher the rank. Market capitalisation is calculated by multiplying share price on March 31st by number of issued shares. The candidates for the list are all companies with free float (portion of shares in market circulation) at least 15%. Companies are then valued based on shares listed on the share market. The total value of listed shares is considered even if the part is tightly held. Unlisted lines of stock are excluded. Investment companies are excluded too. (Dullforce, FT Global 500, 2011)

Other performances that are considered in the Global 500 rank are: rank in the previous year, country origin, market capitalization, sector, turnover, net income, total assets, number of employees, price, price/earnings ratio and dividend yield. (Dullforce, FT Global 500, 2011)

Financial Times provides additional lists FT 500 for Europe, USA, Great Britain and Japan. They also create tables that show newcomers to the list, companies who fell out of the list, the biggest rise and drop on the list market capitalisation by sector or country, as well as the rank of all companies from Global 500 in their sector. (Dullforce, FT Global 500 method and background, 2008)

2.6. Serbian Ministry of Finance: 100 the most successful companies

Serbian Ministry of Finance creates the list of 100 most successful companies in Serbia, based on net income. Beside net income, the list provides data about some other performance indicators, as a success measures: profit margin, net profit change regarding previous year, operating revenue, operating revenue change from the previous year and number of employees. Using this list, the Ministry extracts a separate list of ten most profitable companies, measured by profit margin. (Ministarstvo finansija, 2011)

2.7. Deloitte: 500 biggest companies from Central Europe

Deloitte Company creates list of 500 top companies based on sales revenue. Besides revenue, Deloitte considers some other performance indicators, such as revenue change from previous year, net profit, and change of net profit since previous year. Top 500 is made according to consolidated revenues for the fiscal year, and companies are grouped by industry and country origin. (Deloitte, 2009)

Deloitte also creates additional list of 25 biggest companies measured by market capitalization.

2.8. Ekonom: east Media Group (EMG): Top 300

The most recognized and the most quoted list of best companies in Serbia is Top 300 created and published by Ekonom: east Media Group. This list is comprised of 300 most successful companies in Serbia, measured by the level of operative revenue. (Ekonom: east Media Group, 2011)

Top 300 rank is used for creating additional lists of most successful companies according to other important performance indicators (Ekonom: east Media Group, 2011):

- Top 20 – by operative revenue growth; it ranks 20 most successful companies according to percentage growth of operative revenue regarding previous year.
- Top 20 – by EBITDA; EMG ranks 20 most successful companies measured by earnings before income, tax, depreciation and amortization.
- Top 20 – by earning before tax; it ranks 20 most successful companies by the level of earning before tax in current year.
- Top 20 – by EBITDA margin; the list is consisted of 20 most successful companies measured by earnings before income, tax, depreciation and amortization margin.
- Top 10 – central Serbia; the list of 10 most successful companies from Central Serbia, ranked by operative revenue in previous year.
- Top 10 – Vojvodina; the rank of 10 most successful companies by operative revenue in previous year, from Vojvodina territory.

3. PROS AND CONS FOR DIFFERENT RANKING CRITERIA

Each of the rankings has its strengths and weaknesses in terms of determining the world's top performance companies.

For example, using solely revenue as a measure, does not take into account differences in expenditures for the same amount of incoming revenue, and thus gives a bias towards revenue-heavy retailers. Plus, the rankings may not take into account the impact of variations in accounting standards, among other factors. (Bedell, 2010) Turnover, does not adequately allow for banks and some financial services companies, while profits will be distorted by write-offs. (Dullforce, FT Global 500 method and background, 2008)

A common problem affecting most methods other than market capitalisation is timing. As profit and turnover figures come from annual reports, any ranking based on them must be out of date. (Dullforce, FT Global 500 method and background, 2008) On the other hand, using market value involves a single snapshot of the relative value that investors put on the company, without accounting for variations due to seasonality, the impact of positive or negative news headlines about the company, rumours about mergers and acquisitions, executive changes, and the many other factors that affect share price on a daily basis. Additionally, listing only public companies excludes privately-owned and wholly state-owned corporations. (Bedell, 2010) In contrast, it can also be argued that a ranking based on market capitalisations contains a forward-looking element in the sense that share prices include a view on investors' expectations. (Dullforce, FT Global 500 method and background, 2008). Even with issues mentioned above, one must not avoid these rankings, but rather take it into account with some reserve.

4. CONCLUSION

Many researchers from both scientific and non-scientific arena use various rankings and lists in they work as a side input for the success of the companies. Whether financially focused or not, a research must have in mind what does it mean being i.e. 34th in the Forbes 2000, of 53rd in EMG top 300. This paper has pioneered insight behind the scenes of these lists, giving a clarification and methodological baseline for these ranking. This is what every "consumer" of these products should have in mind when "buying" some of them.

One may conclude that some or most of these lists are far away from being perfect measurement tool of success, let alone the uniqueness or unified approach. However we must not neglect these since they

influence global perception more than some far more sophisticated methodologies of valuation. On the other hand, we must not take them for granted believing that the results of these rankings are “word of god”.

So, to conclude: ranking lists of companies based on performances, described in this paper, are something we must take into account when talking about successfulness of organizations, but also something we can't thoroughly believe, but use it more as a point of departure, rather than destination.

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STRATEGIC DEFENCE PERFORMANCE MANAGEMENT

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Abstract: Strategic defence performance management has a very important role in an overall process of defence system management. This paper presents results of an analysis of many different approaches and explains main features of strategic defence performance management. The paper can be useful for defence and public management practitioners and researchers.

Keywords: defence, performance, management, balanced scorecard. 1. introduction

In a performance-oriented era, organizational efficiency and effectiveness plays a central role no matter the industry or sector involved. Performance management is an ongoing, systematic approach to improving results. The performance aspects in the defence sector started to be viewed and considered with primary interest in the last ten-fifteen years. The fundamental benefit of performance management is that it enables defence systems to provide better results for the public and a higher level of national and international security.

One of the performance management concepts with increased adoption in the defence sector is the Balanced Scorecard. United States Army, UK Ministry of Defence or Canadian Department of National Defence, are amongst the recognized implementers of performance architectures based on Balanced Scorecard.

2. PERFORMANCE MANAGEMENT IN THE PUBLIC SECTOR

Performance management within public sector organisations has always been a difficult and controversial area. However, with continuing pressures for accountability and value for money it is one which requires appropriate management attention.

Accountability demands on the public sector increase every year. Public sector organizations are carefully examined by legislators and the public and compelled to do more with less funding. Those organizations must strive to find new ways to improve their performance and satisfy public needs with constrained resources.

Performance management in the public sector is an ongoing, systematic approach to improving results through evidence-based decision making, continuous organizational learning, and a focus on accountability for performance. Performance management is integrated into all aspects of an organization's management and policy-making processes, transforming an organization's practices so it is focused on achieving improved results for the public (National Performance Management Advisory Commission, 2010).

Performance management within public sector organisations cannot take place in isolation. It needs to be incorporated into general organizational management system (Figure 1).

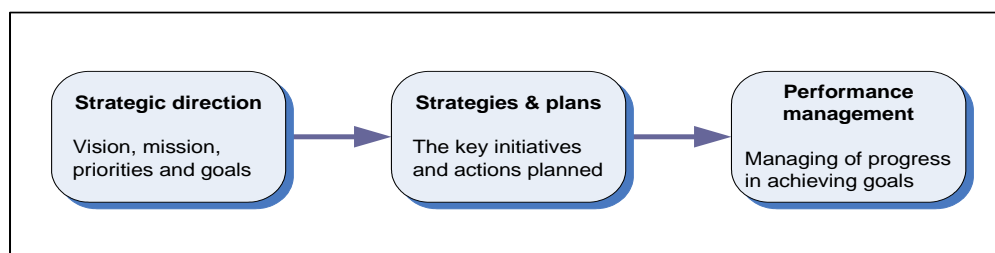


Figure 1: Performance management within general organizational management system (Accounts Commission for Scotland, 1998)

The key metric for public sector organizations' performance is not financial, but rather mission effectiveness. However, mission effectiveness is not a definite and static issue. Usually, organizations have a general mission, which includes many specific sub-missions. At any given time, some sub-missions may be more important for the public than others may. The establishment of priorities among organizational sub-missions is an ongoing strategic planning responsibility.

There are significant differences between public and private sector organizations. The only clear similarity between the two is in the desire for "customer satisfaction", but even here, there is a difference, because the definition of "customer" is different in the two cases. Some of similarities and differences between public and private sector organizations are given in Table 1 (Arveson, P., 1999).

Table 1: Similarities and differences between public and private sector organizations

Feature	Public Sector	Private Sector
General Strategic Goal	mission effectiveness	competitiveness
General Financial Goals	cost reduction; efficiency	profit; growth; market share
Values	accountability to public; integrity; fairness	innovation; creativity; good will; recognition
Desired Outcome	customer satisfaction	customer satisfaction
Stakeholders	taxpayers; inspectors; legislators	stockholders; owners; market
Budget Priorities Defined by:	leadership; legislators; planners	customer demand
Justification for secrecy	national security	protection of intellectual capital; proprietary knowledge
Key Success Factors	best management practices	growth rate; earnings; market share
	sameness; economies of scale	uniqueness
	standardized technology	advanced technology

Performance management implementation should help public sector organizations to address the performance challenges they face. Some of them are listed below.

Satisfy stakeholders' needs and expectations. Performance management involves setting objectives and targets that are in accordance with stakeholders' needs and expectations. It focuses the organizations' resources and efforts toward achieving results that will provide appropriate benefit to their stakeholders.

Results improvement within resource constraints. Public sector organizations are constantly challenged to provide high-quality services and improved outcomes within limited resources. Performance management addresses this challenge by promoting the application of effective and efficient approaches and by encouraging a culture of continuous improvement in order to get the best results for the least amount of resources.

Commitment to better serve the public. In an era of complexity and rapid environment changes, it is necessary to engage all public employees, not just top officials and managers, in finding ways to better serve the public. All public employees should be committed to provide the best service to the public.

The need to gain and keep the public's trust and confidence. Performance management improves accountability and supports confidence in public sector organizations not only by enhancing organizations' ability to communicate performance information but also by giving organizations the right tools for improving results.

Performance management in the public sector organizations should be based on following principles (National Performance Management Advisory Commission, 2010):

- A results focus permeates strategies, processes, the organizational culture, and decisions;
- Information, measures, goals, priorities, and activities are relevant to the priorities and well-being of the public organizations and the community;
- Information related to performance, decisions, regulations, and processes is transparent — easy to access, use, and understand;
- Goals, programs, activities, and resources are aligned with priorities and desired results;

- Decisions and processes are driven by timely, accurate, and meaningful data;
- Practices are sustainable over time and across organizational changes;
- Performance management transforms the organization, its management, and the policymaking process.

Performance management uses evidence from measurement to support planning, funding, and operations within the public sector organizations. Better information enables elected officials and managers to recognize success, identify problem areas, and respond with appropriate actions in order to provide better services to the public.

3. DEFENCE PERFORMANCE MANAGEMENT

Performance management plays very important role in developing of defence capabilities that are necessary for protection of national security and national interests.

Defence performance management is an ongoing and iterative process. Figure 2 presents circular-flow model of defence performance management (Angelis, D., Webb, N., 2009).

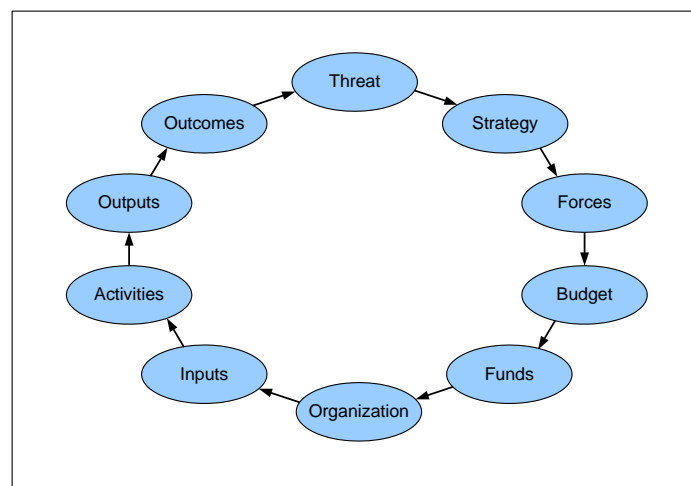


Figure 2: Circular-flow of defence performance management

Beginning at the top with threats, responsible governmental body develops defence policies and strategies based on an assessment of the threat environment. The next step is developing of plan for forces needed to implement the policies and strategies and prepare budgets for personnel, equipment, and other inputs needed to provide defence activities.

Once appropriations are enacted, different types of funds flow to organizations through different apportionments. Each defence organization provides inputs (personnel, materials, infrastructure, etc.) needed to undertake its own activities and missions. Activities combine and engage the inputs to produce outputs.

Efficiency as the quality of being able to do a task successfully, without wasting time, money or energy is reflected in the “inputs to activities to outputs” part of the model. Rather than focusing on budgeting processes, efficiency requires understanding the outputs, including the ability to measure outputs and assign them to the inputs used to generate them. Efficiency answers the question, *are we doing things right?*

Effectiveness comes from the “outputs to outcomes” part of the model. It describes how well the defence outputs performed relative to the strategies or high-level goals that the organization set out to achieve. Effectiveness also answers the question, *are we doing the right things?*

Outcomes are results, consequences, effects, or impacts of direct importance to stakeholders. Outcomes depend on the generated output and on the interaction of the output with the environment and the

interpretation of stakeholders as to the success of that interaction. For example, reaching the goal of providing national security could be measured by how members of the public feel about whether they are “safe”, whether “we are winning the battle”, or “how many attacks occur daily”. Clearly, there are many measures, each with some utility for a particular audience and none fully measuring the „success” of the goal of providing national security (Angelis, D., Webb, N., 2009).

Desirable metrics flow from the goals and show whether the defence is effective and efficient. Developing useful measures requires some understanding of types and characteristics of good measures.

There are three different types of performance measures: natural measures, constructed measures, and proxy measures (Keeney, R., Gregory, R., 2005).

Natural measures are in general use and have a common interpretation. Most natural measures can be counted or physically measured. They also have the property that they directly measure the degree to which a performance target is met. For instance, if the objective is to minimize cost, then we can directly measure how well we achieve that objective in dollars, because the dollar is a natural measure for cost.

Often, particularly in the public sector, it is difficult to find a suitable natural measure. In such cases, we might use a proxy measure, that is, one that is related to the performance target but does not measure it directly. For instance, if we want to measure personnel safety, we might use the number of accidents as a proxy measure.

In many cases, there is no clear understanding of how defence performance should be measured, so it might be necessary to use a constructed measure, one that describes different levels of achievement and assigns a numerical value to each level. To assess, for instance, a safety hazard, a simple constructed scale might be: 5 - Fatal injury; 4 - Permanent disabling injury; 3 - Disabling injury; 2 - Injury causing time off work and 1 - First aid only. Constructed scales involve some degree of subjectivity; therefore, each level must be carefully described to reduce ambiguity.

Finding the right measures requires careful consideration of many parameters. In addition, the measures should have some properties. Keeney and Gregory suggest following five desirable properties to keep in mind as we develop measures (Keeney, R., Gregory, R., 2005):

1. **Unambiguous** - The relationship between the measure and the performance target should be clear and easy to interpret;
2. **Comprehensive** - All possible levels of performance are covered by the measure;
3. **Direct** - The measure should directly reflect the desired performance;
4. **Operational** - The data being used to measure performance is available or can be obtained with a reasonable amount of cost and effort;
5. **Understandable** - Everyone agrees on what is being measured and how it will be measured.

The development and selection of defence performance measures are complex and difficult tasks. Measuring performance in the defence sector generally requires the use of proxies to substitute for direct measures of outcomes and/or constructed measures related to desired outcomes and may require similar measures of outputs. Good measures provide decision makers with useful information while encouraging desirable behaviour that contributes to the achievement of goals and objectives.

4. DEFENCE BALANCED SCORECARD

The key to any successful organization is its ability to create and sustain value production today and into the future. The use of the balanced scorecard can play a vital role in helping organizations achieve that goal.

Initially proposed as a performance measurement system, the Balanced Scorecard concept evolved over time to a more comprehensive performance management system, to finally be transformed in a strategic management system for managing organizational performance and presenting a more “balanced” view of organizational performance.

The balanced scorecard is a strategic planning and performance management system that is broadly applicable to organisations regardless of size or type. It is widely used across sectors and increasingly in the public sector.

The balanced scorecard is used by strategic decision makers to make the right decisions about their business. It provides a method of aligning business activities to the vision and strategy of the organisation, monitoring organisational performance against strategic objectives and, in the process, improves internal and external communication.

Performance management in many ministries of defence is based on the balanced scorecard approach. Ministries of defence adapted the original Kaplan and Norton balanced scorecard model so that it better serves their requirements. The balanced scorecard enables the defence management to monitor performance, both current and forecast, in pursuit of strategic objectives.

The UK Ministry of Defence applied the balanced scorecard for many years. At the beginning, the scorecard had the four perspectives of Purpose, Resources, Enabling Processes and Future. In 2009, they made same adjustment and replaced Purpose with Outputs perspective (Figure 3). The perspectives cover the whole of the defence principal areas of business. Performance against each of the objectives is assessed on a quarterly basis.

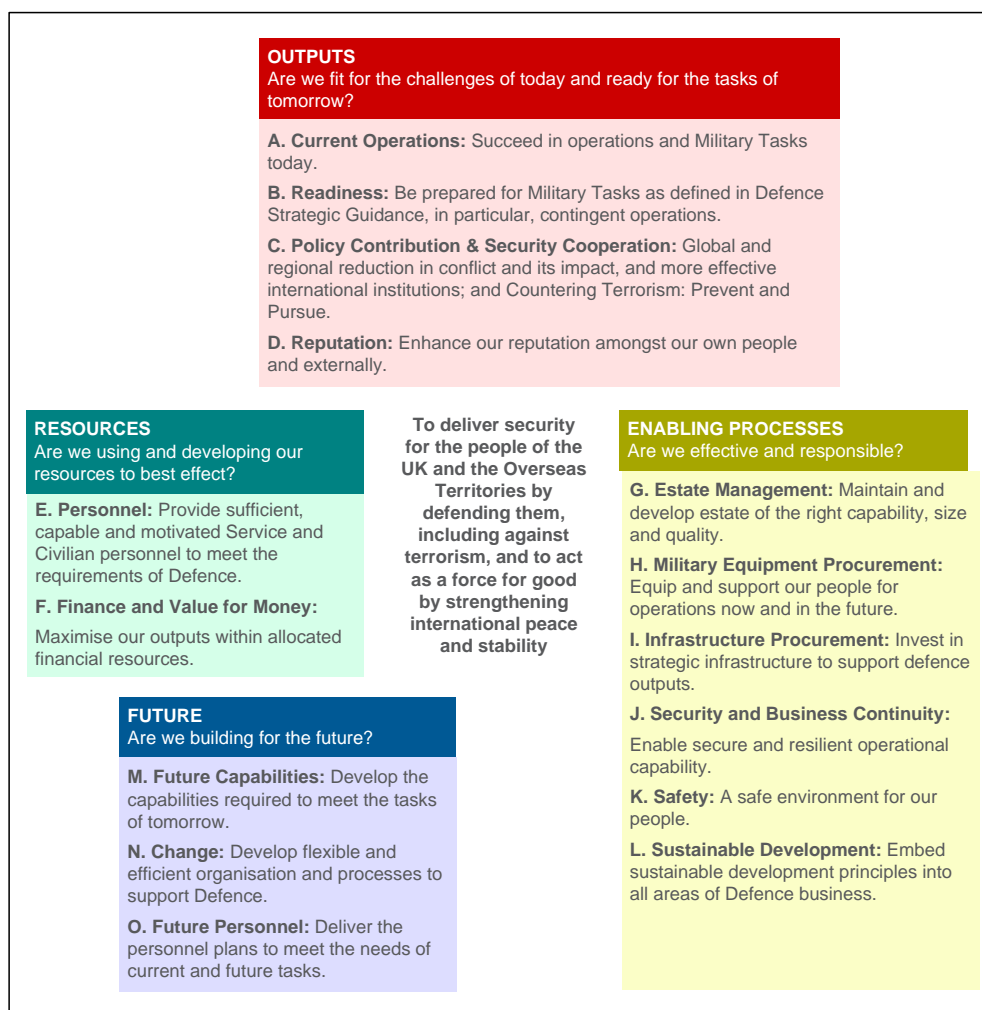


Figure 3: UK Defence scorecard (UK Ministry of Defence, 2009)

In 2010, the UK Ministry of Defence decided to manage defence performance through the new Defence Performance framework. Quarterly, a Performance and Risk Report is produced in order to show progress in implementing the Defence Board Strategic Objectives from the plan. Annually, on the rolling basis, Sub Strategies owners and Top Level Budget holders report on implementation of their Sub Strategies. Strategic Performance Risk Report is produced as well, in order to enable the Defence Board to evaluate and adjust Strategy (UK Ministry of Defence, 2010).

One of the key characteristics of the Canadian Department of National Defence (DND) Performance Management framework is the Balanced Scorecard. The Balanced Scorecard includes following four perspectives: Shape future defence and security outcomes; Deliver defence outputs; Manage program resources, and Professional, effective and sustainable defence team. For each perspective, key strategic objectives are established and the cause and effect linkages are established between them in the Strategy Map (Figure 4). Key performance Indicators are identified under each perspective, linking the strategic goals with the Defence Task and Change initiatives (Gillis, 2004).

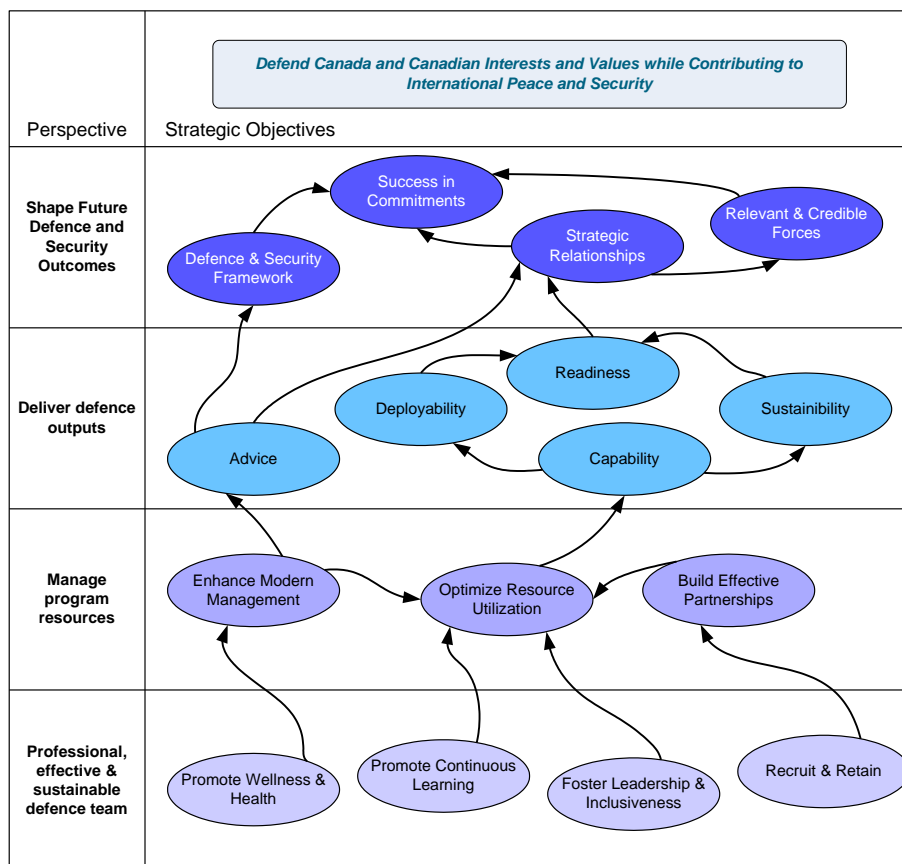


Figure 4: Canadian Defence Strategy Map (Gillis, 2004)

The Ministry of Defence of the Republic of Serbia is developing own strategic performance management system which purpose is to support accomplishment of strategic objectives and development of an entire defence system. Major strategic performance indicators and metrics are defined through the planning, programming, budgeting and execution process that is introduced in 2008.

The Serbian Defence System recognized a balanced scorecard as a useful tool for strategic performance management, but a process of strategy map development is not over. Strategic defence objectives are defined into Long-term defence system development plan that is adopted by National Assembly in 2011. The basic orientation is to develop defence capabilities through performing task within main capability inputs: doctrine; organization; training; material; personnel; leadership; facility; and interoperability.

6. CONCLUSION

Defence performance management is an ongoing and iterative process that requires a sustained effort. It is a constantly evolving process that supports producing appropriate results for the institutions and the public.

Strategic performance management plays very important role in developing of defence capabilities that are necessary for protection of national security and national interests. The development and selection of

defence performance measures are crucial issues for providing decision makers with useful information while encouraging desirable behaviour that contributes to the achievement of goals and objectives.

The balanced scorecard is a strategic management system that enables defence institutions to clarify their vision and strategy and translate them into action. It provides feedback around both the internal business processes and external outcomes in order to continuously improve strategic defence performance and results.

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THEORETICAL AND METHODOLOGICAL APPROACHES TO MODELS OF PERFORMANCE MEASUREMENT

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Abstract *In order to evaluate theoretical approaches and methodological steps of models for the measurement of business activity, success and structural disorders in business, this paper will address the measuring of performance of business companies in the fields of metallurgy, chemical, pharmaceutical and food industries in Serbia. The research will be based on a sample of 30 financial statements of companies in the mentioned industries in 2009 and 2010. Using Kralicek's Quick Test, Altman's EMS Model, Kralicek's functions of discrimination and The Growth Equilibrium Model, the paper will present current business activities and performance of industrial companies in Serbia. Measuring business performance of industrial companies is intended to indicate a limited ability of the model and highlight the need for a more comprehensive access to all the factors affecting business performance in order to have better conditions for making relevant conclusions.*

Key words: *business performance, models, industrial companies*

INTRODUCTION

There is a lot of challenges according to the company management in the contemporary business conditions. The initial assumption of an efficient company management is developed system of measurement, which requires that the system of performance measurement should be improved. The system of performance measurement is an integral part of the control and management systems of companies. Performance measurements have been valuable tools in achieving setting goals and implementing defined strategy of enterprise. Like all tools, they need periodic review to eliminate some, update others, and add new ones in order to meet changing needs in changing business conditions. Measuring business performance develops need for identifying key market and structural factors. In this direction, evaluation of business performance operations is the need of company's management.

More efficient and effective performance measurement system, better implementation of defined strategy in the function of next vision and mission of company. Performance measurement provides a more efficient management, more successful control of management and more efficient operation of companies in the contemporary business (Neely, 1998, str.15). By process of measurements are therefore identify the company's resources and determine the key factors that have impact on its performance. Performance measurement, based only on the use of financial indicators, does not meet the needs of modern companies, due to the limited predictive ability in business performance and future possibilities for their improvement. Therefore, in addition to access to performance measurement which primarily includes financial ratios, there often should be taken into account the non-financial ratios which represent a significant criterion for making conclusions about the success of their business.

1. THEORETICAL APPROACH TO THE ANALYSIS AND EVALUATION OF MEASURING BUSINESS PERFORMANCE

The performances of the company include the company's ability to grow and develop through business activity. Building an effective system of company management requires the development of effective performance measurement system. Performance measurement system links the company's strategy with current operations, providing relevant information on the achievement of the objectives in the function of defined strategy. By measuring the performance of companies, we come to the conclusion about the ability and resources of companies, and the current position of the company in order to define measures for the possible improvement of company performance (Andric i Vukovic, 2011, pp 509). There would be derived evaluation from business operations by monitor, analysis and evaluate performance, based on the financial

statements that reflect the use of company resources. Financial ratios are usually presented in the form of model in order to predict difficulties in the functioning of business companies. In accordance

with these, there were developed models which analyze the general situation of business companies. This group of models, among others, belong Kralicek's Quick test, Altman's EMS model and Kralicek's functions of discrimination. Application of these models is based on the assumption that the company emerges as a purposeful system that is able to form intent, to build a meaningful resources and instructions how to use resources, taking into account the fact that the signs of crisis and instability are result of the transition to a higher level and form of development (Tintor, 2009, pp 403). Taking this into account, the application of these models should allow making conclusions about a healthy business companies or state of existence of structural inconsistencies in the business.

Kralicek's Quick test, as one of the models that analyze the general situation of business companies, is based on the two sets of indicators that measure the financial strength and earning ability of the company. In this regard, it is therefore, the areas of financing as a potential of the company and incomes as a way of using potential. Indicator of the financial situation is measured by the ratio of equity to total sources of financing and the ratio of a year generated cash flow to debt reduced by current assets. Indicators of measuring the financial strength should indicate the indirect coverage of property and protection against risk, by determining the time period for payment of liabilities based on inflow from operating business companies (Tintor, 2009, pp 393). The ability of investing assets to result in some yield and the height of cash flow in company's income reflect the company's ability to earn or to use resources.

General empirical studies conducted in the United States have led to the creation of EMS model (Emerging Market Scoring) in order to assess the financial health of companies based on the previously developed Altman's model. The original Altman's model was one of the most famous and applicable models for predicting bankruptcy. Looking at the ratio of working capital to total assets, retained earnings to total assets, gross profit to total assets, market value of equity to book value of liabilities, incomes from sales to total assets, there was developed a model that found its application in companies quoted on the Stock Exchange. In further research, there was replaced market value of equity by carrying value of equity and on these bases has developed a revised Z score model whose aim was to show the structural distortions in business. Based on this model, in further efforts was developed EMS model (Emerging Market Scoring) for markets outside the U.S., based on the first four aggregate indicators, as most general criterion for assessing the financial strength of companies. According to the conducted research in 2011 year, indicators of business performance had some weaknesses that were manifested in the limited ability of prediction (Muminovic i Pavlovic, 2011, pp 363).

After developing Quick test, Kralicek paid attention on the development of new measurement of company's performance, in order to create models that lead to early indications of structural disturbance and disturbed capacity for long-term business success. In this regard, Kralicek was developed an indicator, called function of discrimination, based on six parameters that determine the ability of companies business. Ratio of net cash flow to liabilities, total assets to liabilities, gross profit to total assets, gross profit to operating income, inventories to operating income, operating income to average assets represented the new sets of measurement of business and success of companies.

All these models are aimed at identifying the strengths, resources, efficiency and measurement of key success factors of business. They should react to weaknesses and critical areas of business. However, it has often not assumed the identification of existing critical areas, but also requires consideration of the initial phase of development of critical areas. In this direction, there should be examined what is the structure of compliance with the dynamics of operating income. To look into this structure, there has developed a model called Growth Equilibrium. This model presents the growth rate of the volume of business or operating income that the company earns from cash flow in operating activities (Walsh, 1996, pp. 198). Because it is a balanced growth, it can be achieved only through a business that is not characterized by any surpluses or shortages of cash. By measuring the ratios of retained earnings to sales, ratios of current assets to sales and the rates of growth of sales, there is determined the size of the cash flow through a combination of these three groups of indicators. Thus, by determination of the parameters of growth, ratios of business income to retained earnings and current assets which in the relationship with income affect the formation of cash flow, it can be concluded that the amount of cash flow is proportional to the combination of this values.

2. METHODOLOGICAL APPROACH TO THE ANALYSIS AND EVALUATION OF MEASURING BUSINESS PERFORMANCE

Methodological approach to analyzing and evaluating business performance has perceived the business activity with the potential signaling disturbed ability for long-term successful business of companies in the food, metal, chemical and pharmaceutical industries in Serbia in the period 2009-2010. The performance of business operations are measured based on the Kralicek's Quick test, Altman's EMS model, Kralicek's function of discrimination (Table 1) and Growth Equilibrium model (Table 2). The study was based on a sample of 30 financial statements of industrial companies which are available on the official website of the Agency for Business Registers.

Table 1: Indicators of Business Performance of Industrial Companies in Serbia by Kralicek's Quick test, EMS Model and Kralicek's function of discrimination

Indicators	Metal industry		Chemical and pharmaceutical industry		Food industry		Reference Values of Indicators
	2009	2010	2009	2010	2009	2010	
1.Kralicek Quick test							
1.1 Equity share in total of liabilities and equity	59.49%	48.44%	43.92%	28.34%	30.65%	43.92%	50%-50% traditionally financing rule, 60%-40% optimal structure of capital
1.2 The rate of return	-0.30%	3.87%	2.93%	1.39%	2.77%	2.93%	>1, higher the value of indicator
2. Z scor EMS model	2.79	3.52	4.95	3.98	4.94	5.99	Z scor<1,1= distress zone 1,1<Z scor< 2,6= gray zone Z>2,6=safe zone
3.Kralicek's function of discrimination	-3.75	1.38	1.62	-0.11	1.47	1.45	1-the average company 2-very good company 3-excellent company

Starting from Kralicek's Quick test and taking into account its limited power to predict, by using this model to evaluate the performance of industrial companies in Serbia, we can conclude that the situation is not at a high level (figure 1, figure 2 and figure 3). By measuring the financial strength of companies on the basis of established indicators of Quick test, the results showed that the company in any industry can not cover liability by cash flow from business operations, since the value of the indicator is negative in both years, with a tendency of slight deterioration in the dynamics. Therefore, companies were characterized by threatened financial power as a result of inability to cover liabilities. By far, the worst financial capabilities had companies in the field of metal industry, which was characterized by the lowest participation of someone else's capital (not it's own) in total of liabilities and equity with 40.51% in 2009 year and 51.56% in 2010. year. The companies in chemical and pharmaceutical industries were largely indebtedness, and there was a negative trend since the indebtedness increased in the dynamics. In this regard, on the one dinar of equity came 0.72 dinars of debt in 2010, unlike 2009 where on the one dinar of capital came 0.69 dinars debts. The share of equity in total of liabilities and equity of companies in the food industry were increasing from 30.65% in 2009. to 43.92% in 2010., but the ratios of their own and someone else's capital in the structure of liabilities was not in accordance with the requirements of the traditional rules of financing or optimal capital structure that provides the minimum average weighted cost of capital after tax, and thereby maximize the value of the

company (Rodić, Vukelić, i Andrić, 2011, pp. 224). The main cause of the increase in indebtedness was the loss of long-term funding and lack of working capital.

The dynamics of the power of making profit of industrial companies in Serbia indicated that the lowest level of return on capital had the companies in the chemical and pharmaceutical industries. However, if takes into account the situation in the European Union, we would come to a completely opposite trend which indicate that the major industrial areas were precisely in the field of chemical and pharmaceutical industries. There was a decline in the rate of return, with minor 2.93% to 1.39%. in 2010. In the food industry recorded a slight increase in the rate of return on capital from 2.77% in 2009. to 2.93% in 2010. In observed time period, the food industry as a labor intensive industry was characterized by the largest decline in participation in Europe. Threatened profitability was characterized companies in the metal industry in 2009, because there was the loss as a measure of return of invested capital. Low profitability and productivity of industrial companies were the result of weakening economic strength, low purchasing power of domestic and weak competitiveness of the foreign markets. The slight improvement in terms of the rate of return on invested capital was characterized company in metal industry in 2010, transferring from zone of loss to zone of gain, achieving return on equity of 3.87%. Generally looking at industry as a whole, there was recorded an unsatisfactory level of utilization of industrial capacity of only 43.4% in 2009. (Ministry of Economy and Regional Development, 2011, www.ntp.rs) This statement was consistent with the general trend of business operations in Serbia and the dynamics of the power of making profit, which indicated that there were existed a low degree of return on investment and a weak economy and rational use of resources. The amount of cash flow in the company's income recorded a positive trend in food, chemical and pharmaceutical industries. The amount of cash flow in income from core activities of the company was little contributed earning capacity. The largest negative effects of operations reflected in the metal industry which was characterized by lower cash flows from operating activities. Taking into account the importance of the metal industry for the economic development of certain industries and the region due to the production of almost all means of production and reproduction of a large number of materials, it was evident that the reduced inflow of cash would have impact on other industries. Considering these facts, by using Quick test, we concluded that the way of using potential and the level of earning power were indicated an unenviable ability of the business of industrial companies in the reporting period. The most favorable trends was characterized the food industry, while the most threatened business performance was recorded companies in the metal industry, which was completely understandable according to the situation in the production and processing of metals in Serbia in observed period. The reduced volume of business and risk of low ability of earning power were indicated the reduction of economic power and potential of business in the reporting period. Of course, all results should be interpreted with caution. If it is concluded that the business ability of the company is not at a high level, based on data from financial statements, and if the predictions based on this information is not promising, it will not necessarily mean that the operating ability of companies is threatened in the following period. For this assessment is necessary overarching insight into the internal and external factors and circumstances of business companies with information on whether the companies entered into the process of restructuring and improving its performance. A comprehensive review, among other things, requires information on the amount of risk factors, retail prices of products, market position of vulnerable products industry, the intensity of the yield per unit of industrial capacity and physical consumption.

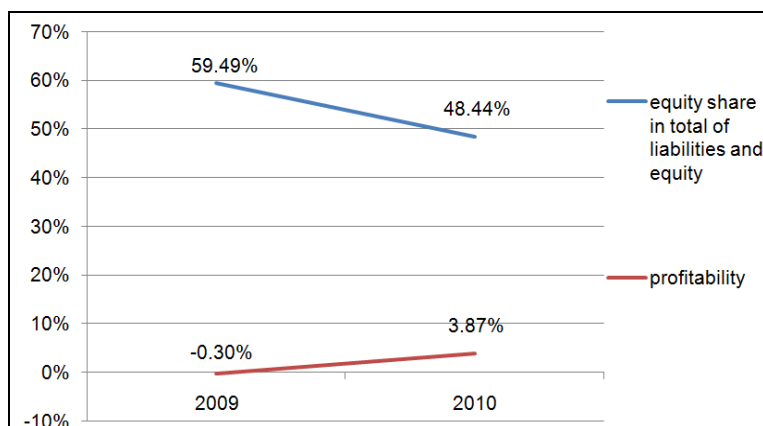


Figure 1: Performances of Metal Industry according to Kralicek's Quick Test

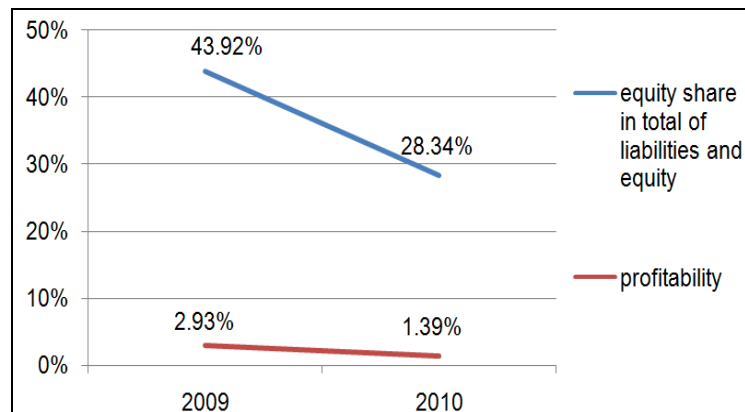


Figure 2: Performances of Chemical and Pharmaceutical Industry according to Kralicek's Quick Test

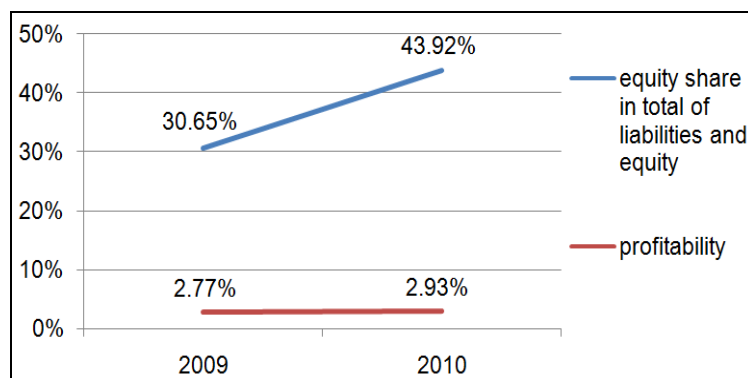


Figure 3: Performances of Food Industry according to Kralicek's Quick Test

Taking into account the limited power of prediction, by using the EMS model as a measurement for performance of business companies in Serbia, we came to the conclusion that the metal, chemical, pharmaceutical and food industries were recorded good business results, which characterized safe zone in the business, according to the reference values of EMS model (figure 4).

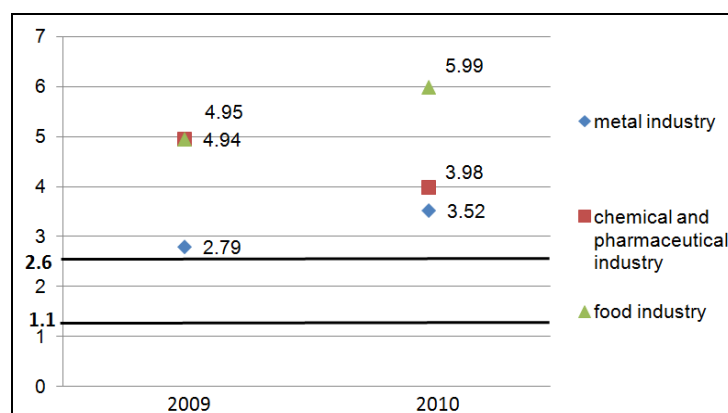


Figure 4: Performances of Industrial Companies in Serbia According to EMS Model

Using Kralicek's function of discrimination, we could conclude that the best business performances were recorded companies in the food industry (figure 5). The negative value of the indicator of function of discrimination in 2009 year had companies in the metal industry or companies in chemical and

pharmaceutical industry in 2010 year, according to the scale of function of discrimination, which was indicated threatened financial viability of the company. In order to comprehend the causes of disadvantaged

of business performance, we should examine the dynamics of the fall in the volume of production, speed of reduction in incomes and whether and to what extent companies are able to cover accrued current liabilities resulting from a reduced volume of business. A low production base of industrial production had evident impact on vulnerable business performance, and which, among other things, characterized by unfavorable interest rates that limited investment in expanding production and lack of financial resources for investment in industrial production.

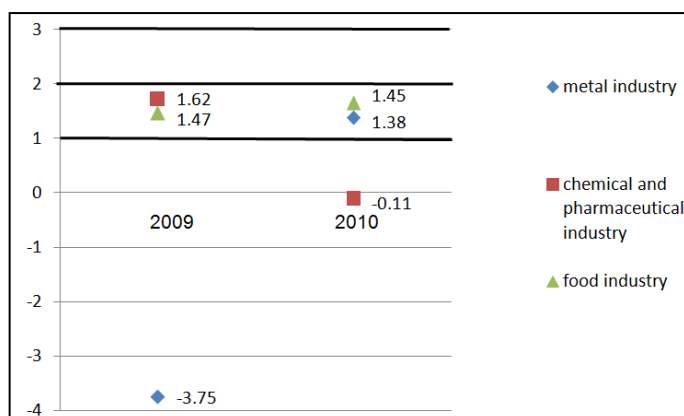


Figure 5: Performances of Industrial Companies in Serbia According to Kralicek's Function of Discrimination

The role of these models in evaluating performance of business was primarily aimed at signaling the structural disorders or unfavorable indicators to continue business in the future. However, if you want to look at the dynamics of business performance through compliance with the volume of business or the scope of operating income, a more representative model for the application is the model of Growth Equilibrium (Table 2). The application of Growth Equilibrium indicated that there was a balanced growth for the business of companies in the field of metal and food industry in 2010. This was largely the result of low growth of income compared to the volume of assets which was implied reduction in turnover ratio as an indicator of the ability of business companies. Reducing in the volume of business activity suggested a reduced cost-effectiveness and efficiency of use of resources, without providing adequate volume of earnings as a source of financial resources. In addition of course, it should be examined the level of solvency, efficiency and increasing capacity in the future with additional costs associated with the survival of existing and breaking into new markets. Economic conditions are a key factor in the dynamics of volume of economy, with the appropriate determinants of balanced growth, on the basis of compliance between the rates of growth and height of cash from operating activities.

Table 2: Indicators of Business Performances of Industrial Companies in Serbia by Growth Equilibrium

Indicator of Growth Equilibrium	2009	2010
Metal industry	-0.05	0.20
Chemical and Pharmaceutical Industry	4,65	2,58
Food Industry	1,44	-5,25

CONCLUSION

Performance measurement is aimed at understanding the results of operations or production volume, total revenue, profit and consumptions and investments to achieve these results in order to determine the capabilities, potential and efficiency of business operations. Theoretical and methodological models of diagnosis status and performance of business companies in the fields of metallurgy, chemical, pharmaceutical and food industries in Serbia were aimed to show the possibility of these models in

evaluating business activities and the ability for long-term successful business enterprise. Using Kralicek's Quick test, EMS models, Kralicek's function of discrimination, the model of Growth Equilibrium was pointed

to a variety of adverse trends and performance indicators of industrial companies due to, among other things, threatened financial strength and a minor degree of the rate of return. Since these models are characterized by different parameters for assessing business performance, according to the criteria of reference values, we have two different situations: according to one model, performance of the company are categorized as threatened business performance, while according to other model, performance of the company are categorized in the safe zone of operation with healthy business performance. According to these facts, we should interpret these results with caution, because of the evident weaknesses in the evaluation of business performance. Extent to which these models can be taken and how representative the results of their use in measuring the performance of business are, without considering the other circumstances of the matter, undoubtedly requires a more comprehensive approach to business performance measurement.

Taking into account the limited predictive ability, theoretical approach to applied models and the results achieved with its implementation, we perform a single conclusion that for representativeness and usefulness of the results of performance measurement of business operations, we should gain a comprehensive insight into the circumstances, key factors and economic conditions which have directly or indirectly impact on business performance.

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EXPLORING THE MECHANISMS FOR IMPLEMENTING A RISK MANAGEMENT PROCESS: OVERALL APPROACH AND PRACTICAL EXAMPLE

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Abstract: *The aim of this paper is to explore the mechanisms for implementing a risk management process into an organisation. A way of exploring the mechanisms for implementing a risk management process is to break it down into its component parts and examine what each part should contribute to the overall risk management process. The main aim of the empirical part of the paper is on the other hand to present empirical research of risk management focusing on forecasting sales using a neural network method. A neural network is a powerful data modeling tool that is able to capture and represent complex input/output relationships. Integrating an overall risk management process into an organisation can significantly improve the respond of an organisation to unplanned events (good or bad) and rises its ability to compete, not to mention the objectives of an organisation are easier to achieve and resources are allocated effectively. Applying neural network method produced consistently accurate sales forecast. However, effort should be put in proper preparation of dataset. This paper has a tremendous added value for all risk management officers, CFOs and all others involved in risk management process. The added value is shown in the description of theoretical risk management model which is upgraded with a practical approach example.*

Keywords:

1. INTRODUCTION

Risk is inescapable in business activity. Economic activity by definition commits present resources to an uncertain future. The one thing that is certain about the future is its uncertainty, its risks. Hence, to take the risks is the essence of economic activity. Nearly all operational tasks and processes are now viewed through the prism of risk (Chapman, 2011). Risk has become shorthand for any corporate activity. It is thought not possible to create a business that does not take risks. The end result of successful strategic direction setting must be capacity to take a greater risk, because this is the only way to improve entrepreneurial performance. Organisations that are more risk conscious have for a long time known that actively managing risk and opportunity provides them with a decisive competitive advantage. Taking and managing risk is the essence of business survival and growth.

Enterprise risk management is a response to the sense of inadequacy in using a silo-based approach to manage increasingly interdependent risks. Enterprise risk management is about understanding the interdependencies between the risks, how the materialisation of a risk in one business area may increase the impact of risks in another business area (see for example Duckert, 2011; Moeller, 2011; Monahan, 2008). Under enterprise risk management all risk areas should function as parts of an integrated, strategic and enterprise-wide system. While risk management is coordinated with senior-level oversight, employees at all levels of the organisation using enterprise risk management are encouraged to view risk management as an integral and ongoing part of their jobs (Fraser and Simkins, 2010).

Early empirical work on enterprise risk management investigated why companies adopted enterprise risk management and most studies utilized survey data. The first study by Colquitt, Hoyt and Lee (1999) investigated the characteristics and extent of integrated risk management. They found that political risk, exchange rate risk and interest rate risk were the three most common nonoperational risks handled by the risk management department. Other early work on enterprise risk management included a focus on the determinants of enterprise risk management. Liebenberg and Hoyt (2003) compared firms that appointed a chief risk officer to a matched sample. They found that firms that appoint a chief risk officer are more likely to be financially leveraged. Similar study can be found in Pagach and Warr (2008). More recent work on enterprise risk management has examined additional determinants of enterprise risk management adoption (see for example Desender, 2007; Beasley, Pagach and Warr, 2008). The earlier studies moved beyond the enterprise risk management adoption question and examine the aspects of whether enterprise risk management adds value. Gates, Nicolas and Walker (2009) extend the early work by examining the value seen inside the company as measured by better decision making and increased profitability.

Without a shadow of a doubt, businesses nowadays operate in an entirely different environment compared with just a few years ago. The adoption of expansion strategies, such as investment in emerging markets, developing significant new products, acquisition, organisational restructuring can all increase an organisation's risk exposure. The main aim of risk management process, as seen as one of the structure of enterprise risk management, is to ensure that organisation is able to respond to unplanned events (good or bad) and rises its ability to compete. The process is successful when enough scenarios are prepared to capture as many different risks as possible and the way how to handle it. In the first stage, the goal of risk management process and people included in such process is to incorporate risks and different scenarios in business and strategic planning of organisation and at the same time to provide the top management with information on current business environment.

The aim of this paper is to explore the mechanisms for implementing a risk management process into an organisation. A way of exploring the mechanisms for implementing a risk management process is to break it down into its component parts and examine what each part should contribute to the overall risk management process. The main aim of the empirical part of the paper is on the other hand to present empirical research of risk management focusing on forecasting sales using a neural network method.

The paper is structured as follows. The introduction is followed by an overview of the risk management process where the proposed stages of the process are described in detail. It is followed by an empirical example of risk management applying neural network method. The paper concludes with a short summary of the main findings.

2. THE RISK MANAGEMENT PROCESS

A way of exploring the mechanisms for implementing a risk management process is to break it down into its component parts and examine what each part should contribute to the overall risk management process. It is proposed here that the risk management process is broken down into the following stages: organisation, methodology, setting the sources of risk, keeping the process up to date. While activities follow a largely sequential pattern, it may be an iterative process over time. For example, as new risks are identified the earlier processes of identification and analysis are revisited and the subsequent processes are repeated through to the implementation of risk response action. The proposed stages are described in detail below.

2.1 Organisation

The risk management process represents strategically important process which can in certain situations act as a framework for changes in business decisions. That is why the process functioning is connected with the top management directly (usually it operates under the chief financial officer) and what is more, the flow of information is provided to the highest levels of organisation.

On the other hand it is important that identification of operational risks is suitably managed and that adequate controls are available to regulate the risk management process. In such a manner a completely newly identified or changed risks should be managed as soon as possible. To be able to ensure that, the roles and responsibilities in the risk management process have to be clearly defined. The board of directors (top management) at the top level is empowered with the authority to confirm and directly track the risk management process, whereas the subordinate body consisting of key process representatives is given the authority to ensure the efficiency and effectiveness of the process functioning. At the operational level there is an ongoing risk management process as a composite part of current processes and represents a mindset of each and every employee. Operational identification, assessment and management is implemented by system trail, which is the fundamental for trend analysis of constant risk management process improvements over the time period.

2.2 Methodology

The methodology which is usually implemented in risk evaluation is based on interaction between the likelihood of risk and consequences that might the risk impose to the business process or to organisation as a whole. When we try to define the probability, it is important to take into consideration the history of a certain event as well as the estimated frequency of such an event (for example the event occurs on each x's repeated process).

According to the mutual influence of both risk parameters, it is presented as a product of numerically estimated levels. Risk management strategy is defined according to the obtained results and represents a framework for setting certain actions and the deadline until the actions has to be taken. A set of actions is implemented periodically (determining the activities, deadlines and decision makers) and is known as risk treatment plan. On the level of a business group unified risk management is especially a great challenge in the area of providing the compatibility of methodologies. For certain areas, processes the more sophisticated methodologies are used, whereas the results of such methodologies have to be adjusted in accordance to be a logic complementary of an overall risk assessment.

2.3 Setting the sources of risk

A way of setting the sources of risk is to consider that risk emanates from two primary areas (see figure 1): from within the organisation itself (labelled as internal risk) and from the environment or context within which the organisation operates and over which it has no control (labelled as external risk). Such classification shows the relationship with the international risk standard ISO 31000 respectively.

What is more, setting the sources of risk in the overall process is as much important as the proper use and suitably chosen optimisation method for risk evaluation. The value of a risk management process is reduced without a clear understanding of the sources of risk and how they should be responded to. It is expected to carefully examine the sources of risk in order not to forget any to include into a catalog of risk. The catalog of risk consists of a set of predetermined risk where each is described with additional parameters needed to properly estimate the risk.

Financial risk	
Internal risk	External risk
<ul style="list-style-type: none"> Internal financial control / Internal audit Fraud exposure Historical liabilities Investment Capex decisions Liquidity and cashflow 	<ul style="list-style-type: none"> Risk of accounting standards Interest rate risk Currency risk Credit risk
Infrastructure risk	
Internal risk	External risk
<ul style="list-style-type: none"> Personnel risk (new employees) Risk of proper qualifications and competencies Health risk and safety at work Working environment risk Computer /IT systems risk 	<ul style="list-style-type: none"> Communication risk Distribution risk Suppliers/contractors risk Terrorism Natural catastrophe Epidemics
Reputation and goodwill risk	
Internal risk	External risk
<ul style="list-style-type: none"> Brand and name expansion Structure of a board Control environment 	<ul style="list-style-type: none"> Product recalls risk Social responsibility risk Public image risk Legal risk Competition risk (unfair)
Market risk	
Internal risk	External risk
<ul style="list-style-type: none"> Mergers and acquisitions risk Research and development risk Intellectual property risk Contractual risk 	<ul style="list-style-type: none"> Economic risk Technological development risk Competition risk on the market Demand risk and users needs risk on the market Legal and market needs risk

Figure 1: Setting the sources of risk

Risks that are monitored during the risk management process represent the set of risk. It is written and evaluated in the catalog of risk which has to be kept up to date by the whole team which is devoted to risk management process in the organisation. It should have not been forgotten to harmonize the set of risk with business needs as well as with operational functioning of business processes.

2.4 Keeping the process up to date

Keeping the risk management process up to date is the most important factor especially in the area of risk management, which has the impact on efficiency, effectiveness and quality of the overall risk management process. At the highest level it is reflected in the appropriateness of the risk management process according to the business objectives. Within such process the period of checking the up to date process depends on the objectives considered. Business objectives are connected with the strategy and vision of an organisation (organisation's risk) and they do change regarding the branch of industry and long-term objectives of an organisation. For the set of risk and method to evaluate risk we can take an assumption that they are rarely changed, whereas in the case of major changes on the level of organisation's performance they change. These changes are mostly faced when expanding to new business activities or branches of industry, which can be related with acquisitions of new companies, business expansion onto different political-economic zones or when changing critical business partners.

Keeping the risk management process up to date is on one hand dynamic, on the other hand simplified taking into consideration project management or project oriented work where goals and risk are defined by establishing the project or in the stage of preparing project elaborat. Risk here is short to medium-term as in most cases risk is terminated by the project duration (when objective goals of a project are accomplished), partly it is transferred to the subject of a project - usually this is a process (when we want to accomplish earmarked goals of a project).

Process risks are the most operational connected risk as they are connected with the process goals as well as with the resources needed for process functioning. Set of risk can be mapped from earmarked project goals in the case of process that is a consequence of previously implemented project, on the other hand the process set of risk partly indicates the transfer of risk that are connected with the strategy and vision as requests of vision and as well as strategy are delegated to the process level.

Keeping the risk management process up to date is inevitably directly connected with setting the goals no matter the level where they are determined and tracked. When goals change it is always necessary to conduct an audit of risk management process, above all it is necessary to check the catalog of risk and set of controls and measures which are established to managing the risk.

Besides ensuring the suitability of risk management process it is also necessary to take into consideration the influences of external world when conducting risk management. Mostly we deal with process controls performed by external auditors and process consistency with valid standards and recommendations which are valid for the branch of industry and on general in the area of risk management.

If the risk management process is to be up to date we need to regularly supervise the controls and measures which are in the role to manage the risk. This is done by checking whether have the planned risk response actions been implemented or have the potential opportunities been examined and results obtained and to what extent the intensity of controls is used.

3. EMPIRICAL EXAMPLE OF RISK MANAGEMENT

Our empirical example of risk management focuses on forecasting sales using a rich database provided by a company which is a leading manufacturer of home appliances. The motivation for choosing the sales forecasting area is that this area is becoming more important in everyday business, not to mention risks involved here (for example economic downturns, changing trends and fashions, increased competition, manufacturer recalls). Sales forecasting is a crucial part of the financial planning of a business. Good forecasting models can increase efficiency of businesses, they are saving money on excess inventory, increase profit and serve its customers better.

There are several methods that can produce consistently accurate sales forecasts. One of them is neural network which we apply in empirical research. A neural network is a powerful data modeling tool that is able to capture and represent complex input/output relationships. The motivation for the development of neural network technology stemmed from the desire to develop an artificial system that could perform "intelligent" tasks similar to those performed by the human brain. Neural networks resemble the human brain in the following two ways:

1. A neural network acquires knowledge through learning.
2. A neural network's knowledge is stored within inter-neuron connection strengths known as synaptic weights.

The true power and advantage of neural networks lies in their ability to represent both linear and non-linear relationships and in their ability to learn these relationships directly from the data being modeled. Traditional linear models are simply inadequate when it comes to modeling data that contains non-linear characteristics.

The most common neural network model is the multilayer perceptron (MLP). This type of neural network is known as a supervised network because it requires a desired output in order to learn. The goal of this type of network is to create a model that correctly maps the input to the output using historical data so that the model can then be used to produce the output when the desired output is unknown (cited from NeuroSolutions.com).

3.1 Data and variables

Proper preparation of dataset is the most important and with no doubt the most time-consuming step in working with neural networks. It is very important to have the right amount of data. Too much data may increase training time of a neural network and even deteriorate network performance. If we have a dataset with a small number of cases, then the neural network will not have enough information about the problem to train correctly. Our dataset, which is based on historical data on sales, contains 1995 cases. From our primary dataset we also removed data with missing values and detected outliers. We have also carefully chosen the variables that should best represent the problem that we want to analyze. In order to include such variables we firstly performed multiple regression analysis to see which variables statistically significantly influence our dependent variable (that is sales). From table 1 we can see that such variables are brand name and type of product. Other variables (such as month of sales) did not perform statistical significant influence on our dependent variable and were therefore excluded from analysis. Since both independent variables are categorical, we also pay attention that categories for both variables are well presented in different combination to ensure that neural network will be able to find the differences and that the results will be valid and reliable.

Table 1: Statistically significant coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	32,202	1,281		25,142	,000
brand	2,480	,099	,221	25,169	,000
type	-,048	,014	-,029	-3,348	,001

3.2 Empirical application

3.2.1 Analysis

In this step the data is partitioned onto training, test and validation set. The training set is a part of input dataset used for neural network training, i.e. for adjustment of network weights. The validation set is a part of dataset used to tune network topology or network parameters other than weights. The statistical program itself retain the best network (the network with the lowest error on validation set). Whereas the test set is a part of input dataset used only to test how well the neural network will perform on new data. The test set is

used after the network is ready (trained), to test what errors will occur during future network application. This set is not used during training and thus can be considered as consisting of new data entered by the user for the neural network application. The partition of data can be done manually or automatically by statistical program. Our dataset is partitioned accordingly: 68% for training set; 16% for validation set and 16% for test set.

3.2.2 Preprocessing

Preprocessing transforms the data to make it suitable for neural network. For example, scaling numeric values and transforming text values into numeric ones. It is to mention that neural networks work only with numeric data. Numeric columns are automatically scaled during data preprocessing. For input columns (in our case brand name and type of product) scaling range is $[-1..1]$. For the target column (in our case sales) scaling range depends on activation function of the output layer: linear output layer activation function (scaling range $-1..1$); logistic (sigmoid) output layer activation function (scaling range $0..1$); hyperbolic tangent output layer activation function (scaling range $-1..1$); softmax output layer activation function (scaling range $0..1$). In table 2 there are some details of the preprocessing stage.

Table 2: Variable details of the preprocessing stage

Variable	Column type	Format	Scaling range	Scaling factor
Type of product	Input	Numerical	$[-1..1]$	0,068966
Brand name	Input	Numerical	$[-1..1]$	0,083333
Sales	Output	Numerical	$[0..1]$	0,003226

3.2.3 Design

This step helps us to design the most efficient neural network architecture. If we want to design a network, we have to specify the network architecture (number of hidden layers and units in each layer) and network properties (error and activation function). A network with too few hidden units only roughly discovers hidden dependencies in the data whereby the network produces a significant number of errors. A network with too many hidden units will tend to memorize all the data instead of finding relations that also lead to bigger network errors. We have chosen a topology with one hidden layer and with one hidden unit. The neural network architecture most efficient for our case was 2-2-1. Whereas activation functions for hidden layers are (see for example Haykin, 1998; McNeil, Frey and Embrechts, 2011):

- Linear: this function produces its input as its output or in other words, just passes the activation level directly as the output. Its output range is $[-inf..inf]$.
- Logistic: this function has a sigmoid curve and is calculated using the following formula: $F(x) = 1 / (1 + e^{-x})$. Its output range is $[0..1]$. This function is used most often and was selected also in our case.
- Hyperbolic tangent: this function also has a sigmoid curve and is calculated using the following formula: $F(x) = (e^x - e^{-x}) / (e^x + e^{-x})$. Its output range is $[-1..1]$. Empirically, it is often found that this function performs better than the logistic function.

3.2.4 Training

To train the network we selected back propagation training algorithm which is the most popular algorithm for training of multilayer perceptron. However there are some drawbacks such as slow convergence, we need to tune up the learning rate and momentum parameters.

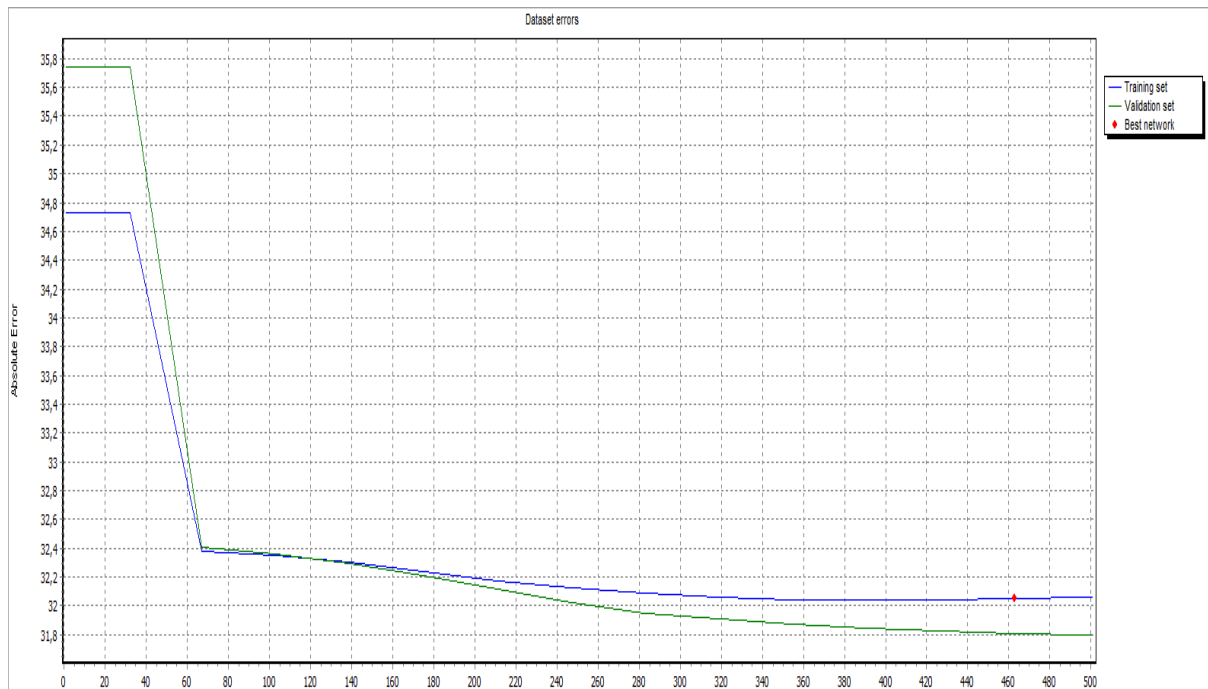


Figure 2: The dataset errors graph

In figure 2 the dataset errors graph plots the average absolute dataset error vs. iteration on training and/or validation set. Because we deal with regression problem, we can see from the graph how the absolute error is reduced from iteration to iteration.

3.2.5 Testing

Network testing is performed after training completion. Testing can help us to analyze performance of the trained network. According to regression situation in our case we have two indication of quality of trained network: absolute error (AE) and absolute relative error (ARE). The difference between the actual value of the target column and the corresponding network output. The difference is displayed in absolute values and in percentage terms. In our case the AE is 32,052541, whereas the ARE is 6,135216.

3.2.6 Query

In this step we can query the trained network either we enter query manually, load the file or we select records from the loaded dataset. From the figure 3 we can see that our trained network performs well as the output lies not far away from the confidence limits (which are calculated using the average absolute error on the test set).

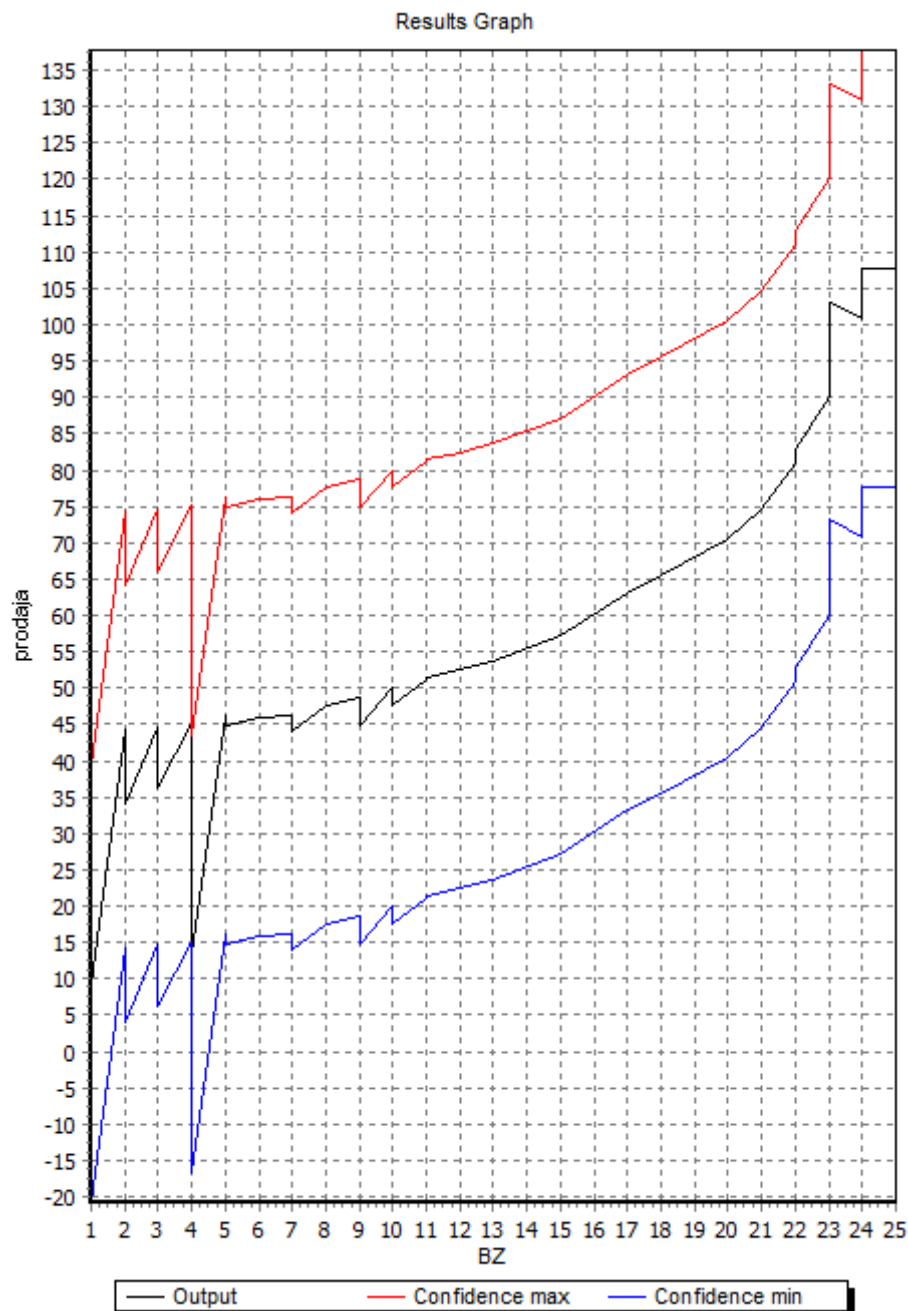


Figure 3: Confidence limits for the output

4. CONCLUSION

The risk management process represents strategically important process which can in certain situations act as a framework for changes in business decisions. That is why the process functioning is connected with the top management directly (usually it operates under the chief financial officer) and what is more, the flow of information is provided to the highest levels of organisation.

The main aim of this paper is to explore the mechanisms for implementing a risk management process into an organisation. It is proposed that the risk management process is broken down into the following stages: organisation, methodology, setting the sources of risk, keeping the process up to date. Whereas in the empirical part of the paper the proposed theoretical model is upgraded with a practical approach example focusing on forecasting sales using a neural network method.

The paper contributes to the better understanding of the risk management process as well as to the implementing different quantitative methods at different stages of risk management process. It also

contributes to the relatively thin literature in the field of risk management process and empirical application of different quantitative methods into the process.

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SELECTION OF INDICATORS FOR MONITORING THE PERFORMANCE OF LOCAL SELF-GOVERNMENT PROCESSES - CASE STUDY

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Abstract: *Designing local services to meet the needs of local citizens is a constant challenge that can only be met by strong commitment to continual improvements. Across the public sector, citizens increasingly and rightly expect good value. An important step forward in helping local authorities in providing services creating greater value for all stakeholders is measuring the process outputs. The results presented here include a common set of indicators representing a great framework for determining the level of local self-government process performance. This paper contains practical findings and results from the project conducted in three municipalities in Bosnia and Herzegovina and may represent guidance and tools for identifying the sources of stakeholder satisfaction. It recognizes a good set of indicators as a key tool for achieving municipal strategic aims, and suggests the aspects that need to be monitored toward sustainable development by combining the best practice around the world.*

Key words: *process, process approach, process performance indicators, process improvements, management systems*

INTRODUCTION

Modern business trends as well as growing need for emphasizing customer satisfaction, and other stakeholders' in nowadays, have had a great influence on public institutions to change their way of thinking and operating and have forced them to put the main focus on the final service users. This has contributed to a growing number of local self-governments initiating and/or implementing projects in the domain of certification of quality management systems as a first step towards achieving the ultimate satisfaction of stakeholders. By maintaining established/certified management systems, local self-governments eventually realized all the benefits which have influenced their aspirations for further improvements of those systems. For the implementation of the mentioned improvements as well as for their clear determination and quantification, it was necessary to establish appropriate mechanisms for monitoring system performance. In order to be able to evaluate actual process performance, it is important to have a clear and shared understanding of process outputs and related key performance indicators (KPIs) (Brocke & Rosemann, 2010). Process-oriented and cost-effectively measured KPIs provide a valuable source for the translation of strategic objectives to process-specific goals and facilitate effective process control. Key process performance indicators need to be defined in accordance to system approach as the basis for the implementation of effective management system.

It is a further development of the implemented/certified quality management systems that is the main topic of this paper which relies on empirical knowledge and the methods and techniques applied during the project "Improvement of Municipal Business Process Management".

The project is implemented in three municipalities in Bosnia and Herzegovina characterized by high similarity in their geographical location, size, population structure and staff hired in the municipalities. All three municipalities have certified quality management systems, designed at the same time and by the same model, by the same consultants.

The aim of the project was to improve processes of the local governments and to define a set of indicators for their monitoring, all with a view to improve service quality and provide the basis for the sustainable development of municipalities, in this case by creating a framework for continuous process improvements.

The project was implemented in three phases:

1. Assignment 1 - Visit to the municipalities and assessment of municipal business process management;

2. Assignment 2 - Training on the improvement of municipal business process management;
- 3.
4. Assignment 3 - Workshops - Choosing indicators for municipal process performance measurement.

The core of this paper is the last phase of the project.

CHOOSING INDICATORS FOR MUNICIPAL PROCESS PERFORMANCE

The selection of indicators as the last phase of this project was conducted after a detailed analysis of the current situation in all three municipalities, after provided guidelines for improvements and trained key representatives for the implementation of the methods for process improvements in all three municipalities.

The procedure is carried out through three sub-phases:

- Selection of a potential set of indicators by the consultant;
- Evaluation and update of the potential set of indicators by local self-government representatives;
- Final selection of indicators by the consultant, based on the rating given by the local self-governments' representatives.

The most important was the second sub-phase, which had the largest contribution to the selection of the optimal set of indicators, adapted and applied in all three local self-governments. This sub-phase is conducted in the form of workshops.

Sub-phase 1

In order to assure required quality of this Assignment results, it was necessary to adequately prepare both consultants and participants. Municipalities' representatives were delivered the instructions on how to conduct preparations for participation in the workshops. Furthermore, it was necessary for participants to explore and collect data on existing methods of processes monitoring for which they are responsible, including indicators for their monitoring.

The preparation of consultant team consisted of defining the set of potential indicators for process monitoring and criteria for their final selection. Those indicators were defined on the basis of relevant strategic documents of municipalities around the world including Bosnia and Herzegovina and its surrounding areas, suggestions of international organizations (such as United Nations) as well as national strategies of sustainable development. However, it was impossible just to copy knowledge and experiences of other more developed societies. Relevant KPIs can differ in their nature, including financial, quantitative, qualitative, or time-based data, and will be dependent on the strategic drivers for the specific enterprise process (Brocke & Rosemann, 2010). Real obstacles came on with the indicators in use in the most urban municipalities which would not be appropriate for this project due to lack of statistical data, lower society awareness and different culture. Furthermore, there were other issues with the possible set of indicators concerning their objectivity and difficulties to quantify them. All this created the strong need to approach very careful to defining the potential set of indicators for these municipalities.

There are certain scientific and technical criteria, which an indicator needs to satisfy. It should (Custance, 2002):

- be representative,
- be scientifically valid,
- be simple, easy to interpret and resonant to its key audience,
- show trends over time and be capable of being updated at regular intervals,
- give early warning about irreversible trends where possible,
- be sensitive to the changes it is meant to indicate,
- be based on readily available data or be available at reasonable cost,
- be based on data adequately documented and of known quality,
- has a target level or guideline against which to compare it.

Criteria for selecting indicators in this project were (Ditor, 2001):

- Scientific or theoretical acceptance of indicators,
- Representativeness of indicators for the problem of sustainable development,

- The ability of indicators to show the connection between causes and effect,
- The importance and comprehensibility of indicators for the user,
- Comparability of indicators to tolerance limits, standards and regulations,
- Compatibility with other indicators of local communities,
- Adequacy of indicators in compared to the size of the local community,
- Adequacy of indicators in regard to the type, accuracy, scope and time availability of the data,
- Cost acceptability of indicators.

When choosing potential set of indicators, the emphasize was on simple, not on complex indicators because it is concluded that if good set of simple indicators is defined it is, on that basis, easy to get data on appropriate complex indicator. For example, the percentage of literate inhabitants is simple indicator, on which basis, combined with other simple indicators, it is possible to conclude about human development index as complex indicator which consists of a greater number of simple indicators.

There are so many potential indicators, so it is very useful to group them together. However, there are different opinions on how to collect together similar indicator under the same group. Alternative ways of grouping indicators has developed over the years each suggesting the most acceptable framework.

Table 1: Framework for indicators (Cartwright, 2000)

Two themes	<ul style="list-style-type: none"> ▪ carrying capacity (resources use/pollution/biodiversity) ▪ quality of life
Three themes	<ul style="list-style-type: none"> ▪ environment ▪ society ▪ the economy
Five themes	<ul style="list-style-type: none"> ▪ goods and services which meet people's needs but involve the use of fewer natural resources ▪ sustainable communities for people to live and work in ▪ manage and protect our environment and resources ▪ send the right signals ▪ international action

Some surveys (Cartwright, 2000) showed preference for grouping indicators into the three themes of environment, society and the economy, with 81% of respondent choosing this option. Their reasons included that it was the most "manageable" and "easy to explain to the public". Furthermore, these categories are in line with the most of local authorities' efforts to achieve well-being in the areas of economic, social and environmental aspects. Methodology used in our project was based on these findings.

Sub-phase 2

The process of indicators selection needs to be participative and involve key players who can represent relevant needs for sustainable development, such as policy makers, businesses, non-government organizations – NGOs, the public, etc, as mentioned in (Custance, 2002). However, existing obstacles in the three municipalities has influenced municipals' stuff to be the only stakeholder representative. Thus, active participation of local self-governments' representatives was vital for the success of the project, especially the role of top management was important. It is up to executive process leaders to create an environment and culture of continuous improvement and educate managers and staff in the importance of improving and managing business processes. Executive process leaders need to ensure that KPIs reflect this business process-focus, or indeed, if necessary enforce it (Jeston & Nelis, 2008). Finally, it is critical that executives understand that they will usually get what they decide to measure. If a measure is poorly chosen or if it has unintended side effects, then performance will suffer. Thus, time spent developing and selecting good measures and aligning them with strategic goals is usually time well spent (Harmon, 2007).

Measuring role performance is useless unless the organization ensures that people understand why the measures established are important to the organization (Jeston & Nelis, 2006). Thus, workshops were carried out according to defined plan. Three groups of participants for three areas (economy, society and environment) were formed. Each group consisted of representatives from all three municipalities who are, within his/her authority and responsibility, in the same or similar area. In that way, knowledge and interests of participants were equal in each group. They, in teamwork, were dealing with specific problems related to their area of work.

This Assignment was carried out through two phases. The first phase was introductory lecture aiming to renew knowledge gained during Assignment 2 as well as to familiarize participants with method of further work. Time spent on lecture was less than 15% of overall spent time, whereas the rest of time was dedicated to direct interactive work with participants which was the second phase of the assessment conducted in the form of workshops. The second phase played key role in indicator selection and participants were pretty involved and active during entire workshop, while consulting team took over the role of moderator and just was giving directions for work and discussion which were led in certain periods of work in order to make selection of indicators as good as possible.

Participants were given the pre-paired set of potential indicators which should be evaluated and, if necessary, supplemented in order to get the final set of indicators which will be monitored by the municipalities in the future. The selection and evaluation of indicators during workshops was conducted in several sessions:

1. Indicators which refer to the situation in observed area are selected from overall set of indicators. Each participant individually made the selection of indicators which, to his/her mind, in the best way provide data for the situation in one of the three areas (economy, society and environment) and according to that, a new set of indicators was formed as the union of all indicators which are selected by all participants.
2. The new set of indicators was re-analysed and reduced to the optimal number of indicators. This choice was performed in the way that each proposed indicator was analysed, the discussion on it was led on the level of the whole group of participants and, by the consensus, the decision on whether the indicator reflects the situation in the observing areas (previous, future or the potential for development of that area) was made. In such way, about 30% previously selected indicators were eliminated.
3. When the new set of indicators was selected and significantly reduced comparing to the original set by joint work of group, the re-selection was performed. Depending on number of indicators selected after last iteration of selecting, participants were given the task to choose 5-10 most important indicators which reflect the situation in observed area in the best and the most comprehensive way. Then, all votes for each indicator were counted and on the basis of number of votes, the rang list of indicators was made.
4. The most important indicators, as well as those without votes which were on the list after the second iteration of selecting, were evaluated using the scale from 1 to 3. Criteria for evaluation were availability and reliability of data on values of observed indicators. Evaluation was conducted on the level of the whole group and each mark was given by the consensus. Method of evaluation was the following:
 - Mark 1 was given to indicator for which there is no reliable data, there is no organization that monitor such data, costs for collecting those data are too high and much time is necessary;
 - Mark 2 was given to indicator for which there is no reliable data but there are estimated values of that indicator;
 - Mark 3 was given to indicator which values have already been monitored in reliable and acceptable way by the municipality or some other organization, so costs and time necessary for collecting those data are very low or they do not exist at all.

Sub-phase 3

After the workshops, selected set of indicators was re-analysed and compared to the initial set. This analysis was performed by consultants, taking into consideration information gained during the workshops. Each of those indicators were evaluated by grade 1 to 3, per each of predefined criteria. Value of indicators according to the criteria was defined by multiplying the values (weights) of the criteria with the score given to indicator. Final evaluation of indicators was conducted by summing total value of all indicators under each of the criteria. Criteria evaluation was done using the AHP method by consulting team. General Criteria for final selection of indicators were:

- Representativeness of indicators for the problem of sustainable development,
- The importance and comprehensibility of indicators for the user ,
- Adequacy of indicators in compared to the size of the local community,
- Cost acceptability of indicators.

Indicators were evaluated according to the following table.

Table 2: Framework for indicator evaluation

	K1	K2		Kn	Total value	Rang
	PK1	PK2		PKn		
Score I1						
Value I1						
Score I2						
Value I2						

K – criteria for selection of indicators

PK – value of criteria got by AHP method

Score I - score of the importance of indicators to criteria K (1 to 3)

Value I – value of indicator got by multiplying the score of indicator and value of criteria which score was obtained by

Total value - the sum of all indicator values I

The following table shows examples of indicators selected to be monitored by the three local self-governments which represents the basis for setting the future development strategies, goals and targets.

Table 3: List of indicators

Group	Nº	Indicator	Definition	Source
Environment	1.	The quantity of waste	The quantity of waste generated annually in total and in areas: <ul style="list-style-type: none"> Industrial waste from households, Dangerous and safe waste. Unit of measure: t, m ³ , t/inhabitant, t/national income	Indicators of sustainable development: guidelines and methodologies, Commission on Sustainable Development; Sustainable Development Indicators Set for Scotland
	2.	The quantity of treated waste	The quantity of waste that has been recycled, composted or incinerated; in total and as a part of the total quantity of the waste. Unit of measure: t, m ³ ,t/inhabitant, %	UK Govt Sustainable Development – Indicators; National strategy of sustainable development of Serbia
	3.	Number of illegal landfills	Unit of measure: #	Defined by municipality representatives and consultant team
	4.	The quantity of communal waste which has duly been disposed	The quantity of waste which has been disposed on appropriate landfills; in total and as a part of the total quantity of the waste. Unit of measure: t, m ³ , %	National strategy of sustainable development of Montenegro
	5.	The amount of investment in new capacity	Total monetary value of investment in new capacity on the annual level. Unit of measure: €	Defined by municipality representatives and consultant team
Economy	6.	Amount of investment into the economy by sectors	Amount of investment into the economy by sectors on the annual level (agriculture, tourism, manufacturing, services). Unit of measure: €	Montreal Process Criterion and Indicators for Sustainable Forest Management
	7.	Amount of income by sectors	Unit of measure: €	The World Bank Environment Department
	8.	Gross domestic product	Unit of measure: €, €/inhabitant	The World Bank Environment Department
	9.	The number of registered business systems according to categories and types	Unit of measure: #	Defined by municipality representatives and consultant team
	10.	The degree of utilization of available land	Land used for economy in relation to the total available land. Unit of measure: %	Indicators for sustainable development for Norway
Social	11.	Number of inhabitants attending secondary/primary school	On the annual level according to gender. Unit of measure: #	Indicators of sustainable development: guidelines and methodologies, Commission on Sustainable Development
	12.	Number of inhabitants who use or need social care	Number of inhabitants who use or need social care (under-age and adults). Unit of measure: %	Sustainable Development Indicators for Sweden

13.	Population growth	Number of births on the annual level. <i>Unit of measure: #</i>	Sustainable Development Indicators in Australia: Progress on their development
14.	Degree of mortality	Number of deaths on the annual level. <i>Unit of measure: #</i>	Sustainable Development Indicators in Australia: Progress on their development

CONCLUSION

Growing efforts for sustainable development has influenced local self-governments to continuously question their operation regarding improvement of their citizens' quality of life. Measuring its contribution to stakeholder satisfaction represents the necessary step in achieving this goal. Considering processes as the basis of an effective management system requires a systematic approach to defining the indicators of its performance. It is obvious that PDCA methodology is impossible to be implemented if there are no values enabling comparison to needed or wanted situation in terms of process performance. However, there are hundreds of potential indicators and number of frameworks which are appropriate for use at the local level. Therefore, guidance could be helpful to assist local authorities in making their selection. Methodologies useful in this kind of communities must meet some important challenges, including a lack of statistic data, different level of development and an absence of society-wide awareness. That is the reason why no other stakeholders but municipality representatives were engaged in selection of indicators which is the one of the most important aspects of this process. Therefore, defined set includes some of the indicators that are not even recognized in developed societies, but represent very important parameters for these municipalities. Indicators defined in these three local self-governments represent a combination of the best knowledge and experience around the world on the one hand, and needs of the local communities in the areas of economics, society and environment, on the other side. Proposed indicators and used methodology are appropriate for use in other local self-governments in our country as well as in surrounding countries and may represent good tool for achieving sustainable development.

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PROSPECTS OF “KOLUBARA SURFACE COAL MINES” IN THE LIGHT OF EUROPEAN INTEGRATIONS OF THE REPUBLIC OF SERBIA

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Abstract: *In March 2012, the European Union granted Serbia a membership candidate status. In the near future, Serbia is going to become a member state of the European Union and Serbian economy is going to find itself in the open European market. This new status will provide Serbian companies with new opportunities such as lesser obstacles for export and much more availability of capital at European markets with lower interest rates than now and much more possibilities for investment. The purpose of this paper is to show how “Kolubara Surface Coal Mines” will meet the challenges of the European market, especially now when planned investment projects in nuclear power plants are taking place. It will be essential to know how to successfully manage surplus quantities of coal produced in the “Kolubara Surface Coal Mines” and how to keep production at the current rate. At this point it is very important to use all available benefits of EU integrations and undertake further efforts in order to increase export as well as to keep the current employment rate and not allow it to go into a painful downsizing process. Literature used for the purpose of writing this paper is exclusively from publicly available records and does not represent official plans of the “Kolubara Mining Basin” or “Electric Power Industry of Serbia”, even though it is based on the behavior of these two companies in the past years and their public records of business within the Serbian market..*

Keywords: *European Union, Kolubara Surface Coal Mines, export, EU integration, nuclear power plants*

1. INTRODUCTION

Kolubara Mining Basin (further in text Kolubara) is a Limited Liability Company, and the biggest integral part of Electric Power Industry of Serbia. As the biggest exploiter of coal in Serbia, it is situated 60km South-West from Belgrade, occupying surface of 600 square km. Available reserves of coal in this region are estimated around 2 billion tones. If we consider current projected intensity of digging, these available reserves are projected to run out by the year 2060. Kolubara has four active surface mines: Field B, Field D, Tamnava Western Field and Veliki Crljeni, but with the investment of 650 million euro's in next 5 years opening of new mines is absolutely possible. Most of the Kolubara coal (90%) is used in thermal power plants (“Nikola Tesla” I and II, “Kolubara A” and “Morava”), for electricity production. Consumption of remaining 10% is divided between different sectors of industry and widespread market. Official data shows that 52% or 17 billion kWh of electricity comes from Kolubaracoal (<http://www.rbkolubara.rs/>).

Serbia is not primarily oriented toward export, but is mainly focused on export promotion. Having this in mind, and the fact that in 2010 Electric Power Industry of Serbia has exported 700 million kWh of electricity and 1.3 billion kWh in 2009; one could see the potential that Kolubara has in reducing deficit in balance of payment. Therefore, Serbia could be considerate as an exporter country for electricity. Having into consideration that all Kolubara coal is mostly used for Serbian thermal power plants needs, surplus is commonly exported or distributed for a widespread consumption. Although creating electric power from firing coal is a distinguished mark of old Techno-Economic Paradigm, hence in Strategy of Energetic Development of Republic of Serbia, alternative energy sources are considered such “pure energy” from wind or solar power, further development of hydro power plants, still there is serious attention on Kolubara's development. Confirmation of this development could be seen in the level of planned investments that goes up to (*Energetic Strategy of Republic of Serbia until 2015, Ministry of Energetic of Republic of Serbia*) the amount of 650 million euro's until 2015.

When analyzing the current and future state of Kolubara, it is important to mention that in March 2012 The European Union has granted Serbia membership candidate status. In the near future Serbia is going to become a member state of European Union and Serbian economy is going to find itself in the open European market. This new status will provide Serbian companies with new opportunities such as lesser obstacles for export and much more availability of capital at European markets with lower interest rates than now and much more possibilities for investments.

This article has the following structure. After this introduction, first part explains...

2. GOING EU, GOING FOR BETTER OR FOR WORSE, GOING NUCLEAR

Becoming EU member state provides a country with various benefits, but also there are obstacles. Namely, Bulgaria was forced to shut down its nuclear reactors at "Kozlodyn" nuclear power plant, which were declared unsafe by European agencies, since they were based on Soviet technology. Decommissioning those reactors became one of the conditions for Bulgarian EU membership. According to ENSREG (European Safety Regulators Group) data in Bulgaria at the moment there are: a two reactors - type WWER 1000, model 320 - currently in operation; four reactors - type WWER 440, model 230 - being prepared for decommissioning; two reactors - type WWER 1000, model 466 - under licensing, design approval stage; and one research reactor under reconstruction. (<http://www.ensreg.eu/country-profile/bulgaria>). Since these decommissioning decreased electricity exports, Bulgaria all together with Russia plans to build a brand new nuclear power plant generation near town of Belene, which will also be power plant name. (*Electric Power Company of Serbia Company Bulletin "kWh", 2010*)

Bearing Bulgarian case in mind, there is a legitimate reason to be concerned for the future of any industry in the light of new EU membership, especially when considering EU standards in safety and environment protection. However, there is no reason to fear of shutting down production in Kolubara, because from August 2008, entire production process got licensed according to ISO 9001, ISO 14001 and OHSAS 18001 demands of International Standards and is constantly upgrading, which enables Kolubara to be competitive in the European market.

Nuclear power plants in Serbia do not exist, since they are prohibited by the Law. However, investing into nuclear facilities outside borders of the Republic of Serbia is not forbidden. Hence, in last two years negotiations are taking place about Serbian participating in the building of nuclear power plant Belene in Bulgaria. Investing in nuclear energy would increase Serbia's energetic potentials, but on the other hand this cheaper type of energy would jeopardize more expensive one, gained from thermal power plants operated on coal. At this point of discussion, the problem of lowering demand for Kolubara coal could emerge, which will consequently lower productions, and finally would lead to downsizing and laying-off work force. Having in mind that Kolubara has over 10.000 active employees and another 10.000 or even more depends on Kolubara in supporting industries, any shock on it would be enormous impact on employment and economy of Serbia in general. Solution could be found in increasing of export of coal to those countries, whose economy is based on old Techno-Economic Paradigm and that would be almost every country of former Yugoslavia.

Table 1: Kolubara's export for period 2007 - 2009

COUNTRY / YEAR	2007.	2008.	2009.
Montenegro	876.400,00	143.191,34	No export
Macedonia	3.737.215,15	3.027.328,56	No export
Romania	1.126.888,60	1.133.261,51	20.628,46
TOTAL €	5.740.503,75	4.303.781,41	20.628,46

(According to Kolubara Commerce Division, Internal Financial Report 2007-2009)

Table 1 shows Kolubara's export for period 2007 - 2009, shown in euros, hence there was no export in 2010 and 2011. As we can see from it, main export markets are Balkan countries. As already mentioned in the Introduction that export is not main priority for this company and only surplus of coal is exported. Main concerns of this company are Serbian power plants. Nevertheless, this data showed to us that this company is capable of exporting and has experience in exports and a huge market, so widening efforts on export shouldn't be hard to do.

Here we should mention that Bosnia and Herzegovina widespread market is covered by third party companies, which are just re-selling Kolubara coal, investing only in transport and reaching profit margins up to 500%.

Situation at home widespread market is not very different from Bosnian-Herzegovian market. This is all because of mantra that says: "Our main concern at Kolubara is stability of Electro-energetic sector of Serbia." This is a very good formula when country is in a state of war, but when country is moving towards EU membership, so does economy and soon this mantra shall be revised with following: and market demands, market demands, market demands.

There is another potentially big market in region: Croatia. Namely, Croatia does not produce coal, but has thermal power plant “Plomin”, which is operating on coal. Strength of this power plant is 335 MW and for sole

purposes of operating and need of cement and food processing industry, Croatia imported 1.9 million tons of coal in 2010. Croatian Electric-power Company applied to construct third unit of 500 MW at “Plomine”, which will increase Croatian energetic potential, but will make Croatia more dependent on coal import, because it will be more than double than in 2010 (*Coal industry across Europe 2011, EURACOAL, 2011*). Bearing this in mind, Kolubara could focus on Croatian market. Proximity of the market is in our favor, which means we can be competitive with price, considering low costs of train transportation.

From all this we could learn one important fact, about present state of this company and that is: Kolubara is...

3. NOT IN SELLING COAL BUSINESS

Kolubara behaves as a self-sufficient giant, with the possibility wheatear to sell its product or not. In market economy there is no such dilemma. If there is a market, one should do business on it. Leaving home market to re-selling companies is not that painful and unfixable, as not exporting for two years. Home market can be swiftly taken over, by simple action of withdrawing supplies to re-selling companies and organizing network of coal distribution facilities, throughout country. Hence this product has no close substitutes at home market; this company could behave as monopolist and soon take over distribution of its product to widespread market. Foreign market is another story. Leaving markets unattended for two years, especially the foreign ones, where close substitutes could be offered by other companies is a very risky business. So, this company should as soon as possible become a proactive in order to survive in following years, when Serbia enters EU and open energy market becomes a reality. At open energy market consumers could choose from which company they are going to buy electricity from and Electric-power Industry of Serbia is going to have a lot of competition. That's why it is important for Kolubara to become a dominant player on widespread market of coal at home and in the Balkan region, hence electricity could be bought cheaper, but it is not cheap to use electricity for heating purposes. Coal is highly appreciated energy-generating product by households and Kolubara coal is a brand in Balkan region. Of course, household consumption of coal, could never meet thermal power plant consumption, but in market economy no consumer or market should be ignored or left aside. Every euro counts. Besides power plants and household consumption, there is a lot of industry need for coal; steel producers and other energy-intensive industry use coal.

4. FIRING COAL FOR ELECTRICITY-EUROPEAN PRESENT AND FUTURE

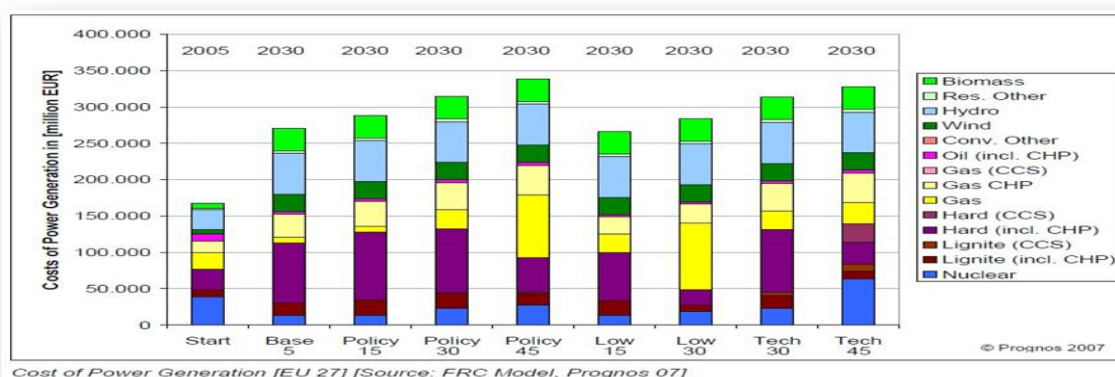


Figure 5: Cost of Power Generation
(Source; Study “Future Role of Coal in Europe” by Prognos AG, Berlin & Basel, 2007)

Future of Coal Industry in Europe is bright, as long as costs of electric-power generated from coal are at low rate. Study commissioned by the European Association for Coal and Lignite (EURACOAL) from the “Prognos” AG Berlin, says that costs of power generation from coal (marked as “Lignite” on the chart; Lignite is a type of coal exploited at Kolubara mines) are lowest from all other ways of power generations except nuclear, of course. They took into considering various scenarios with wide range of taxes on pollution and European policies. As we can see from the chart in each and every case Lignite is still cheaper from any

other fossil fuel. This low-cost trend will be present throughout the next decade until 2030.

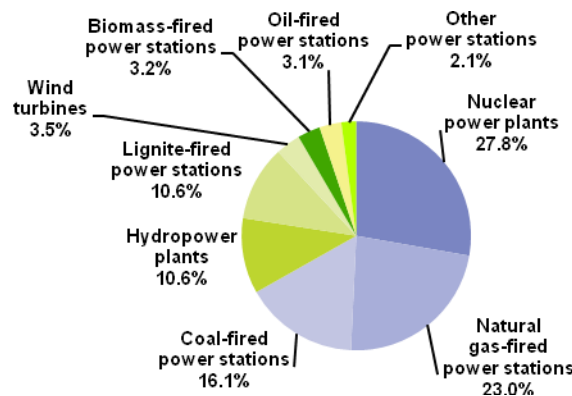


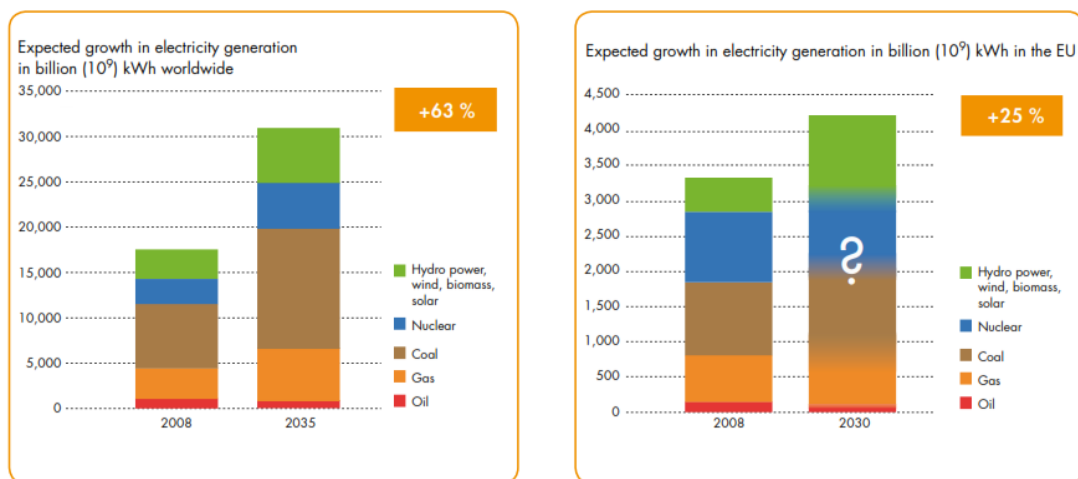
Figure 6: Power Generation in Europe
(Eurostat Yearbook 2011: Energy)

Latest Eurostat data shows us that share of coal in power generation mix in Europe is 26,7% (of which hard coal is 16,1% and lignite is 10,6%). Nuclear power plants are just 1,1% more engaged in this mix, so the coal and lignite combined are second best, third place goes to gas with 23% share. All other ways of power generating combined such as: oil, wind, biomass, hydropower and other can't beat coal share and are behind it by 4,5%. From the 2006 to 2011 share of coal in power generation according to Eurostat Yearbooks vary from 31% to last year's 26,7%.

These are facts of the present days, but let us see some prognoses for the decades to come.

Next charts (*VGB Powertech E.V. Facts and Figures 2011/12, Electricity Generation*) represent projected growth in electricity generation worldwide until 2035 and in EU until 2030. As far the world in general, taking 2008 for the base year, until 2035 electricity production shall rise for 63%. By that time share of fossil fuels will be 70%, which is around 90% increase on the base year. Coal consumption for electricity generation will double by 2035 and its share in power generation mix will rise to more than 50%.

Chart on the right is focused on the EU electricity generation until 2030, taking 2008 for the base year. Here we don't see such a drastic need for increase in production of energy; such is on the world level and this 25% increase in production we could call "steady 25". Share of fossil fuels here is 50% and it is clear that EU regulations concerning environment contributed that percentage be on the substantial lower level than in world in general. Coal is shown here with a major share; therefore coal industry has no reason to worry. Maybe this prognosis is too optimistically in favor of clean energy, time will show. Important thing is: coal doesn't lose its significance to European electric-power industry.



Source: Eurostat, IEA, VGB

Figure 7: Expected growth in electricity generation

(VGB PowerTech E.V. Facts and Figures 2011/2012)

Figure 1, showed us that coal industry is most cost efficient in power generation from fossil fuel and it shall be so within the next 20 years or so. Figure 2 illustrated present facts about big role of coal in energy mix of the EU. Finally, Figure 3 anticipated trends in power generation and showed despite, harsh regulatory surrounding in EU, concerning environment which is harsher every day, coal industry will not lose its position, as a provider of most cost efficient energy-generating product. We can go that far to say: European electric-power industry cannot be imagined without coal. So, European coal industry has a future and Kolubara must find its place in that future.

After considering perspectives of coal industry in Europe in general, now we need to focus to a central thing in economy...

5. CHEAP MONEY, WHO COULD ASK FOR ANYTHING MORE?

Money is not just a piece of paper or metal. Money is merchandise too and as one, it has its price. In Serbia money is expensive merchandise. Economy relies heavily on money, but usually price of money shows state of the country's economy. Serbian economy survived very tough two decades, first decade marked war and

economic sanctions and second transition to market economy. Those are reasons why in Serbia in year 2012, money is considered most expensive merchandise. Companies can't meet both investment and current business needs. Long term credits are used to finance current needs; golden rule of financial management is broken every day. Only big systems such Kolubara can function without turbulence. When buying equipment which are usually multi-million deals Kolubara gets credit directly from the manufacturer of equipment and that kind line of credit is ten times better than the ones offered on the Serbian financial market. So, Kolubara can finance investments because it is huge company and State of Serbia is backing it, so international partners trust her.

Good example of excellent credit conditions Kolubara gets can be found in credit obtained back in 2008 from EBRD (European Bank for Rebuilding and Development) and KfW Bank to finance entire mining system at Tamnava Western Field. Sum obtained through this credit is 72 million euros and is used mostly in acquiring mining equipment from German corporation Thyssen Krupp (*Kolubara Company Bulletin, December 29, 2008*). Here is important role of Thyssen Krupp, because mission of KfW Bank is to finance German economy worldwide and to promote its growth, so indirectly Thyssen Krupp is the one who is crediting Kolubara, not banks. Without reliable partner this kind of credit couldn't be acquired nowhere. So, reputation is the main advantage of Kolubara in doing business across worldwide and Kolubara's reputation altogether with Government backing represents magic formula in business. Domestic banks in Serbia neither have potential to finance these sorts of project, nor did they are interest in it.

But what is with financing current business? For that sort of financing every company in Serbia is forced to turn to local finance market, which consists merely of banks, because Belgrade Stock Market is not developed like European markets. Banks have enormous interest rate, no matter if you are big or small company, whether it is your family business for 30 years or the State is backing you interest rates are just too high. To conclude: short-term money is expensive at the moment not only to small companies, but to the giants like Kolubara too.

With Serbia accession into the European Union all this has to change. Interest rate has to go down. It's only logical. Bank couldn't calculate into their interest rates "high country risk" to make money more expensive. Surely there is one benefit for Kolubara, when Serbia joins EU and that is: cheap money. Financing current business won't be so expensive then. By opening country to the EU, more options for raising cheap money for companies are emerging. Acces to European financial markets becomes reality. Kolubara can go public and enlist on some of the big European stock markets. Surely that is the easiest way to raise cheap money for business. No more banks with sky high interest rates, when going public. That opens up new topics which aren't subject of this paper, but it is clear that going enlisted to some European stock market is an option that opens to Serbian companies, once the country joins EU.

6. CONCLUSION

Kolubara is a giant in coal mining, both for Serbian and European market. Its main preoccupation is to maintain quality and in-time distribution to Serbian coal firing plant, generating more than 50% of electricity produced in Serbia. This company successfully meets this goal, which is the only goal on its agenda. Another potential goal could be export. With all condition for exports Kolubara needs to re-invent itself as an export oriented company. A lot of markets in the Balkan region are available to be taken over. Home widespread market is also unattended and must be won in the near future.

Even though coal industry is highly energy active, coal remains one of the cornerstones of world energetic industry. Part 4 of this paper showed us, that coal has tendency to remain most cost efficient energy generating product if we exclude nuclear energy, until forth decade of XXI century. Coal industry in Europe has a bright future; coal reserves of Kolubara are great and estimated to run out by 2060, so this company has a future in Europe too, because coal is vital part of energetic mix of the European Union.

Problem that each and every company in Serbian economy, regardless of sector, faces is connected to the price of money. Money is expensive merchandise in Serbian economy. With Serbian membership to the European Union, companies will have opportunity to borrow money on the European markets. Many of them could enlist to some European Stock Markets and gain access to new sources of capital. So, Serbian membership in the EU will make money cheap and that is just what economy needs.

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INCREMENTAL INTERVAL REGRESSION TREE LEARNING WITH MEAN VARIANCE NUMERICAL DATA STREAMS

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Abstract: *In this paper, we present a novel method for interval regression tree incremental learning with mean variance patterned numerical data streams. The proposed Mean Variance Interval Regression Tree (MVIRT) algorithm transforms continuous temporal data into two statistical moments according to a user-specified time resolution and builds a regression model tree for estimating the prediction interval of the target variable. The main property of the algorithm is the time-based incremental mean variance tree induction algorithm accompanied by novel time resolution and an outliers detection mechanism. Results of the real world data stream show that the MVIRT algorithm produces more accurate and easily interpretable prediction models than other state-of-the-art batch incremental model tree methods.*

Keywords: prediction, regression tree, incremental learning, data stream mining, interval prediction

INTRODUCTION

A sequence of instances, such as sensor transmitted data, geospatial location, tick - by - tick stock prices and exchange rates, electric signals and voltage, the values of which may be recorded and observed continuously in time, is called a *data stream*. The sources of data streams include meteorological and financial data, network monitoring, web applications, sensor networks, etc.

In regression, the attribute for which values are being predicted is numeric (continuous-valued and ordered) rather than categorical (discrete valued and unordered). This attribute can be referred as the predicted attribute. Note that regression⁷ can also be viewed as a mapping function, $Y=f(X)$, where X is the input and the output is a continuous or ordered value Y . Thus, the regression problem in data streams will be considered as the problem of learning a function of several input attributes from the past stream data with the goal of estimating as accurately as possible the value of a numerical target attribute in the future stream data.

The classical batch regression tree methods for predicting a numerical target variable build upon the supervised divide-and-conquer approach. In terms of the terminal node (leaf) representation, these methods can be classified into following categories:

- constant or mean value
- model
- interval prediction

The main difference between the methods is that the model and the interval representations, unlike the mean value approach, employ more complex prediction models with the aim of improving the target variable prediction accuracy. An efficient batch regression model tree algorithm ensures that the model construction and prediction can be processed with consistently improving accuracy, as new information is incorporated. Moreover, smaller trees, i.e., those which do not have too many splits, are easier to get and to interpret. In many real world applications, which contain large data masses the regression model tree fast processing and ease of interpretation is just as important as predictive accuracy^{6, 10}.

According to Holmes et al.⁸ the batch - incremental algorithms place hard restrictions on regression tree learning. First, a model must be induced incrementally. Second, the instances processing time must keep up with their speed of arrival. Third, a model may only use a constant amount of memory while providing an accurate and updated prediction model at any point in time. Therefore to overcome these restrictions Bifet et al.^{3, 4} introduced the new class of the ensemble batch - incremental algorithms. These algorithms usually apply an ensemble of sliding window methods and split the data stream into a stream of disjoint batches whereas each data batch can be processed in the order of its arrival using one of batch regression tree algorithms, which are discussed much deeper in the next section.

MINING DATA STREAMS WITH MODEL TREE REGRESSION METHODS

Although regression trees are well-studied class of learners, little research has been done in the area of incremental regression tree induction. The problem becomes even harder if the learning must deal with continuous data streams. That means that the regression tree learner becomes fully incremental and must be updated with every new arriving instance. In an incremental learning system, the data instances arrive sequentially in time. Each instance represents a snapshot of the changing system environment at time t . Since data streams are very long and often open-ended, the system must be updated using one instance at a time. Each instance is discarded as soon as it is used for updating.

Potts^{11, 12} brings together the batch and incremental versions of the two splitting rules of regression linear model tree with two unified frameworks Online - RD and RA. The proposed tree models are built from the top down, using one of two statistical tests to determine both the split point and whether to carry on splitting. They use the Chow⁴ test, a standard statistical test for homogeneity amongst sub-samples.

Alberg and Last^{1,2} introduced MOPT (Mean Output Prediction Tree) algorithm for interval prediction of numeric target variables from temporally aggregated numerical data, where each aggregated data instance is represented by its mean and variance. The proposed algorithm differs from the state-of-the-art regression algorithms in the splitting of each input and output feature to two moments according to the input time resolution and it can also identify the most appropriate prediction time resolution that minimizes the prediction error and builds more compact interval based regression tree. The main disadvantages of the MOPT algorithm is posed by the fact that is not using an explicit time resolution detection mechanism and thus is not suitable for dealing with massive data streams, which may include distribution change patterns and can require excessive memory and processing power resources.

Ikonovska et al.⁹ describe the FIMT-DD (Fast and Incremental Model Tree with Drift Detection) algorithm which is an advanced adaptation of the FIMT (Fast and Incremental Model Tree) and FIRT (Fast and Incremental Regression Tree) algorithms and uses an explicit change detection method (DD) for dynamic environments and time-changing distributions. The main difference between FIRT and FIMT algorithms concludes in the fact that FIRT has no linear models in the leaves. According to the authors, the main advantages of the FIMT-DD are that it is competitive with batch algorithms in terms of accuracy, enables local change detection, and avoiding the costs of re-growing the whole tree when only local changes are necessary.

The common disadvantage of the represented methods that they are unable to detect changes properly and adapt their tree models with a minimal loss of accuracy. A simple way to cope with this problem is to calculate every possible splitting point. As a result, the task becomes computationally expensive and it has a negative effect on the algorithm scalability. This non-trivial problem raise the need of incremental algorithms with fast execution and response time, which are able to detect changes properly and adapt their tree models with a minimal loss of accuracy.

THE MEAN VARIANCE INTERVAL REGRESSION TREE MVIRT METHODOLOGY

The Mean Variance Interval Regression Tree (MVIRT) algorithm introduced in this paper requires continuous aggregated temporal variables, represented in the form of two unbiased estimators (sample average and variance) and produces an interval batch incremental interval regression tree for a numeric target variable Y .

In our algorithm the average and variance of each variable will be mapped in univariate Mahalanobis distance based on auxiliary control variable $M(\cdot)$ that should respond to changes in both statistical moments. The proposed approach enables to ignore outliers, which cause to prediction instability and model overfitting effect, and thus achieve a considerable reduction in the size of the induced tree.

$$X_i \sim \{\bar{x}_i(r); \hat{s}_{x_i}^2(r)\}, \text{ where } i \in (1, \dots, N) \quad (1)$$

Suppose that each instance i of input variable X is represented by two aggregated mean and variance estimators $\bar{x}_i(r)$ and $\hat{s}_{x_i}^2(r)$ for a given temporal measurement aggregation resolution r . Let $x_A(r)$ and $x_S(r)$ be the sample average values over all instances, and let $V_A(\bar{x}_i(r))$ and $V_S(\hat{s}_{x_i}^2(r))$ be the sample variance of the corresponding unbiased estimators. The corresponding sample covariance

between $\{\bar{x}_i(r); \hat{s}_{x_i}^2(r)\}$ is denoted by $V_{AS}^2(\bar{x}_i(r), \hat{s}_{x_i}^2(r))$ and the Mahalanobis distance between the two measured statistical moments of the input variable X is calculated by:

$$M_i(\bar{x}_i(r); \hat{s}_{x_i}^2(r)) = \frac{N}{V_A V_S - V_{AS}} \cdot (*), \text{ where} \quad (2)$$

$$(*) = V_S \cdot (\bar{x}_i(r) - x_A)^2 + V_A \cdot (\hat{s}_{x_i}^2(r) - x_S) - 2\sqrt{V_{AS}} \cdot (\bar{x}_i(r) - x_A) \cdot (\hat{s}_{x_i}^2(r) - x_S)$$

To identify outlying values of M_i we need to determine its probability distribution. The proposed distance metric under the null hypothesis (which includes the assumption of multivariate normality of X variable) has a chi square - distribution with two degrees of freedom and express Mahalanobis multivariate standardized distance between the values of the current two first moments. For example, if the input variable averages remains at the values x_A and x_S then values of $M(\cdot)$ should be less than the $\chi_{\alpha,2}^2$ and greater than 0, where $\chi_{\alpha,2}^2$ is the upper α percentage point of the chi-square distribution with two degrees of freedom. If at least one of the averages shifts to some new value, then the probability that the statistical moment $\chi_{\alpha,2}^2$ exceeds the limit increases. In the tree induction algorithm the confidence interval limits of the M distance metric are calculated by:

$$UCL(M_i) = \frac{2(r-1)(n-1)}{rn-r-1} F_{\alpha/2, 2, rn-r+1} \quad (3)$$

$$LCL(M_i) = \frac{2(r-1)(n-1)}{rn-r-1} F_{1-\alpha/2, 2, rn-r+1}$$

where r is a temporal aggregation resolution.

THE MVIRT TREE SPLITTING PROCEDURE

In the instance splitting stage of the MVIRT algorithm we assume that we have a set of n training instances at a given node. The pseudo code in Figure 1 finds the best split for predicting the mean of a numeric target variable. This procedure applies to splitting the values of bivariate numeric input variables, where each variable is represented by the sample mean $AVG(X)$ and variance $VAR(X)$ according to the predefined temporal aggregation resolution r .

The splitting procedure includes three main steps. The first step consists of the Mahalanobis distance calculation for numeric input variable X in every instance (see Equation 2) and outliers detection procedure. The second step contains incremental time resolutions logic mechanism which increasing current time resolution TR when all input variables instances are outliers. It should be noted that if the number of outliers equals to the number of training instances, then the algorithm ignores a given input variable and shifts to the next one or returns the tree. The third final step is aimed at selecting the best estimator (sample average or variance) for input variable. In this step, the algorithm calculates the absolute differences ratio between the value of MX and the values of the estimators $MAVG$ and $MVAR$ in the best splitting instance of X and chooses the best node estimator (Best_Contributor), which minimizes that difference ratio.

Figure 1: MVIRT splitting criterion pseudo code

MVIRT(α , TR, X, Y) splitting procedure	
Input	User defined , α
Args:	Current time resolution, r The mean-variance input variables, X The mean-variance target variable, Y
Output:	The best split point for input attribute X
Pseudocode body:	
# Calculate the Mahalanobis distance vector for input variable MX	
For each instance Do:	

(1)

<pre> MX = M (AVG(X),VAR(X)) (formula 2) Next #Outliers detection & dropping procedure {C} = null If MX(α) is not outlier (formula 2) Then {C} ++ # Non outliers data instances collection End If </pre>	
<pre> # Time resolution setting If {C} is empty Then #Shift to the next input variable Call recursively MVIRT(α , TR, X, Y) If all input variables instances are outliers (<u>concept drift is detected</u>) Then # Increase time resolution TR for current input variable TR = r - - If TR is empty Then Return MVIRT Tree Else Call recursively MVIRT(α, TR, X, Y) End If End If End If </pre>	(2)
<pre> # Best contribution variable detection For each instance in {C} Do: MY = M (AVG(Y), VAR(Y)) MXY = M (M(X), M(Y)) #Mahalanobis distance between averages of X and Y MAVG = M (AVG(X), AVG (Y)) (formula 2) #Mahalanobis distance between variances of X and Y MVAR = M (VAR(X), VAR (Y)) (formula 2) Next Best_Contribution_Ratio = Max(MXY - MAVG , MXY - MVAR)/ MXY #Best split value for current input variable X in time resolution TR Return Split (TR; Best_Contributor (Avg/Var) ; Best_Split_Value) </pre>	(3)

THE MVIRT TREE LEAF CONSTRUCTION PROCEDURE

In each terminal node the MVIRT algorithm computes the bounds of a prediction interval for the corresponding tree leaf with a user-defined confidence level $1-\alpha$ using the following equations:

$$\begin{cases} \bar{y}_i \mp t_{1-\alpha/2, n_l-1} \cdot \hat{s}_{y_i} \sqrt{(1+1/n_l)}, n_l \leq 30 \\ \bar{y}_i \mp z_{\alpha/2} \cdot \hat{s}_{y_i} \sqrt{(1+1/n_l)}, n_l > 30 \end{cases} \quad (4)$$

where $i \in (1, \dots, n_l)$ are tree leaf instances and \bar{y}_i, \hat{s}_{y_i} represent mean and standard deviation estimators of the tree leaf. Thus, when the confidence level equals to zero (i.e. $\alpha=100\%$) then the corresponding values of $t_{0.5}$ and $z_{0.5}$ distributions are equal to zero, the MVIRT model transforms the interval representation of a tree leaf into the sample average of the target variable. This fact is very useful in the sense of experimental comparison between MVIRT tree and other, point estimation regression tree algorithms.

EL NINO DATA SET

The El Nino data stream is available at the UCI KDD Archive (<http://www.ics.uci.edu>). This data was collected with the Tropical Atmosphere Ocean (TAO) array, which was developed by the international

Tropical Ocean Global Atmosphere (TOGA) program (<http://www.pmel.noaa.gov>). The TAO array consists of nearly 70 moored buoys spanning the equatorial Pacific, measuring oceanographic and surface meteorological variables critical for improved detection, understanding and prediction of seasonal to inter-annual climate variations originating in the tropics, most notably those related to the El Nino/Southern Oscillation (ENSO) cycles. This data stream was collected on a daily basis and contains 178,080 numerical instances from March 1980 to June 1998. Each instance in the data stream has the following numerical attributes: date, latitude, longitude, zonal winds (west<0, east>0), meridional winds (south<0, north>0), relative humidity, air temperature, sea surface temperature and subsurface temperatures down to a depth of 500 meters. The latitude and longitude in the data showed that the buoys moved around to different locations. The wind data, both the zonal and meridional winds fluctuated between -10 m/s and 10 m/s. Relative humidity values in the tropical Pacific were typically between 70% and 90%. Both air temperature and sea surface temperature fluctuated between 20 and 30 degrees Celsius. The target (prediction) attribute in the El Nino data stream is sea surface temperature (SST), which is identified by warmer than normal sea surface temperatures.

There are missing values in the data. As mentioned earlier, not all buoys are able to measure current attributes because these values may be missing dependent on an individual buoy. The missing values replacement operation was performed with both time series neighbors average value interpolating procedure. Finally in order to evaluate the predictive performance, the set of all examples was split into learning and testing examples sets in proportion 70:30.

The MVIRT algorithm performance is compared to three state-of-the-art incremental model tree algorithms implemented by the Rapid Miner which were tuned with time series plug-in: M5P¹³, M5-Rules¹⁴, RepTree¹⁴. Due to the memory and time constraints, it was very important to evaluate the capabilities of all algorithms to learn incrementally and correctly and at the same time to construct an appropriately small model tree. Therefore in each experiment we applied the constant months sliding window mechanism. These algorithms do not typically provide interval predictions therefore, to overcome this limitation we have used the average sliding windows mean estimator to make point predictions in our comparative evaluation experiment. Finally, in order to improve the algorithm scalability, we tuned M5P and RepTree with bagging evaluation mechanism which was implemented in Java API of WEKA package.

The results in Table 1 show that under Average Root Mean Square Error (A[RMSE]) and Average Explained Variability (A[EV]) criteria the MVIRT and the RETIS-M algorithms are more accurate than other proposed algorithms in terms of t-Student pair-wise test difference. We have denoted by * the cases where the p value of the difference between MVIRT and other algorithms is smaller than or equal to 5%. The MVIRT algorithm outperforms significantly the other algorithms in the terms of Average Cost Complexity Measure (A[CCM]). Finally, we will consider that our proposed MVIRT tree models are more interpretable than RETIS tree models in terms of Average Tree Size (A[TS]) measure (7 vs. 23).

Table 1: El Nino data set learners comparison

Learner	A[RMSE]	A[TS]	A[CCM]	A[EV]
B-M5R	0.84*	7	1.01*	0.46*
B-M5P	0.83*	10	1.07*	0.47*
B-REPT	1.57*	5	1.69*	NA
M5 RLS	0.86*	7	1.03*	0.45*
M5P TR	0.84*	8	1.03*	0.46*
MVIRT	0.60	7	0.77	0.62
REPT	1.57*	3	1.64*	NA
RETIS	0.63	23	1.18*	0.60

CONCLUSIONS AND FUTURE WORK

In this paper, we have presented the two moments MVIRT algorithm, which is able to predict values of numeric attributes in massive temporal data sets. The proposed algorithm differs from the state-of-the-art regression algorithms in the splitting of each input continuous feature according to the best mean variance contributor, identifies outliers in the training data and as result builds more compact interval prediction tree. The conducted experiment indicate that the proposed MVIRT algorithm produces more accurate and compact models by comparison to the state-of-the-art regression tree algorithms. In our opinion, the proposed algorithm is only the first step towards a family of truly scalable and fast regression tree algorithms. We see two immediate extensions for the future work. First, our general aim is to construct online accurate and robust multi-r target variable forecasting mechanism, which in turn can be used for massive data streams prediction. Second, we can look into other possible analytical methods for the split point selection, which may reduce the algorithm time and space complexity.

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THE INFLUENCE OF FOREKNOWLEDGE ON CUSTOMERS' SATISFACTION WITH MOBILE OPERATING SYSTEMS

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Abstract: *This paper deals with the influence of customers' foreknowledge on satisfaction with mobile operating systems (OS). The need for investigating this issue comes from the fact that customers' loyalty and the analysis of factors affecting it are important for the corporations' success. The producers of mobile OS are investing millions of EUR into mobile OS and mobile application development. This is one of the main reasons for the analysis of customers' satisfaction with mobile OS, taking into account customers' foreknowledge, awareness, and information. Our findings have shown that the most satisfied customers are the ones that often follow new trends related to mobile phones and mobile OS. We have also found that customers that are completely familiar with current models of mobile phones are much more satisfied with mobile OS than the customers who are not. The difference in customers' satisfaction with mobile OS performance, in relation to the phone usage frequency, is also significant. The results of this research point to the current state of the market in Serbia, providing guidelines for mobile OS producers and some references for understanding mobile phone customers.*

Keywords: *mobile operating systems, mobile phones, customers' satisfaction, customers' loyalty, customers' foreknowledge*

1. INTRODUCTION

Choosing the mobile phone has always been a decision that requires certain level of customers' awareness. Some customers need less time and foreknowledge, some need much more, but one thing is certain: their choice would depend on how well they are informed.

Release of smart phones has made it not only the matter of the phone, but also the matter of mobile operating systems (OS). Capabilities of mobile OS have opened the door to endless list of possibilities (Seongwon, Kwangeak, & Bong Gyou, 2011; Milutinovic et al., 2011). However, main goal of all the efforts that producers are putting into the improvement of OS and applications development is creating and breeding customer satisfaction and loyalty (CS&L). This concept has attracted quite a lot of attention in recent years (Diaz, Martin-Consuegra, & Esteban, 2011; Bayraktar et al., 2012). Oliver (1981) defined customer satisfaction as "the summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience". Many researchers have recognized the need for investigating the customers' satisfaction, experience, and loyalty (Deng et al., 2010; Verkasalo, 2010; Lee, 2011; Bong-Won, & Kun Chang, 2011; Lee et al., 2011). Most of these studies emphasize that customer loyalty and analysis of factors affecting it are important for the corporations' success. Furthermore, they agree that customer satisfaction is the main important mediate goal for the corporations on their way to obtaining economic success. According to Deng et al. (2010), trust, customer satisfaction, and switching cost directly enhance customer loyalty. Tektas (2011), among others, claims that satisfaction, perceived value and reputation have direct effects on customers' behavioural intentions.

In any case, the fact is that giant multinational corporations - the producers of the mobile OS - are investing millions of EUR into the mobile OS and mobile application development. Consequently, one of the reasons to conduct the survey, concerning the customers' satisfaction with mobile OS is the fact that, as Shye (2010) reports, holistic, objective and precise data on mobile customer behavior and experience are needed in today's product development and marketing activities. Other reason is obvious: "There are nearly 7 billion people in the world. In 2011, a smart device - be it a tablet, smart phone or a PC - was sold for one out of every seven of those people, according to estimates from International Data Corp. The research firm reports that about 946 million smart devices were shipped last year at a market valuation of \$489 billion. Mobile is

booming, with nearly 500 million of those devices being of the smart phone variety. The world is becoming connected, and growth does not project to slow any time soon" (Rowinski, 2011).

All abovementioned research upholds that customers' satisfaction depends on their experience, while the customers' experience is directly connected with their foreknowledge on mobile phones and mobile OS. This is the main reason to analyze customers' satisfaction with mobile OS, regarding the customers' foreknowledge, awareness, and information.

According to data from the Statistical Office of Serbia (SORS, 2012), situation in Serbia is such: mobile phones employ about 4.8 million citizens. At age 25 to 54, even 94% of citizens use mobile phones while that number drops significantly in age from 55 to 74, where mobile phones are used by 61.7% of men and 58.2% of women. This study presents the results of a research regarding the current state of customers' satisfaction with mobile OS in Serbia, primarily focusing on drawing the attention of large multinational companies - the producers.

The conceptual framework of the conducted research is briefly presented in Section 2. Third section explains the survey in detail, focusing on the research sample, instruments, and methodology. Fourth section presents the results of the research, and finally, the concluding remarks are given.

2. PROBLEM DEFINITION

This study is primarily focused on investigating whether the customers' foreknowledge and familiarity with the mobile phones and mobile OS, influence their satisfaction with mobile OS. Measurement of the customers' satisfaction is based on their experience with specified OS. Perception of customers' experience can influence their decision to continue using the same mobile OS, or to choose another. It is very important to investigate customers' satisfaction with mobile OS because the producers are constantly struggling in the huge inconsistent market, spending enormous sums of money in order to succeed.

Our primer assumption was that the difference in customers' satisfaction with mobile OS, among users, regarding to how often they follow trends related to the mobile phones, is statistically significant. In order to prove this assumption, we have carried out a survey which envelopes the posted problem.

Second assumption supposes that the difference in customers' satisfaction with mobile OS, regarding their familiarity with current models of mobile phones, is statistically significant. Supporting research includes measuring of the differences in customers' satisfaction with mobile OS performances regarding the frequency of mobile phone usage.

3. SAMPLING AND METHODOLOGY

The study was conducted in Serbia, using the online survey. The survey was anonymous. It was conducted using random sampling methodology. Collected sample consisted of 340 respondents.

The questions used in the survey were grouped in four parts. The first part addressed demographic data, including data on age, sex, education level, average mark on studies and the employment. The second part of the questionnaire was related to the mobile phone usage frequency and foreknowledge. It included questions on how often do customers follow trends related to the mobile phones and mobile OS, are they familiar with current models of mobile phones, which mobile phone do they use, for which purpose do they mostly use their mobile phones, do they use multitasking and how frequently do they use mobile phone.

The third part of the questionnaire was related to customers' opinion on quality characteristics of mobile OS. Following characteristics were examined:

- Functionality
- Speed
- Use simplicity
- Price and quality ratio
- Multitasking
- Availability and possibility of installing new applications
- Bagging
- Internet surfing simplicity

Similarly, the fourth part was related to customers' opinion on quality characteristics of mobile phones:

- Shape and form
- Keypad
- Screen size and resolution
- Camera resolution and photograph quality
- Quality of conversation
- Quality of sound
- Additional equipment

Customers' satisfaction on mobile OS and mobile phones was measured using two variables, obtained in this research. The variables are:

- *OS Satisfaction* – it measures customers' satisfaction with mobile OS. It consists of the questions from the third part of the questionnaire.
- *Phone Satisfaction* – it measures customers' satisfaction with mobile phones, consisting of the questions from the fourth part of the questionnaire.

To create these variables, we defined two scales. Both of them were created using 5-point Likert scale. The first variable *OS Satisfaction* consisted of nine questions that comprise the first construct. A Cronbach's alpha coefficient for internal consistency of the scale was 0.859, pointing out on a good internal consistency (Cronbach, 1951; George & Mallery, 2003). The second variable *Phone Satisfaction* consisted of seven items in a construct. Cronbach's alpha coefficient was 0.865, again pointing out on a good internal consistency.

Respondents were mostly aged from 20 to 25 (65%), and 25 to 30 (24%). Regarding the education, 48% were graduates, while 24% have finished high school, 17% were bachelors and 11% have finished postgraduate studies. The percentage of males was 41, and females 59. Respondents were mostly employed (59%), while 13% were unemployed, and there were 26% of students. There were 10% of customers, who use a phone for business purpose, while 46% use it for private and 44% for both private and business purpose. Information on customers' foreknowledge and experience with mobile OS and phones, collected in the survey, is presented in Table 1.

Table 1: Customers' foreknowledge on mobile phones and mobile OS

Groups	Customers' foreknowledge (%)		
How often do customers follow trends related to the mobile phones?	Rarely	Medium	Often
	27	21	52
Are customers familiar with current models of mobile phones?	Not at all	Partly	Completely
	7	68	25
How frequently do customers use mobile phones?	Rarely	Medium	Very often
	5	21	74

In order to establish the accuracy of our assumptions appropriate parametric tests were performed. Kolmogorov-Smirnov test established if the variables were normally distributed, in order to confirm the assumption of the parametric tests. We used parametric independent samples t-test in order to establish the difference between two groups, and accordingly the ANOVA test (Lilliefors, 1967), to establish the difference among three or more observed independent groups. To track statistically significant differences, we used Tukey multiple comparisons test. The means were calculated in order to locate the differences (among which groups do the differences occur).

4. RESULTS

Central part of the research is related to the variable *OS Satisfaction*, which is directly associated with our initial assumptions. We used Kolmogorov-Smirnov test of normality to investigate whether the variable is normally distributed. Table 2 presents the test result, as well as the descriptive characteristics of the given variable. The significance for the variable *OS Satisfaction* is greater than 0.05, which proves the null hypothesis that it is normally distributed value, i.e. that there are no significant deviations from normal distribution.

Table 2: Kolmogorov-Smirnov test of normality

	Mean	Standard deviation	Kolmogorov-Smirnov Z	Significance
OS Satisfaction	33.362	6.898	1.284	0.074

Table 3 presents the results of confirmatory data analysis. Leven's Homogeneity of variance test had confirmed that the assumption on homogeneity of variances among the groups was not disturbed in any of the assumptions. We used parametric ANOVA test to establish whether there was a statistically significant difference among specified groups.

Table 3: The results of the ANOVA data analysis

Assumption	Test value
The difference in customers' satisfaction with mobile OS, among the groups of users formed regarding to how often they follow trends related to the mobile phones, is statistically significant.	21.526**
The difference in customers' satisfaction with mobile OS, among the groups of users formed regarding their familiarity with current models of mobile phones, is statistically significant.	13.049**
The difference in customers' satisfaction with mobile OS performances, among customers regarding the phone usage frequency, is statistically significant.	7.685**

* $p < 0.05$, ** $p < 0.01$

The first assumption presumes that the difference in customers' satisfaction with mobile OS, regarding to how often they follow trends related to the mobile phones, is statistically significant. Customers were divided in three groups, according to the answer to the question on how often they follow new trends: *rarely*, *medium*, and *often* (Table 1). The results of parametric ANOVA test showed that the difference in satisfaction among the specified groups is statistically significant at 0.01 level of significance. The value of F statistics was 21.526, $p < 0.000$, which proves that these groups are not equally satisfied with mobile OS. Influence of the difference expressed by η^2 (eta-squared) indicator is 0.113, which indicates that the influence is large (Cohen, 1988). The subsequent analysis using Tukey HSD test, showed that these differences occur among all three groups (*rarely*: $M=30.424$, $SD=6.927$; *medium*: $M=33.337$, $SD=6.663$; *often*: $M=37.124$, $SD=5.54$). It is evident, from Figure 1(a), that customers, who often follow trends related to the mobile phones, are most satisfied with mobile OS, followed by customers that *medially* follow trends related to the mobile phones and customers that *rarely* follow trends related to the mobile phones.

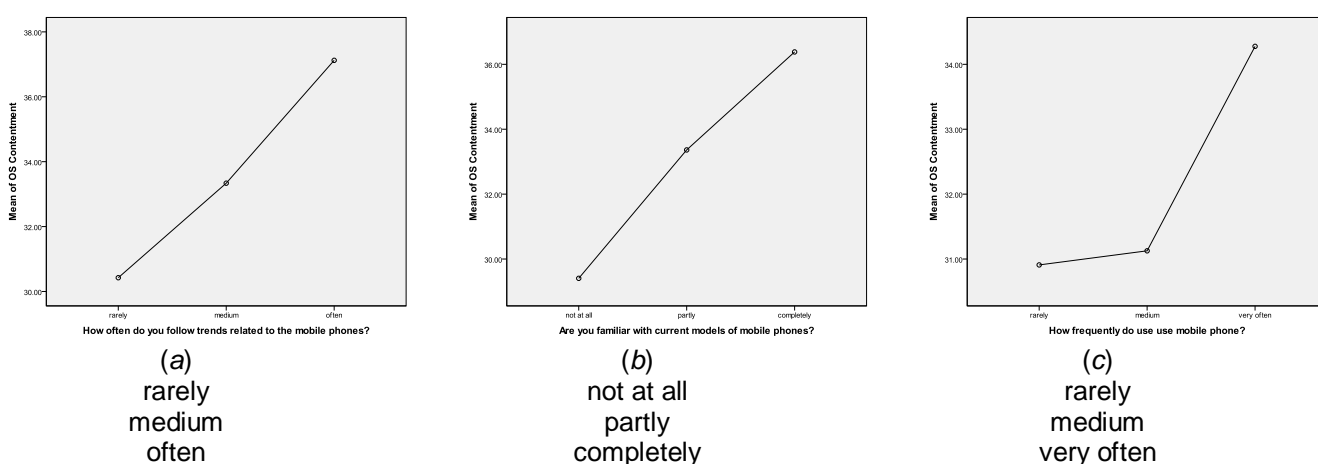


Figure 1: Differences in customers' satisfaction among users regarding
(a) how often they follow trends related to the mobile phones,
(b) their familiarity with current models of mobile phones, and (c) usage frequency.

Second assumption presumes that the difference in satisfaction with mobile OS performance among customers, regarding their familiarity with current models of mobile phones, is statistically significant. There were also three groups of customers according to how they answered the question about their familiarity with

current models of mobile phones: *not at all*, *partly*, and *completely* (Table 1). The results of parametric ANOVA test showed that the difference in satisfaction among the specified groups is statistically significant at 0.01 level of significance. The value of F statistics was 13.049, $p < 0.000$, which proves that these groups are not equally satisfied with mobile OS. Influence of the difference expressed by η^2 (eta-squared) indicator is 0.072, which indicates that the influence is medium (Cohen, 1988). The subsequent analysis with Tukey HSD test, showed that these differences occur among all three groups here as well (*not at all*: $M=29.405$, $SD=7.002$; *partly*: $M=33.362$, $SD=6.844$; *completely*: $M=36.382$, $SD=6.898$). The differences are presented in Figure 1(b) and we can see that customers, who are not familiar with current models of mobile phones, are less satisfied with mobile OS than other groups. Customers that are partly familiar are more satisfied and customers that are completely familiar with current state of the market are most satisfied with their choice of mobile OS.

In the course of the research, we have also tested if the difference in customers' satisfaction, regarding the phone usage frequency, was significant. The groups of customers according to this criterion are customers that use phone: *rarely*, *medium*, and *very often* (Table 1). The results of ANOVA test show that there is a statistically significant difference in satisfaction among these groups at 0.01 level of significance. The value of F statistics was 7.685, $p=0.001$, proving that these groups are not equally satisfied with mobile OS. The η^2 (eta-squared) indicator is 0.044, reporting on the medium influence (Cohen, 1988). The results of Tukey HSD test, showed that the differences occur among the group that uses phone *very often* ($M=34.277$, $SD=6.66$), and two other groups (*rarely*: $M=30.909$, $SD=7.569$; *medium*: $M=31.126$, $SD=6.958$). Other two groups (*rarely* and *medium*) do not differ from each other with statistical significance. Differences are shown in Figure 1(c).

5. CONCLUSION

As elaborated in Section 1, previous studies have reported that customers' satisfaction and loyalty is greatly influenced by their experience and proficiency. Our research has brought us to numerous conclusions, and first among them is concerning precisely the verification of these claims. Our findings have shown that the most satisfied customers are ones that often follow new trends related to the mobile phones and mobile OS, and are well informed on the current state of market. These customers know what is new on the market, what are the performances of phones and mobile OS, how much do the companies invest in their products and what are they going to get by buying the product. It is certain that these customers will choose carefully when buying the product and that they find information very valuable. Far less satisfied are the customers that do not follow trends related to the mobile phones. These customers are not going to choose the product by mobile OS performance criterion, but some other criterion, such as price/quality relation, basic functions, etc. This is why producers not only have to build strong brands, but also to find the right balance between the mobile OS performance quality and prices, which are directly connected with customers' consumption abilities.

Secondly, we showed that the difference in customers' satisfaction with mobile OS performances among customers, regarding their familiarity with current models of mobile phones, is statistically significant. Customers, who are not familiar with current models of mobile phones, are less satisfied with mobile OS than other groups. Customers that are partly familiar with it are more satisfied and customers that are completely familiar with current state of the mobile phone market are most satisfied with their choice of mobile OS. Major smart phone manufacturers are very important players on the market and the quality of their products strongly influences the success of mobile OS producers.

Finally, we have also found that the difference in customers' satisfaction with mobile OS performances, regarding the phone usage frequency, was significant. Customers that use phone very often are more satisfied with mobile OS performances than customers who use it medially or rarely. This is why the frequent users are more likely to chose carefully and "give it a deep thought", considering not only the phone characteristics but also the mobile OS characteristics, before buying the phone.

The results of this research are very useful since they point to the current state of the market in Serbia. It is clear that the perception of customers' experience and foreknowledge can greatly influence their decision to continue using the same mobile OS, or possibly choose another. This could be the guideline for mobile OS producers, as well as the directive for their future actions and strategies, providing them some references for understanding mobile phone customers.

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DATA MINING MODELS FOR PREDICTION OF CUSTOMERS' SATISFACTION: THE CART ANALYSIS

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Abstract: *This paper discusses the prediction of customer satisfaction with mobile operating systems (OS) using the classification and regression trees (CART) method. This reliable and effective decision-making technique provides high prediction accuracy with a simple representation. It provides transparent results and minimizes user intervention in the analysis process. One of the main goals of this research was solving a predictive task, concerning the prediction of continuous variables. It was necessary to investigate users' opinions on mobile OS, since they affect producers' success, and that is an important goal for the corporations on their way to obtaining economic success. Results show that the CART technique achieves very high accuracy, that it can easily handle numerical variables and provides some explanations for understanding customers' decisions and choices, guiding OS producers to success on the large, unstable and fast-growing market.*

Keywords: *data mining, classification and regression trees (CART), decision trees, customer satisfaction, mobile operating systems, mobile phones*

1. INTRODUCTION

Data mining is a powerful technology with great potential to help companies focus on the most important information in their data warehouses (Fayyad, Piatetsky-Shapiro, & Smyth, 1996; Xu, & Zhang, 2005). Data mining tools can predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions (Sharma, Goyal, & Mittal, 2008). They scan databases for hidden patterns, finding predictive information that experts may miss because it lies outside their expectations. Technologies that have been developed in the area of data mining and knowledge discovery in databases became necessary since the traditional analysis of data has been insufficient for a very long time (Frawley, Piatetsky-Shapiro, & Matheus, 1991). The automated, prospective analyses offered by data mining move beyond the analyses of past events provided by retrospective tools typical of decision support systems. Data mining tools can answer business questions that traditionally were too much time consuming to resolve.

Data mining is the application of specific algorithms for extracting patterns from data (Fayyad, Piatetsky-Shapiro, & Smyth, 1996). It is a process that consists of applying data analysis and discovery algorithms that, under acceptable computational efficiency limitations, produce a particular enumeration of patterns (or models) over the data. The space of patterns is often infinite, and the enumeration of patterns involves some form of search in this space. Practical computational constraints place severe limits on the subspace that can be explored by data mining algorithms.

Tasks supported by data mining include prediction, segmentation, dependency modeling, summarization, and change and deviation detection. Data mining can be used for solving descriptive and predictive tasks. Descriptive data mining tasks are concerned with finding interesting patterns in the data, as well as interesting clusters and subgroups of data. Predictive data mining starts from the entire data set and aims to induce a predictive model that holds on the data, and can be used for prediction or classification of unprocessed instances. Data mining has been frequently used to solve different predictive tasks (Ramaswami, & Bhaskaran, 2010; Hong et al., 2011). Various data mining methods are used for predictive tasks, and the most popular are decision trees, neural networks, logistic regression, multiple regression, generalized linear models, discriminate models, support vector machine models, etc.

This paper discusses the prediction of customers' satisfaction with mobile operating systems (OS) using the decision trees algorithm. Decision trees are a reliable and effective decision making technique that provides high prediction accuracy with a simple representation. Specifically, in our research we have analyzed the

data using classification and regression trees (CART) method. One of the main reasons for applying this specific method is precisely the importance of interpreting the results to users in an understandable way. In this sense, the analysis tools should provide transparent results and minimize user intervention in the process of analysis, which is one of the main characteristics of CART (see Section 3). Moreover, the main idea of the study is to illustrate how CART can be used for prediction of continuous variable (Karacan, & Goodman, 2012).

A number of scientific papers deal with the CART algorithm, but apply the method on different type of problems (Mohanty, Ravi, & Patra, 2010; Kashani, & Mohaymany, 2011). Lemon et al. (2006) used it to identify distinct and meaningful population subgroups, and they compared it to a traditional statistical logistic regression method. They concluded that CART is a promising research tool for the identification of at-risk populations in public health research and outreach. Toschke, Andreas and Rudiger (2005) consider that identification of children at high risk for childhood overweight is a major challenge in fighting the obesity epidemic and so they tried to identify the most powerful set of combined predictors for childhood overweight at school entry. They used CART analysis because they claim it provides a useful and precise tool for decision-making in the physician's daily routine by simple visual assessment of disease probability without the need of any calculations. CART has also been applied to the problem of prediction of methane emissions that can arise during extraction of a long wall panel for a range of coal productivities (Karacan, & Goodman, 2012). Lee et al. (2011) used CART to classify HSDPA network traffic applications, comparing the results with support vector machine (SVM). They also took the initiative to compare CART to K-Means, the wired network traffic-clustering scheme, and showed that CART is more accurate for classification than is K-Means. According to Upendar, Gupta, and Singh (2012), the CART method is able to classify faults (classification of faults on power transmission lines) with very high precision under various fault conditions.

The subsequent part of the paper is organized as follows. The following section defines the problem this research tackles. Section 3 explains the CART methodology. The fourth section shows the results of CART analysis and their discussion. Finally, the conclusions are given.

2. RESEARCH FRAMEWORK AND PROBLEM STATEMENT

This paper deals with the problem of forecasting the customers' satisfaction with mobile OS based on the certain set of variables. The main idea is to find the expected satisfaction value, based on the analysis performed with the input data, collected within the survey.

The study was conducted using the anonymous online survey, and the collected sample consisted of 340 respondents. The questions used in the survey were grouped in four parts. The first part addressed demographic data, including data on age, sex, education level, average mark on studies and the employment. The second part of the questionnaire was related to the mobile phone usage frequency and foreknowledge. It included questions on how often do customers follow trends related to the mobile phones and mobile OS, are they familiar with current models of mobile phones, which mobile phone do they use, for which purpose do they mostly use their mobile phones, do they use multitasking and how frequently do they use mobile phone.

The third and the fourth part of the questionnaire were related to customers' opinion on quality characteristics of mobile OS and phones. Examined characteristics are presented in Table 1, (a) for mobile OS and (b) for mobile phones.

Table 1: Mobile OS and mobile phone quality characteristics

Mobile OS quality characteristics (a)	Mobile Phone quality characteristics (b)
<ul style="list-style-type: none"> ▪ Functionality ▪ Speed ▪ Use simplicity ▪ Price and quality ratio ▪ Multitasking ▪ Availability and possibility of installing new applications ▪ Amount of bugs ▪ Internet surfing simplicity 	<ul style="list-style-type: none"> ▪ Shape and form ▪ Keypad ▪ Screen size and resolution ▪ Camera resolution and image quality ▪ Quality of conversation ▪ Quality of sound ▪ Additional equipment

Customers' satisfaction on mobile OS and mobile phones was measured using two variables, obtained in this research. The variables are *OS Satisfaction* and *Phone Satisfaction*. *OS Satisfaction* measures customers' satisfaction with mobile OS. It consists of the questions from the third part of the questionnaire. *Phone Satisfaction* measures customers' satisfaction with mobile phones, consisting of the questions from the fourth part of the questionnaire. To create these variables, we defined two scales. Both were created using 5-point Likert scale. The first variable *OS Satisfaction* consisted of nine questions that comprise the first construct. A Cronbach's alpha coefficient for internal consistency of the scale was 0.859, pointing out on a good internal consistency (Cronbach, 1951; George & Mallery, 2003). The second variable *Phone Satisfaction* consisted of seven items in a construct. Cronbach's alpha coefficient was 0.865, again pointing out on a good internal consistency.

Respondents were mostly aged from 20 to 25 (65%), and 25 to 30 (24%). Regarding the education, 48% were graduates, while 24% have finished high school, 17% were bachelors and 11% have finished postgraduate studies. The percentage of males was 41, and females 59. Respondents were mostly employed (59%), while 13% were unemployed, and 26% were students. There were 10% of customers, who use phone for business purpose, while 46% use it for private and 44% for both private and business purpose. As for the information on customers' foreknowledge, 27% follow trends related to mobile phones rarely, 21% medially, and 52% often; 7% are not at all familiar with current models of mobile phones, 68% partly and 25% completely. We have also examined the frequency of phone usage: 5% of customers use mobile phone rarely, 21% medially, and 74% very often.

Set of input variables - the parameters of customers' satisfaction with mobile OS forecasting, are the demographic data from the first part of the questionnaire, and customers' characteristics from the second part of the questionnaire:

- *Age*
- *Sex*
- *Education* – the level of education
- *MarkAverage* – mark average during the studies
- *Employment* – are customers employed?
- *FollowTrends* – how often do customers follow trends related to the mobile phones?
- *ModelFamiliarity* - are customers familiar with current models of mobile phones?
- *PhoneType* – mobile phone brand
- *MobileOS* – the mobile operating system that customers are using
- *PhonePurpose* – the most frequent purpose for using the phone
- *Multitasking* – do they use multitasking?
- *Priv/Buss* – mostly private or business purpose
- *Tied* - how frequently do customers use mobile phones?
- *PhoneSatisfaction* - measures customers' satisfaction with mobile phones, consisting of the questions from the fourth part of the questionnaire.

3. METHODOLOGY

As indicated in Section 1, CART is one of the most popular decision tree methods. CART is the decision tree method used for classification and prediction. It illustrates the important prognostic variables as related to outcome. CART is a recursive partitioning method that builds classification and regression trees for predicting both, continuous dependent variables (regression) and categorical predictor variables

(classification). This is one of its best advantages compared to their antecedent C5.0 tree. Breiman, Friedman, Olshen and Stone (1984) popularized the classic CART algorithm.

One of the main reasons for applying this specific method is the fact that it gives the results that can be interpreted to users in an understandable way. In this sense, CART provides transparent results and minimizes user intervention in the process of analysis. It is a model of low complexity, but high transparency and accuracy. CART is widely used for estimating and prediction. The system is reliable, efficient and able to process a large set of entities (Linoff, & Berry, 2011).

CART is a tree shaped model, consisting of the set of branches and nodes (see Figure 1). This method recursively divides processed data to segments with similar values of the output fields. CART examines the input fields to find the best division measured by reduction of impurities resulting from the division. The division defines two subgroups, each divided again into two subgroups, and so on, until a stopping criterion is met. All divisions are binary. Decision trees systems with the top-down induction process, generate the tree from a given set of entities. Each internal node is labeled by the attribute, and the branches linking the nodes, are labeled by values of the attributes.

Tree construction process selects 'the most informative' attribute at each step, in order to minimize the expected number of cases necessary for classification. Let E be the current set (at the beginning the whole set) of processed entities, and let $c_1...c_N$ be the classes to place the entities (Lavrac, & Zupan, 2005). The algorithm for constructing the tree is consecutively called in each generated node. The construction of the tree ends if all the entities in the node belong to the same equivalence class c_i (or if another stopping criterion is met). This node, called the leaf, is labeled by the value of the class. Otherwise, 'the most informative' attribute, for example A_i is selected as the root of the sub-tree, and the currently processed set of entities E is divided into subsets E_i according to the values of the most informative attributes. Recursively, the sub-tree T_i is built for each E_i . Figure 1 shows the process of dividing data in order to obtain pure subsets (classes).

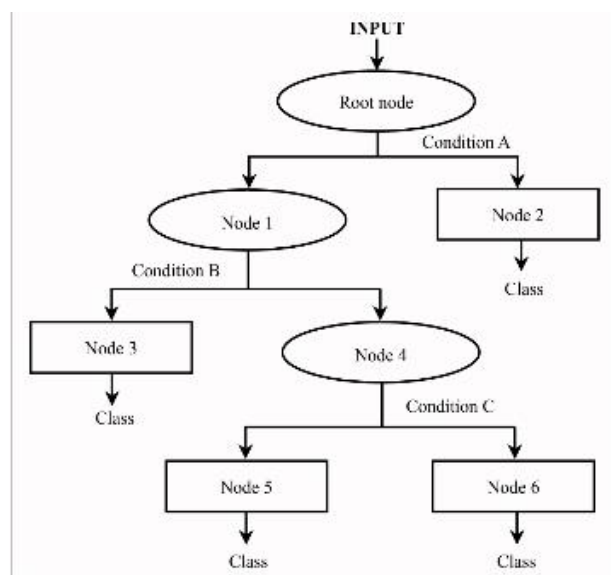


Figure 1: Dividing data in order to obtain pure subsets (classes)

Ideally, each leaf is labeled by exactly one class value. However, leaves could also be empty, if no entities with attribute values lead to the leaf; or they may be labeled by more than one class value (if there are processed entities with the same values of attributes and different values of the classes). Figure 2 shows the class assignment probability for the CART method.

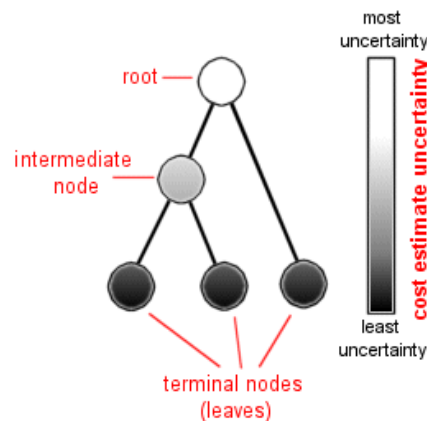


Figure 2: Class assignment probability

One of the most important CART features is tree pruning, which is the mechanism for handling noisy data (Quinlan, 1993). In tree pruning, unreliable parts of tree are eliminated in order to increase the accuracy of classification when applying on new entities. CART provides an opportunity to grow the tree, and then it prunes the tree based on the cost-complexity algorithm, which adjusts the risk assessment based on the number of end nodes. This method, which allows the tree to grow out before pruning, can result in a smaller tree with better properties. Increasing the number of end-nodes generally reduces the risk for processed data, but the actual risk is higher when the model is applied to the new entities.

CART uses top-down approach in the process of building a tree. The main difference between CART and C5.0 tree algorithm (Quinlan, 1993) is that in the C5.0 construction of decision trees involves the classification into a finite set of discrete classes while in CART the decision variable can be discrete and continuous. In CART, the leaves consist of the prediction into a numeric value or a linear combination of variables (attributes). CART (Breiman et al., 1984) features both classification and regression tree learning.

One of the CARTs advantages is its robustness with the missing data. Second is that the large number of input fields does not require a long time to process. It is easily understandable and has a simple interpretation. It can process categorical and continual data output (in our example, the data is continual).

4. RESULTS

The results of the CART analysis, conducted in this research are presented in Table 2.

Table 2: The results of CART analysis: prediction of customers' satisfaction with mobile OS

CART model
PhoneSatisfaction <= 24.500 [Ave: 27.873, Effect: -5.489]
PhoneSatisfaction <= 15.500 [Ave: 20.333, Effect: -7.54] => 20.333
PhoneSatisfaction > 15.500 [Ave: 28.971, Effect: 1.098]
Mobile OS in [Android] [Ave: 34.312, Effect: 5.342] => 34.312
Mobile OS in [Symbian OS Windows Mobile I dont know] [Ave: 27.989, Effect: -0.982]
PhoneSatisfaction <= 21.500 [Ave: 26.171, Effect: -1.818]
UsageFrequency in [rarely medium] [Ave: 28.125, Effect: 1.954]
ModelFamiliarity in [not at all] [Ave: 23.833, Effect: -4.292] => 23.833
ModelFamiliarity in [partly] [Ave: 29.556, Effect: 1.431]
PhoneSatisfaction <= 19.500 [Ave: 33.333, Effect: 3.778] => 33.333
PhoneSatisfaction > 19.500 [Ave: 27.667, Effect: -1.889]
PhoneSatisfaction <= 20.500 [Ave: 25, Effect: -2.667] => 25.0
PhoneSatisfaction > 20.500 [Ave: 30.333, Effect: 2.667] => 30.333
UsageFrequency in [very often] [Ave: 23.412, Effect: -2.759]
Employment in [student] [Ave: 25.455, Effect: 2.043] => 25.455
Employment in [unemployed employed] [Ave: 19.667, Effect: -3.745] => 19.667
PhoneSatisfaction > 21.500 [Ave: 29.609, Effect: 1.62] => 29.609
PhoneSatisfaction > 24.500 [Ave: 36.279, Effect: 2.918]

```

PhoneSatisfaction <= 27.500 [ Ave: 33.309, Effect: -2.971 ]
  Multitasking in [ no sometimes ] [ Ave: 31.618, Effect: -1.69 ]
    UsageFrequency in [ rarely medium ] [ Ave: 28.769, Effect: -2.849 ] => 28.769
    UsageFrequency in [ very often ] [ Ave: 32.5, Effect: 0.882 ] => 32.5
  Multitasking in [ yes ] [ Ave: 36.885, Effect: 3.576 ]
    PhonePurpose in [ 1 3 ] [ Ave: 39, Effect: 2.115 ] => 39.0
    PhonePurpose in [ 2 4 ] [ Ave: 34.417, Effect: -2.468 ] => 34.417
PhoneSatisfaction > 27.500 [ Ave: 37.986, Effect: 1.707 ]
  PhonePurpose in [ 1 2 ] [ Ave: 36.59, Effect: -1.396 ]
    Education in [ primary school high school bachelor ] [ Ave: 38.045, Effect: 1.456 ] => 38.045
    Education in [ master PhD ] [ Ave: 34.706, Effect: -1.884 ]
      PhoneSatisfaction <= 31.500 [ Ave: 33.417, Effect: -1.289 ]
        Employment in [ student ] [ Ave: 34.867, Effect: 1.45 ] => 34.867
        Employment in [ unemployed employed ] [ Ave: 31, Effect: -2.417 ]
          Phone purpose in [ private ] [ Ave: 25.75, Effect: -5.25 ] => 25.75
          Phone purpose in [ business both ] [ Ave: 35.2, Effect: 4.2 ] => 35.2
        PhoneSatisfaction > 31.500 [ Ave: 37.8, Effect: 3.094 ] => 37.8
      PhonePurpose in [ 3 4 ] [ Ave: 39.714, Effect: 1.728 ]
        Mobile OS in [ Symbian OS Android Windows Mobile Apple iOS ] [ Ave: 40.153, Effect: 0.438 ]
          PhoneSatisfaction <= 32.500 [ Ave: 39.256, Effect: -0.896 ]
            PhoneType in [ nokia sony ericsson HTC ] [ Ave: 38.571, Effect: -0.685 ]
              Education in [ primary school high school bachelor ] [ Ave: 37, Effect: -1.571 ] => 37.0
              Education in [ master PhD ] [ Ave: 39.444, Effect: 0.873 ] => 39.444
            PhoneType in [ samsung iPhone other ] [ Ave: 41, Effect: 1.744 ] => 41.0
          PhoneSatisfaction > 32.500 [ Ave: 41.9, Effect: 1.747 ]
            AverageMark <= 7.800 [ Ave: 40.8, Effect: -1.1 ] => 40.8
            AverageMark > 7.800 [ Ave: 43, Effect: 1.1 ]
              PhoneType in [ nokia sony ericsson iPhone ] [ Ave: 44.75, Effect: 1.75 ] => 44.75
              PhoneType in [ samsung HTC other ] [ Ave: 41.833, Effect: -1.167 ] => 41.833
          Mobile OS in [ BlackBarry OS ] [ Ave: 33.25, Effect: -6.464 ] => 33.25

```

'The most informative' attribute selected in the first step is *PhoneSatisfaction*. If the customers' satisfaction with the phone is less than 15.5, than the predicted value of their satisfaction with mobile OS is 20.333. If the *PhoneSatisfaction* is more than 15.5 and if the customers use Android OS, than the predicted satisfaction with mobile OS is 34.312. If the *PhoneSatisfaction* is among 15.5 and 21.5, mobile OS is Symbian OS, Windows Mobile, or the customer is not sure of mobile OS, and if he is not familiar with current models of mobile phones, than the predicted satisfaction with mobile OS is 23.833, etc. It can be noted, from the model in Table 2, that customers who use multitasking are more satisfied with mobile OS than the ones who do not; that customers who use phone for private purposes are less satisfied with mobile OS than those who use it for business purposes; that customers who use phone very often are more satisfied than the less frequent users, etc. Generally, customers that are more satisfied with mobile phones are also more satisfied with mobile OS (details of the results are given in CART model, presented in Table 2).

Table 3: Variable importance

No.	Nodes	Importance
1	PhoneSatisfaction	0.1141
2	MobileOS	0.0945
3	PhoneFamiliarity	0.0913
4	Multitasking	0.0861
5	Sex	0.0846
6	Age	0.0846
7	FollowTrends	0.0846
8	Education	0.0777
9	PhoneType	0.0756
10	Employment	0.0689
11	AverageMark	0.0598

Importance of input variables is shown in Table 2. There were 14 input variables, and 11 of 14 had importance greater than 0.05. As expected, most important variables for predicting the customers'

satisfaction with mobile OS are *PhoneSatisfaction* and *MobileOS*, followed with *PhoneFamiliarity* and *Multitasking*. Unexpected result is that *PhoneType* and *FollowTrends* (how often do customers follow trends related to the mobile phones) are less important than some other variables, which at first glance, might have seemed less relevant: *Sex*, *Age*, and *Education*.

Table 4: Table name

Comparing \$R-OS Satisfaction with OS Satisfaction	
Minimum Error	-11.333
Maximum Error	10.583
Mean Error	0.0
Mean Absolute Error	2.993
Standard Deviation	3.816
Linear Correlation	0.833
Occurrences	340

Evaluation of the results is presented in Table 4. It shows that the maximum absolute error of the results is 11.333. The Pearson correlation coefficient is 0.833, $p < 0.001$, pointing that the correlation is strong and significant. Mean Absolute Error of the difference is 2.993 and SD of the difference is 3.816.

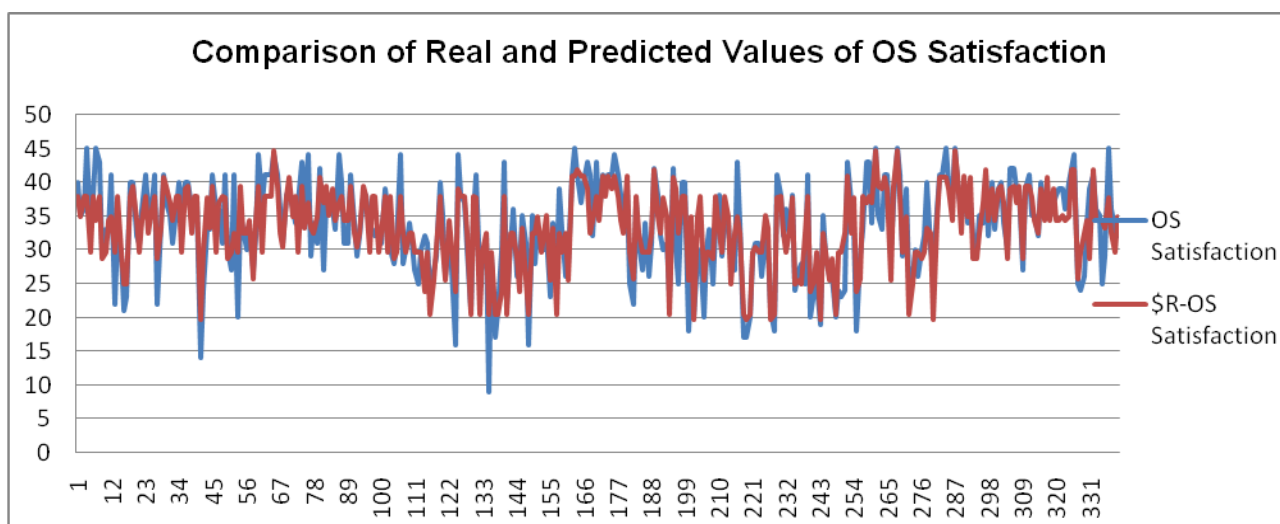


Figure 3: Prediction of customers' satisfaction using CART analysis

Figure 3 presents the differences between the results and the original data. We can notice from Figure 3 that there were no significant deviations of the results from original data. Interestingly, the range of real data is 9-45 and the range of the results is 19.667 to 44.75, which means that the model was unable to capture the low values of satisfaction with mobile OS. This is also evident from Figure 3. Moreover, SD for original data is 6.898, and SD for the CART model results is 5.746, pointing that the variability of the original data is higher than the variability of the results.

5. CONCLUSION

The main goal of this paper was to predict customers' satisfaction with mobile OS, based on the certain set of input variables, using the CART analysis. The main idea was to find the expected satisfaction value, based on the analysis performed using the input data (see Section 2). Based on the data, collected during the survey, we have measured the amount of customers' satisfaction with mobile OS. It was very important to investigate the users' opinions on mobile OS, since the mobile OS producers invest millions of EUR into the mobile OS and mobile application development. The concept of customer satisfaction and loyalty (CS&L) is important for the corporations' success, and it is the important goal for the corporations on their way to obtaining economic success.

Firstly, it can be concluded that CART technique is very simple and can achieve very high accuracy. Evaluation of the results shows that the Pearson correlation coefficient between the results and the original data is 0.833, $p < 0.001$, pointing that the correlation is strong and significant. Mean Absolute Error of the

difference is 2.993 and SD of difference is 3.816. The performance results, measured by the false positive and negative rates of CART, are in most cases larger than within other similar models.

Secondly, as Upendar, Gupta, and Singh (2012) report, besides the categorical variables, CART can easily handle numerical variables, which was the issue and the center of this research.

Finally, the results obtained in this research could provide some explanations for understanding customers' decisions and choices, guiding OS producers to success on the large, unstable and fast-growing market.

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CHARACTERISTICS OF DECISION-MAKING IN EMERGENCY RESPONSE

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Abstract: Crises are as old as mankind. Even the biblical doctrine of the origin of the world indicates antagonistic relationships among people and between people and the natural environment. Regardless of the degree to which an approach to the analysis of human society development is scientific or dogmatic, it is an undisputed fact that the man is faced with great challenges in solving existential problems. Scientific and technological development and global impacts of activities in which a country can have a dramatic role beyond its borders, led to the development of crisis management as a new scientific discipline. Main characteristics of decision making in crisis situations arise from the nature of crisis situations, which usually develop rapidly and lead to various disturbances in the functioning of natural and social systems. They are characterized by: suddenness, uncertainty and time pressure (lack of time). Efficient and effective emergency responses depend on a stable set-up of the integrated management system in emergency situations and the quality and speed of gathering information about the crisis.

Keywords: crisis situation, crisis, disaster, conflict, decision-making

INTRODUCTION

Crisis situations (those caused by man and the natural ones) have a destabilizing effect on society. The destructive nature of emergency imposes the need for timely preparation of the reaction caused by crisis situation. Preparation is multilayer and generally includes:

- Preparing for emergencies;
- Prevent of formation of emergency;
- Response to emergencies;
- Measures for the rehabilitation of consequences of emergency situations.

Crisis management or Emergency Management is a specific management process that consists of several subprocesses. The integrity of crisis management provides an adequate response to the potential crisis or a crisis. Crisis management involves identifying the crisis, crisis response planning, coping with the crisis and resolving the crisis.

The appropriateness of engaging all subjects in resolving crisis situations, depends upon the quality and speed of gathering information about the resulting crisis, and on the other hand, from the stable established an integrated management system in emergency situations.

From decision makers are expected to know the standard operating procedures and to make decisions in the shortest possible period of time:

- have all current information from the field;
- in the decision making process have to involve all relevant data and information about the crisis;
- make the best decisions based on available data;
- formulate decisions about activities and adjust for the forces on the ground and distribute commands and instructions.

When considering a "crisis situation", whether they are consequence of natural disasters, or the result of human activity, it can be concluded that there are some basic characteristics that define them, such as:

- suddenness,
- uncertainty,
- time pressure.

These characteristics emphasize the importance of timely data collection, automated processing and their appropriate use of information obtained in the decision making process.

1. CRISIS SITUATION

The current world events and weaknesses which showed liberal capitalism and globalization, suggest an increased sensitivity of the global community to the formation of turbulent social events. One should not forget the natural disasters and disasters that in short period of time radically abolish decades of development of affected regions.¹

Speed, efficiency and coherence of responses of relevant subjects for resolving crisis decisively influence the level and extent of consequences of the crisis. Timely, consistent and coordinated activities, help to reduce the risk of compromising human life and health and reduce the total material damage. Thus society must prepare to react to a crisis situation and generally includes:

- Preparing for emergencies;
- Response to emergencies;
- Measures for the rehabilitation of consequences of emergency situations.

In order to better understand the nature of crises and its basic characteristics, it is necessary to unambiguously define the concepts of the term "crisis" and discuss the relationship with the similar concepts.

1.1. The concept of crisis

The word "crisis" is now often used in everyday speech. It is used in different contexts, to describe a personal situation, to describe a situation with potentially negative consequences for individual organizations, the wider region, or a complete company. Although often used, there is still no precise and unambiguous definition of the conceptual content of the term "crisis". The difficulty in defining the term is due to the prevalence of the term "crisis" in many different scientific disciplines (economics, history, politics, medicine, ecology, psychology, sociology, "catastrophe", public administration, political science and international relations, epidemiology, computer science, military science and others.). For instance there can be a crisis of personality in psychology, in medicine we talk about the height of the crisis as a serious illness (or crisis in the health system) while ecology indicates a critical threat to the environment. Even within the same scientific discipline, the notion of crisis takes on different meanings depending on the level of generality of the subject area (eg, micro and macro economics).

There is no generally accepted definition of a crisis. By Kathleen Fern-Banks crisis is a "major event with potentially negative consequences that affect the organization, company or industry, as well as its target audience, products, services or good name ...".² For Hamblin crisis is "an urgent situation in which all members of the group are faced at common threat",³ while Pauchant and Mitroff understand crisis as "a physical disorder that affects the system as a whole and threatens its basic assumptions, its essence and identity".⁴ Fink claims that the crisis is any event that could escalate in intensity, which may be in the spotlight of the media and governments, which can interfere with normal business operations and affect the company's image and profit".⁵ In the London School of PR crisis is defined as a serious incident that affects the person's safety, the environment, products and reputation of the organization.⁶ According to Person and Claire crisis is defined as "low probability event with major consequences that threaten the life of the organization, characterized by unclear causes, effects and means of solution, and the belief that decisions must be made quickly".⁷

The simplest definition of the crisis suggests that it is large and adverse event that occurs suddenly and brings negative consequences. Although sudden, the crisis in some cases is not unexpected, because there are usually some indicators that warn of potential occurrence of crises. If these warnings are not timely noticed, it's a sign that either there was insufficient information on the indicators, or they were not taken seriously.

¹ Mihalski, K.: O krizi, Književna zajednica Novog Sada, Novi Sad, 1987, str. 33.

² Faren Banks, K.: Crisis Communications, A Casebook Approach, Lawrence Erlbaum Associates Publishers, Mahwah, NJ, 1996., p. 1

³ Hamblin, R., L.: Leadership and Crisis, Sociometry 21, 1958., p. 322.

⁴ Pauchant, T. C. and I. I. Mitroff,: Transforming the Crisis-Prone organisations, Preventing Individual, Organisational, and Environmental Tragedies, Jossey Bass Publishers, San Francisco, CA, 1992. p. 12.

⁵ Fink, S.: Crisis Management, Planning for the Inevitable, Amacom, New York. 1986.

⁶ London School of Public Relations, 1998.

⁷ Pearson, C. M. and J. A. Clair: Reaffirming Crisis Management, Academy of Management Review 23, 1998., p. 60.

Crisis situations can be defined as incidents that occur quickly and include any kind of threats for the country, its territory, citizens, armed forces, property, or vital interests. This threat leads to the creation of conditions for some kind of diplomatic, economic, political or security justification and necessity of the use of state, military and civilian institutions and agencies in order to preserve national values. Crisis situations can be caused by events in nature or man's influence. Some examples of emergencies include:

- natural disasters (floods, fires, earthquakes, snowfall, ...),
- terrorist attacks,
- industrial incidents,
- epidemics and pandemics,
- armed aggression from outside,
- riots and protests of the population, etc.⁸

In addition to sudden natural disasters, in most crises time period preceding the development of the crisis. If you understand the causes of such risks, it is necessary to establish a risk management process to eliminate or reduce the probability of crises. This means above all that is necessary to establish a stable system of organization in all areas where there is an increased risk of crisis. Stable and well-organized system is a good prevention for prevention of crisis situations.

Without going further into the difficulties of the concept of crisis, for the purposes of this paper will be accepted modern definition of crisis by Paul t'Hart, who believes that the crisis is "a serious threat to the basic structures or the fundamental values and norms of the social system which, in terms of time pressures and very uncertain situations, requires critical decision making".⁹ This definition has two important features. As an important priority states, that can be applied to all types of disturbances (environmental threats, crashes of command and information system (CIS), the economic crisis, conflicts within the country, riots, regional wars, explosions and natural disasters). Second, this definition focuses attention on the decisions necessary to resolve the resulting crisis.

1.2. Crisis and Disaster

In the everyday life we often use the term "crisis" and "catastrophe." Term generally describes undesirable event, natural or technological disaster, and they are often confused and used interchangeably. Like any scientific discipline, and crisis management is trying to make a systematic classification and definition of conceptual content.

According to Arjen Battalion, "it can not be formulated useful definition of a disaster without the proper definition of the term crisis, since the two concepts are inseparably linked." As well as when it comes to defining the term "crisis", there is no universal definition of the term "disaster". It also depends on the area in which it appears.

In defining "disaster" at the highest level of generality approach is from four different angles, including:

- According to the source or origin (natural or technological);
- The consequences (degree of loss and damage, the intensity and duration);
- According to the course (intervention of different actors, the capacity for response, organizations and communities);
- The level of risk that entails.¹⁰

The classic definition of a disaster (Kvaranteli), revolves around four key elements:

- description of the source,
- physical damage,
- social disorder and
- negative effects.

⁸ http://csi-aba.com/index.php?option=com_content&task=view&id=31&Itemid=1, doc. dr sc Korajlić, N., Krizni menadžment – pojam kriza.

⁹ Rosenthal, Uriel, Michel T. Charles and Paul t'Hart.: The World of Crises and Crises Management, in: Coping with Crises, The Management of Disasters, Riots and Terrorism, edited by Uriel Rosenthal, M. T. Charles and Paul t'Hart, Springfield, IL: Charles T. Thomas, 1989., p. 10.

¹⁰ Lalonde, C.: In Search of Archetypes in Crises Management, Journal of Contingencies and Crisis Management, No. 2, June 2004.

Older versions have a focus on definitions of sources and impairments, but the recent on social disorder. The question is whether the definition of which includes a combination of these elements encompass the essence of the disaster.

In a joint consideration of the concept of "crisis" and "disaster", we differ processes of objectivized disorders and subjective process of collective thinking. "Crisis" refers to the process of perception disorder, a "catastrophe" to when a collective assess that process with negative terms. In this perspective, a disaster is a crisis with a bad end.

1.3. Crisis and conflict

Social conflicts are one of the major social phenomena. They dated throughout the history of the human society originating from a difference in the needs and interests between individuals and groups.

As a rule, the conflict of interests of individuals and groups lies in the heart of most sociological crises such as wars, demonstrations, terrorist attacks, kidnappings, most economic conflicts, crises and conflicts caused by cultural differences and so on. In addition to the conflict (conflict), milder forms that may precede the crisis are "disorders" and "emergency".

The disorder is seen as a time-limited dysfunction in the normal events that do not require too much potential to overcome social problems. They happen every day and do not necessarily lead to severe dysfunction of the system (different types of delays, the larger failures, strikes, etc..).

The state of emergency is not yet a crisis, but imposes extraordinary demands for the elimination of the causes. Social systems already have some established structures to address some emergency situations (larger fires, rescue operations in case of natural and other disasters, combat demonstrations and riots, etc..).

2. CHARACTERISTICS OF DECISION MAKING IN EMERGENCY RESPONSES

Basic characteristics of decision making in solving the crisis directly arise from the characteristics of crisis situations that are reflected through:¹¹

- Suddenness - The crisis usually occurs suddenly and unexpectedly, though in some cases there are indicators (indicators) that indicate possible emergence of a crisis (hurricane, etc..).
- Uncertainty - How the event that caused the crisis represents a possible future situation, that incitement and crisis follows the uncertainty that the future will bring. Therefore, planning the crisis management is under big uncertainty, (lacking the necessary information to make rational decisions).
- Time pressure - The third characteristic is the time pressure of the crisis and the need to work and make decisions very quickly, in terms of lack of time, in order to prevent or reduce the negative effects of the crisis.

It may be noted that the decision making process in resolving crises and uncertainty is characterized by ambiguity. The first and most important is the choice of the appropriate decision. Most often, the selection of the best alternative defining the outcome and results of activities undertaken. In terms of lack of knowledge of the probability of occurrence of upcoming events, it is difficult to single out one criterion for selection of variants as the most effective. The best-known criteria for decision making in these situations are as follows:

- criterion of pessimism,
- criterion of optimism,
- the criterion of minimum regret,
- criteria of rationality.

Implementation these criteria will be explained through the analysis of a decision making in situations of uncertainty in which they defined three types of action and decision-makers assumed three possible "states of nature" as shown in tables through the matrix C:

Table 1: The matrix C

¹¹

http://www.men.fon.rs/index.php?option=com_jotloader§ion=files&task=download&cid=132_789e5ec57049dc83daf2c7bf8ea45723&Itemid=132, prof. dr Petrović, Dejan, Krizni menadžment, prezentacija, slajd 5, 6 i 7.

i \ j		States of nature		
		N1	N2	N3
Variants of the decision-maker	S1	50	40	10
	S2	45	35	25
	S3	38	44	35

The elements of the matrix represent the effect achieved by the decision maker for each variant of acting, in all states of nature defined. Using the criteria for deciding when uncertainty should decide on the variants of action decision maker.

2.1. Wald's pessimistic criterion

Wald's pessimistic criterion to decision maker suggests extreme caution. It starts from the pessimistic assumption that for any selected option, occurs the most unfavorable state of nature to the decision maker. In other words we need to determine the worst result for each variant, and then choose the one option that ensures the best among the most unfavorable values ($\max_i \min_j$).

Table 2: Wald's pessimistic criterion

i \ j		States of nature			\min_j
		N1	N2	N3	
Variants of the decision-maker	S1	50	40	10	10
	S2	45	35	25	25
	S3	38	44	35	35
$\max_i \min_j$					35

Applying Wald's pessimistic criterion its suggest to decision maker to select an optimum S3.

2.2. Hurwicz's criterion of optimism

The criterion of complete optimism assumes that for decision maker is always best to perform a condition that allows the maximum possible effect for the selected variant. For each selected variant should determine the best value for the effect of these values, then select the best value by the decision maker. In accordance with the received value of the effect a variant of activity is chosen.

Table 3: Hurwicz's criterion of optimism

i \ j		States of nature			\min_j
		N1	N2	N3	
Variants of the decision-maker	S1	50	40	10	50
	S2	45	35	25	45
	S3	38	44	35	44
$\max_i \max_j$					50

Applying this criterion, to Hurwicz optimism-decision maker is proposed selection variants S1. Correction of complete optimism is done by coefficient optimism $0 < p < 1$. The coefficient of optimism is multiplied with the best value variant, and its complementary value $(1-p)$ is multiplied by the most unfavorable value variant. If you are resolved to put the example $p = 0.6$, we get the following result:

Table 4: Correction of optimism criteria

	max	min	
S1	50	10	$50 \times 0.6 + 10 \times 0.4 = 34$
S2	45	25	$45 \times 0.6 + 25 \times 0.4 = 37$
S3	44	35	$44 \times 0.6 + 35 \times 0.4 = 40.4$

After adjusting of criteria optimism, to decision maker is suggested to select variant S3.

2.3. Savage's criterion of minimum regret

Regret should be understood as a lost opportunity to choose the decision that to decision maker provides the best results. As a measure of regret is taken the difference between the results that could achieve the maximum good selection and results achieved as a result of the selected variant (before knowing the actual state of nature).

By calculating the value of regret for all of nature is getting the matrix of regret. For each variation in the matrix of regret it should be determining the least favorable results, and then choose the best among them and according to them to choose a variant action.

Table 5: Matrix of regret

i \ j		States of nature			min j
		N1	N2	N3	
Variants of the decision-maker	S1	0	4	25	25
	S2	5	9	10	10
	S3	12	0	0	12
min max $i \quad j$					10

Using the criteria of minimum of regret to the decision maker is suggested to select an optimum S2.

2.4. Laplace's criterion of rationality

This criterion is typical for decision making in risk situations. It is assumed that there are few situations in which the decision maker could not assign a probability of occurrence to states of nature (the environment, opponents). It is also recommended that all states have assigned equal probability, in which shall be $\sum p_j = 1$. Then, for each variant calculate the expected value and then the best is chosen with maximum expected value.

Table 6: Laplace's criterion of rationality

i \ j		States of nature			Expected values
		N1 $p_1=1/3$	N2 $p_2=1/3$	N3 $p_3=1/3$	
Variants of the decision-maker	S1	50	40	10	33,33
	S2	45	35	25	35
	S3	38	44	35	39
Maximum expected value					39

To the decision maker is suggested to select an optimum S3. Laplace criterion can be applied to a matrix of regret. In doing so, you get the following result:

Table 7: Implementation of Laplace criteria to matrix of regret

i \ j		States of nature			Expected values
		N1 $p_1=1/3$	N2 $p_2=1/3$	N3 $p_3=1/3$	
Variants of the decision-maker	S1	0	4	25	9,67
	S2	5	9	10	8
	S3	12	0	0	4
Minimum expected value					4

Applying of Laplace criterion on matrix of regret to decision maker is suggested to choose variant S3.

3. CONCLUSION

Emergency and crisis management preoccupy many theorists and practitioners involved in the process of managing the crisis. The study of the crisis management in our country is relatively recent and still in beginning, especially when it comes to the defense system (still in the stage of basic conceptual considerations). The main precondition for understanding the concepts of crisis management is to define the crisis and theoretical systematization of fundamental characteristics.

The term crisis causes a number of concerns. Involves uncertainty, suffering and testing, and points to an unknown future whose conditions can not be sufficiently clarified. This concept is comprehensive, so it can be said to represent pseudoconcept. For the purposes of this paper was accepted definition of crisis according to Paul t'Hart, who believes that the crisis is **"a serious threat to the basic structures or the fundamental values and norms of the social system which, in terms of time pressure and highly uncertain circumstances requires making critical decisions"**.

Crisis situations in the field of defense activities are significantly narrower concept than crises in general and specified in the defense strategy and doctrine through the defined mission. Mission of the Army are: (1) defending the state from external armed threat, (2) participation in building and maintaining peace in the region and the world, and (3) support in case of natural disasters.

Whether the crisis is caused due to natural disasters, or is result of human activity, it can be concluded that there are some basic characteristics that define them as follows: suddenness, uncertainty and time pressure. These characteristics negatively reflected on the decision making process because they assume a high degree of uncertainty. Decisions made in such circumstances, often have far-reaching consequences.

Since the destructive impact of a crisis is large and crisis can not be eliminated in the future, there has been a rapid development of new scientific discipline called **"crisis management"**.

Main characteristics of decision making in crisis situations arise from the nature of crisis situations, which usually develop rapidly and lead to various disturbances in the functioning of natural and social systems. Taking into account the specificities of crisis situations, modern decision theory have developed a special approach for decision making in emergency response - **contingency (situational) approach**, which takes into account the great state of dynamic change and uncertainty of events in connection with the crisis. The contingency approach neglect universal principles and solutions and highlight the extreme complexity of decision making in crisis situations. In its essence is a "diagnostic approach" that encourages decision makers to constantly analyze and understand the situation on the ground, and to promptly detect changes and to respond to them.

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APPLYING THE CRITERIA OF DECISION-MAKING TRENDS IN UNCERTAIN SITUATIONS

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Abstract: *Threats to survival, uncertain trends in environment changes, a large number of constraints and market globalization are all imposing two key dimensions of production system strategy: predicting and risk-taking. The paper describes a quantitative approach to decision making when the probability distribution of future system states is unknown. Using statistical data on production trends for a selected product of 'Sloboda' Co., Cacak, Serbia, a mathematical model was defined, and criteria of decision-making trends were applied to design a production program.*

Keywords: *model, predicting, decision making, uncertainty, criteria, production program, production*

1. INTRODUCTION

Business and manufacturing systems (BMS) belong to a group of organizational, complex, dynamic and stochastic systems, where current state is known, which, influenced by management actions and environment impact, is transformed into one from a set of possible states. If corresponding inputs are not continuously provided due to entropy increase, these systems tend to degenerate. The production program is an instrument of business policy defined by the type and amount of products to be manufactured in a certain period of time having in mind the principle of "it should be produced what can be sold". The systems for armament and military equipment production have a specific place and role. Armament production and trade are governed by special legal provisions, with a high level of business globalization presence. Lacking reliable indicators of the marketing needs and possibilities, and taking into account the fact that production is often intended for 'unknown customers', require the analysis of goods sales dynamics in the previous period. Also, using the corresponding models and methods it will be possible to view the tendencies and to forecast the market absorption power.

2. PROBLEM ANALYSIS AND DESCRIPTION

Dynamic development, the results achieved and more than six decades long experience in special-purpose production have placed 'Sloboda' Co. Cacak, Serbia in a group of leading enterprises of metalworking industry in the Republic of Serbia. Special-purpose production program characteristics, thereby product features, have significant impact on the choice of technologies, number and structure of the range of products, development of products, utilization level of production capacities, supply of raw materials and parts, choice of suppliers and cooperating enterprises, defensive doctrine and the attitude of state. The purpose, complexity and characteristics of products all demand involvement of a number of technological disciplines such as machining, chemical and heat treatment, production of pyrotechnical mixtures and explosive composition of the product. This type of production requires provision of conditions for equipment maintenance and internal supply of special tools, power and fluids, therefore appropriate equipment for the purpose is a constituent component of total capacities to realize the foreseen production program. It should be pointed out that the character and purpose of products impose the highest possible quality and reliability level, which implies corresponding methods, equipment, qualified labor force and necessary polygonal testing of functional characteristics and reliability of parts, units and the product itself. Production program development is partly dependent of other plants that, being cooperating members, manufacture specific parts (gunpowder, caps) or items for using the products (pistols, rifles, guns). Basic characteristics of the range of products that are of significance for the system's dynamic equilibrium and management are: a large number of articles for various purposes produced in more than one variant, a complex structure of articles with a comparatively large number of parts and technological installment levels, a smaller number of principal parts installed in a number of articles limiting the production and delivery priority.

The analysis of market and production characteristics shows the significance of export participation. Threats to survival of special-purpose enterprises, uncertain trends of changes in the environment, a large number of

constraints and impact of diverse markets impose two key dimensions to the strategy: forecasting and risk-taking. Each product's lifetime is filled with dynamic changes viewed through changes in the volume of production as a function of time, so its presence in the production program is uncertain and is linked to adequate risk-taking. Under conditions of undefined production program for one or more than one product, most frequently due to the absence of contract, forecasting methods should be used in program design. In this way, the system could utilize production resources correspondingly, **time** as the only non-renewable resource and would be able to respond in real time to unexpected orders by short-term deliveries.

The problem of production results generalization with the aim to predict the likely trends is associated with a time interval, within which the behavior of BMS is analyzed, and time horizon for predicting, considering that the behavior of those systems is analyzed as a function of time. The time interval for statistical analysis must be chosen very carefully having in mind intensive and rapid changes of business system's state and relevant impacts on production program trends and production orientation. A set of data that defines the experimental sphere depends on BMS's business cycle duration, total number and frequency of the article's consecutive distribution in the production program, dynamics and volume of production per article and per year.

As the production program synthesizes a complex set of factors of stochastic and dynamic nature, the design of production program includes and summarizes two key contradictions: uncertainty of future states and quantification of relevant parameters. In accordance with the adopted concept of dealing with the problem of the program and production orientation, from forecasting to short-term planning, this paper presents a quantitative approach that summarizes regression and correlation analysis, extrapolation of trends and decision making based on applying rules and criteria that are used in the game theory. The concept proposed comprises:

- Establishment of regularity in trends of physical volume of production of the BMS in order to define the time dimension of business cycle (T).
- Analysis of the structure of production programs from the aspect of the article's consecutive distribution to establish the time interval relevant to statistical analysis (experimental area).
- Analysis of the market dynamics for the article, group of articles or production program, depending on the scope of investigations, in order to choose the approximative curves that define market absorption power.
- Defining the prediction time interval (prediction area) and designing possible states by extrapolation of trends in order to perceive alternatives in market behavior.
- Forming the game matrix for alternative-system states in the interval that comprises both the experimental area and the prediction area.
- Choice and application of criteria and methods for ranging the alternatives in order to make decisions that are, in a further procedure, susceptible to re-examination, using qualitative analysis.

Analyzing market and production characteristics of a chosen BMS (Djukic, et al., 2010), we established the production cycle length, $T=18$ years. Assuming that the experimental area should reflect the existing average (not extremely good, or extremely bad) conditions from the aspect of the article consecutive distribution in production programs during an 18-year period, a 5-year time interval was used to determine a statistical set of data – experimental area (Djukic, Zizovic & Jovanovic, 2010). The 18 years' period of business operations of 'Sloboda' Co. is characterized by manufacturing a broad range of products with pronounced dynamic trends in respect of the volume and distribution of products in production programs. Based on the analysis of production dynamics at 5-year intervals, the stochastic dependence of the volume of production trends is possible to describe using first-, second-, third- and fourth-degree polynomials, geometric and exponential regression, where the prediction area is determined by a 1-year time period (Djukic, et al., 2010). Developing a model of alternative-system states, choice of criteria, decision making method and decision making argumentation depend largely on manager's method and work style (Djukic, Dobricic & Djukic J., 2007; Lindsey, Pavur, 2009), use of appropriate software tools being desirable (Djukic & Jovanovic, 2009; Goodwin, Önköl, & Thomson, 2010).

In order to forecast market demands for anti-aircraft ammunition of cal 30-57 mm and aircraft ammunition of cal 30 mm, the dynamics of production was investigated for 32 products manufactured in a number of variants for various weapon systems. A 5-year production dynamics given in 10^3 pieces/year of a selected product-representative (R) is described by the relation (1).

$$R = \{\{t_1, Q_1\}, \{t_2, Q_2\}, \{t_3, Q_3\}, \{t_4, Q_4\}, \{t_5, Q_5\}\} = \{\{1, 234.3\}, \{2, 566.4\}, \{3, 256.3\}, \{4, 222.5\}, \{5, 350.6\}\} \quad (1)$$

Stochastic dependence of a product-representative sale as a function of time is described by six adopted types of approximative curves: linear regression, square regression, third-degree polynomial regression, fourth-degree polynomial regression, geometric and exponential regression.

Regressions were defined by the relations from (2) to (13) according to the choice of dependent and independent variable.

$$q_1(t) = 359,41 - 11,13 \cdot t \quad (2)$$

$$q_2(t) = 293,56 + 45,312857 \cdot t - 9,407143 \cdot t^2 \quad (3)$$

$$q_3(t) = -832,18 + 1626,709524 \cdot t - 612,482143 \cdot t^2 + 67,0083 \cdot t^3 \quad (4)$$

$$q_4(t) = -269,14 + 513,119167 \cdot t - 2745,9125 \cdot t^2 + 583,4583 \cdot t^3 - 43,0375 \cdot t^4 \quad (5)$$

$$q_5(t) = 301,73704546686 \cdot t^{0,01233317152} \quad (6)$$

$$q_6(t) = 317,30097620,9872533173 \quad (7)$$

$$t_1(q) = 3,44049 - 0,001351 \cdot q \quad (8)$$

$$t_2(q) = -8,512162 + 0,068391 \cdot q - 0,0000878495 \cdot q^2 \quad (9)$$

$$t_3(q) = 65,29945 - 0,5947887 \cdot q + 0,0017808 \cdot q^2 - 1,6383958 \cdot 10^{-6} \cdot q^3 \quad (10)$$

$$t_4(q) = 2890,026 - 37,345485 \cdot q + 0,17505 \cdot q^2 - 0,00035 \cdot q^3 + 2,49656 \cdot 10^{-7} \cdot q^4 \quad (11)$$

$$t_5(q) = 2,1556391448 \cdot q^{0,0331059257} \quad (12)$$

$$t_6(q) = 2,7527817876 \cdot 0,9998309645 \quad (13)$$

Data on production trends and corresponding regression curves are presented in Figs.1-4.

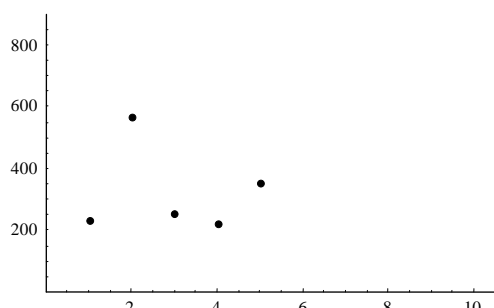


Figure 1: Experimental area of product R presented in coordinate system $\{t_i, q_i\}$

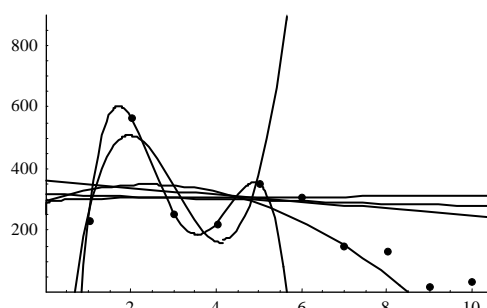


Figure 2: Regression functions $q_i(t)$ presented in experimental area and prediction area

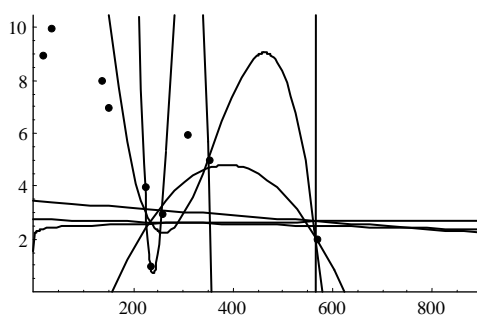


Figure 3: Regression functions $t_i(q)$ presented in experimental area and prediction area

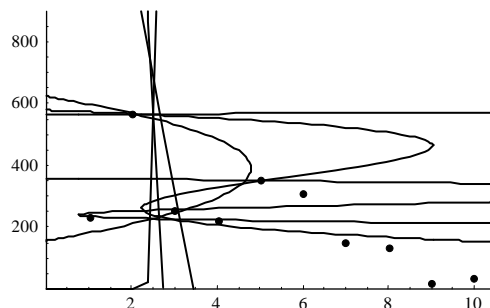


Figure 4: Multi-functions $p_i(t)$ inverse to regression functions $t_i(q)$ presented in coordinate system $\{t_i, q_i\}$

Figure 1 shows the dynamics of product R production analyzed over a 5-year period, Figure 2 shows production trends and regression curves $q_i = f_i(t)$ described by the relations (3) – (7), Figure 3 the dynamics of production and regression curves $t_i = f_i(q)$ described by the relations (8) – (13) and Figure 4 multi-functions $p_i(t)$ inverse to functions $t_i = f_i(q)$. Situations where it is little known about the future state of a system, and the distribution of probabilities for the event that decision is made on is unknown, are referred to as uncertain. Solving the prediction model requires the choice of one of the alternatives offered (regression curve). We can then use certain rules well-known in the Game Theory, i.e. the Theory of Statistical Solutions. Uncertainty situations do not have ingredients of conflict because the states of nature are a consequence of the alternatives (strategies) chosen by a decision maker. In order to overcome the above mentioned fact, apart from regressions $q_i = f_i(t)$, multi-functions $p_i = f_i(t)$ were introduced. To the maximum, six types of alternative curves $t_i(q)$ can define twelve multi-functions. A few criteria can be used in decision making, from extremely pessimistic to extremely optimistic. In ranking the alternatives three criteria of trends will be applied: standard error of the regression, coefficient (index) of determination and elasticity coefficient of demand.

- Standard error of the regression $K_1 \rightarrow$ principle of minimum

It is a mean value of original data deviation from estimated values obtained by corresponding regression curves (14). According to this criterion, the best alternative has the least standard error (15):

$$\{(t_i, q_i), i = \overline{1, n}\} \Rightarrow q_r \Rightarrow S_q = \sqrt{\frac{\sum_{i=1}^n (q_i - q_r)^2}{n}}, \quad \{(q_i, t_i), i = \overline{1, n}\} \Rightarrow t_r \Rightarrow S_t = \sqrt{\frac{\sum_{i=1}^n (t_i - t_r)^2}{n}} \quad (14)$$

$$K_1 = \min_i \{S_{q_i}, i = \overline{1, m}\} = \min_i \{S_{t_i}, i = \overline{1, k}\} \quad (15)$$

- Coefficient (index) of determination $K_2 \rightarrow$ principle of maximum

To measure the strengths of correlations between the observed characteristics, coefficient (index) of determination is applied (R_{iq}^2, R_{qt}^2), relations (16) and (17). The best alternative has the highest value of coefficient (index) (18):

$$\{(t_i, q_i), i = \overline{1, n}\} \Rightarrow q_r \Rightarrow \left\{ \bar{q} = \frac{\sum_{i=1}^n q_i}{n} \wedge S_q^2 = \frac{\sum_{i=1}^n (q_i - q_r)^2}{n} \wedge s_q^2 = \frac{\sum_{i=1}^n (q_i - \bar{q})^2}{n} \right\} \Rightarrow R_{iq}^2 = 1 - \frac{S_q^2}{s_q^2} \quad (16)$$

$$\{(q_i, t_i), i = \overline{1, n}\} \Rightarrow t_r \Rightarrow \left\{ \bar{t} = \frac{\sum_{i=1}^n t_i}{n} \wedge S_t^2 = \frac{\sum_{i=1}^n (t_i - t_r)^2}{n} \wedge s_t^2 = \frac{\sum_{i=1}^n (t_i - \bar{t})^2}{n} \right\} \Rightarrow R_{qt}^2 = 1 - \frac{S_t^2}{s_t^2} \quad (17)$$

$$K_2 = \max_i \{R_{iq_i}^2, i = \overline{1, m}\} = \max_i \{R_{qt_i}^2, i = \overline{1, k}\} \quad (18)$$

- Elasticity coefficient $K_3 \rightarrow$ principle of maximum

Elasticity between two characteristics is defined as a relationship between their relative changes. The thus obtained value is expressed by elasticity coefficient that indicates the per cent level of some quantity future change in case when the other quantity changes by 1 per cent from the observation level. The coefficient can represent arc elasticity (20) or point elasticity (21).

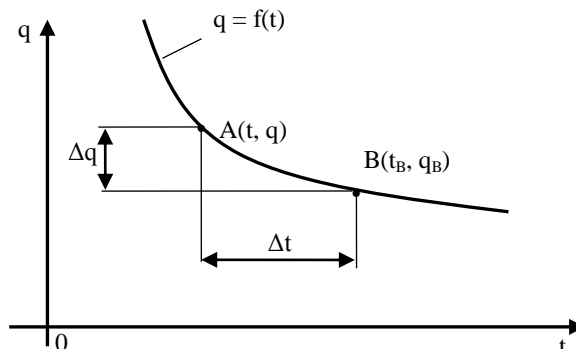


Figure 5: Regression curve $q = f(t)$ with designated initial point (A) and terminal point (B), absolute growth-rate (Δq) with respect to absolute time change (Δt)

$$\Delta q = q_B - q, \Delta t = t_B - t, r_q = \frac{\Delta q}{q}, r_t = \frac{\Delta t}{t} \quad (19)$$

$$\varepsilon_q = \frac{r_q}{r_t} = \frac{\frac{\Delta q}{q}}{\frac{\Delta t}{t}} = \frac{t}{q} \cdot \frac{\Delta q}{\Delta t}, \quad \varepsilon_t = \frac{q}{t} \cdot \frac{\Delta t}{\Delta q} \quad (20)$$

$$\varepsilon_q = \lim_{\Delta t \rightarrow 0} \frac{t}{q} \cdot \frac{\Delta q}{\Delta t} = \frac{t}{q} \cdot \lim_{\Delta t \rightarrow 0} \frac{\Delta q}{\Delta t} = \frac{t}{q} \cdot \frac{dq}{dt}, \quad \varepsilon_t = \frac{q}{t} \cdot \frac{dt}{dq} \quad (21)$$

Point elasticity coefficient shows a value for infinitesimally small value of the observed characteristics. The best alternative has the highest value of elasticity coefficient (22):

$$K_3 = \max_i \{ \varepsilon_{q_i}, i = \overline{1, m} \} = \max_i \{ \varepsilon_{t_i}, i = \overline{1, k} \} \quad (22)$$

3. PREDICTION AND DECISION MAKING MODEL

Six adopted types of approximative curves define a set of alternatives $q_i = f_i(t)$ and $p_i = f_i(t)$ in the game matrix, whereby we can determine the states of the systems $S_1 - S_5$ in the experimental area (5 years), while using trend extrapolation the state of the system S_6 in the prediction area (1 year) can be determined. Applying the adopted criteria of trends $K_1 - K_3$ we will choose optimal alternatives. The prediction and decision making model is presented in Table 1.

Table 1: Integrated model for prediction and decision making (alternatives – systems states – decision making criteria)

q _i ,p _k		S _j ,K _s	SYSTEMS STATES S _j , j = 1,2,...,6						CRITERIA K _s , s = 1,2,3		
			S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	K ₁	K ₂	K ₃
ALTERNATIVES	q _i (t)	q ₁	348	337	326	315	304	293	127,4	0,01513	-0,228
		q ₂	330	347	345	324	285	227	126,4	0,02993	-1,79
		q ₃	249	507	345	164	365	1352	55	0,81541	6,716
		q ₄	234,3	566,4	256,3	222,5	350,6	-507	0	1	23,57
		q ₅	301,7	304,3	305,8	306,9	307,8	308,5	130,1	- 0,02756	0,012
		q ₆	313	309	305	301	298	294	129,5	- 0,01716	-0,08
		PRINCIPLE "MIN-MAX":						MIN	MAX	MAX	
	VALUE OF CRITERIA K _s :						126.4	0.02993	0.012		

	OPTIMAL ALTERNATIVE $q_i(t)$:							q_2	q_2	q_5
ALTERNATIVES $p_k(t)$	$p_1(t_1)$	1806	1066	326	-414	-1154	-1894	1,404	0,01513	0,427
	$p_2(t_3)$	573	566,3 9	224	206	349,5	184	0,902	0,5929	-3,27
	$p_3(t_3)$	573	566,3 9	224	206	349,5	369	0,902	0,5929	3,088
	$p_4(t_3)$	573	566,3 9	224	206	349,5	534	0,902	0,5929	-8,41
	$p_5(t_4)$	234,3	566,4	256,3	222,5	350,6	218	0	1	-20,2
	$p_6(t_4)$	234,3	566,4	256,3	222,5	350,6	267	0	1	13,31
	$p_7(t_4)$	234,3	566,4	256,3	222,5	350,6	349	0	1	-33,7
	$p_8(t_4)$	234,3	566,4	256,3	222,5	350,6	567	0	1	538,2
	$p_9(t_5)$	-0,008	0,104	21674	33333	66666	90999	1,470	- 0,08066	0,033
	$p_{10}(t_6)$	5990	1890	-509	-2210	-3530	-4609	1,463	- 0,06970	0,779
	PRINCIPLE "MIN-MAX":							MIN	MAX	MAX
VALUE OF CRITERIA K_s :							0	1	538,2	
OPTIMAL ALTERNATIVE $p_k(t)$:							p_5, p_6, p_7, p_8	p_5, p_6, p_7, p_8	p_8	
IDEAL EXPLOITATION CAPACITY: $C_e = 600\ 000\ \text{kom/god}$										

Linear (t_1 – relation 8), geometric (t_5 – relation 12) and exponential (t_6 – relation 13) regressions define the states of the systems by functions p_1 , p_9 and p_{10} . A second-degree polynomial regression (t_2 – relation 9) is not included in the model because it does not define possible states (S_6) in the prediction area. A third-degree polynomial regression (t_3 – relation 10) defines three values of the state (S_6) by multi-functions p_2 , p_3 and p_4 . A fourth-degree polynomial regression (t_4 – relation 11) defines four values of the state (S_6) by multi-functions p_5 , p_6 , p_7 and p_8 . Considering that real values of the volume of production (Q_R) range from zero to ideal exploitation capacity (C_e), it is necessary in decision making to leave out the states of the system S_6 that are defined by the functions q_3 , q_4 , p_1 , p_9 and p_{10} . This means that the prediction model consists of two game matrices of the (4x6) and (7x6) formats. The criteria of trends will be applied to the alternatives defined by the relation (23). Relations (24) and (25) are used to define optimal alternatives (q^* , p^*).

$$Q_R \in [0, C_e] \Leftrightarrow \{q \in (q_1, q_2, q_5, q_6) \wedge p \in (p_k | k = \overline{2,8})\} \quad (23)$$

$$(K_1 \Rightarrow q^* = q_2 \wedge K_2 \Rightarrow q^* = q_2 \wedge K_3 \Rightarrow q^* = q_5) \Rightarrow \{q^* \in (q_2, q_5)\} \quad (24)$$

$$K_1 \Rightarrow p^* = (p_5, p_6, p_7, p_8) \wedge K_2 \Rightarrow p^* = (p_5, p_6, p_7, p_8) \wedge K_3 \Rightarrow p^* = p_8 \Rightarrow \{p^* \in (p_5, p_6, p_7, p_8)\} \quad (25)$$

4. CONCLUSION

Based on Table 1, Figure 6 and relations (24) and (25) it is possible to define the limits within which the future volume of production (Q_R) trends are predicted for the product – representative (R), relation (26):

$$\{q^* \in (q_2, q_5)\} \Rightarrow 227000 \leq Q_R \leq 308500 \wedge \{p^* \in (p_5, p_8)\} \Rightarrow 218000 \leq Q_R \leq 567000 \quad (26)$$

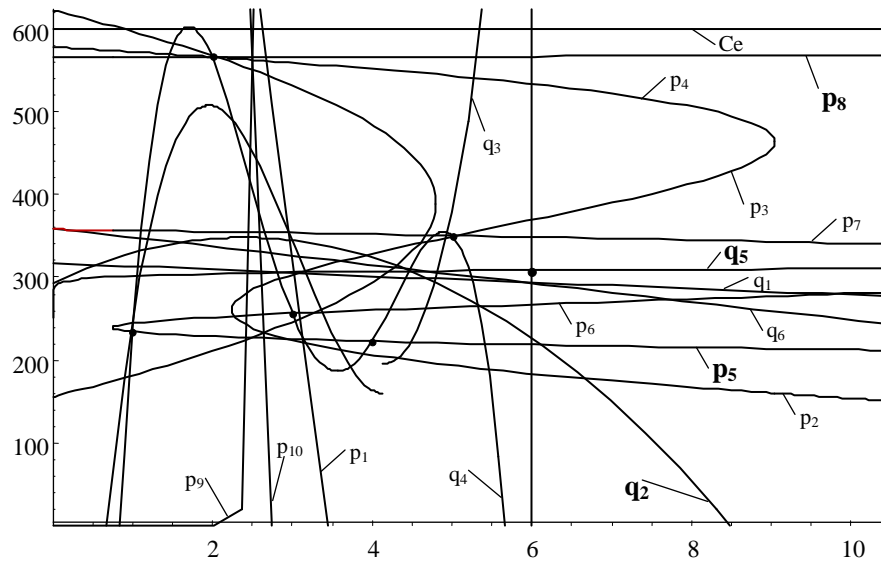


Figure 6: Exploitation capacity (C_e), production realized $S_1 - S_5$, regression curves $q_i(t)$, regression curves $p_k(t)$ inverse to the functions $t_i(q)$ and volume of production in the prediction area (S_6)

The paper presents the decision making process that synthesizes in itself several methods and techniques as a starting point for applying quantitative models, which no doubt represents progress compared to intuition and experience mainly dominating the prediction practice. Based on a 5-year analysis of business operations the production program was designed for the next year, and using the adopted criteria it ranges within limits defined by the relation (26). With a flow of time, it is possible to conclude that the volume of $Q_R = 306\,700$ pieces/year (indicated in Fig.6, on a rectilinear line $t=6$) was realized, which subsequently confirms the applicability of the methodology described.

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APPLICATION OF MULTI-AGENT SYSTEMS IN SUPPLY CHAIN MANAGEMENT

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Abstract: In traditional business, negotiation is viewed as a long process, which resulted in the development of computer methods to aid decision making. In recent years, great effort has been invested in the research and development of intelligent agents and multi-agent systems for the automation of negotiation in supply chain management. The main task of a multi-agent system is to link independently developed agents into a single system that allows collaboration and interaction among agents. In that way we get a much more efficient system for decision making in relation to the individual use of each agent. The aim of this paper is to highlight the positive effects that are achieved by the introduction of multi-agent technology in supply chain management. The application of multi-agent systems results in significant improvements in the field of communication and negotiation processes, cost reductions (the expenditure of time and resources), customer satisfaction, supply chain efficiency, reduction of human work, inventory control, virtual pooling etc.

Keywords: supply chain management, agent technology, the negotiation mechanism, multi-agent systems, intelligent agents.

1. INTRODUCTION

The rapid development of products and a dynamic market require companies to reconstruct their functions and positions in the modern industry. In such circumstances, the companies will take appropriate actions to remain competitive in the global market. Concurrent engineering - CE is a productive way to survive in the global marketplace, it can be realized by simultaneous work of experts who have different functions within the company in order to produce specific products of high quality and functionality with minimum spending of time and resources (Figure 1). The system of supply chain management is an effective approach to solve this complex situation. As an integrated network of suppliers, factories, warehouses, distribution centers and retail outlets, supply chain management system coordinates the processes in the entire logistics chain for faster and more flexible cooperation between companies, customers and suppliers.

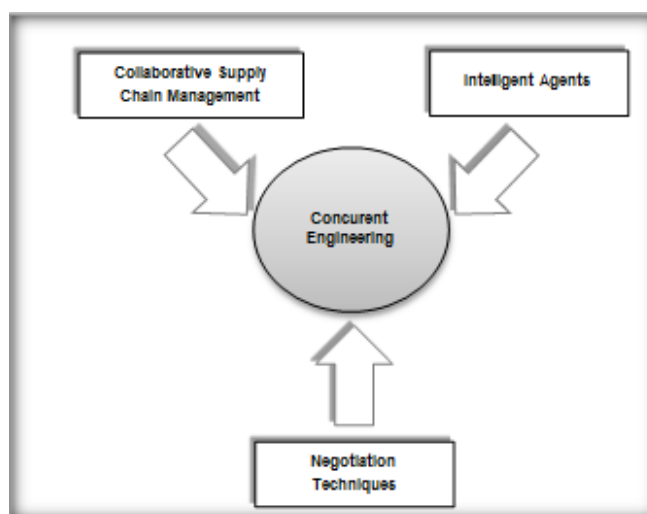


Figure 1: Assistants for CE realization (Ito & Salleh, 2000)

The cooperation of members in the supply chain management is a critical point in the implementation of effective supply chain; such implementation is not simple and cannot be efficiently implemented using only conventional mechanisms of information exchange. Hence arise in business the new forms of collaboration and organization to facilitate joint work of suppliers and customers, to exceed the traditional type of organization within the linear supply chain to engage a large number of independent agents whose goal is a virtual association and formation of *time-sharing* resources. Such arrangements are described in the *adaptive value network* (AVN): "Arrangement in which companies have close relationships, working together as a system that provides customized products and services, achieve quality and in a responsible and coordinated ways adapt to the changing environment" (Makatsoris, Chang & Richards, 2004).

The emergence of agent technology initiates the development of new architectures and modeling software and supply chain management (Liang & Huang, 2006). Agent programming (Jennings, 2000) is defined as a software development paradigm that combines artificial intelligence and distributed systems. In fact, agent programming is a set of software components that are designated as agents - autonomous and proactive agents who are able to communicate with each other (Wooldridge & Jennings, 1995). The application of agent technology provides to distributed environment, effective communication, thus making it easier to integrate the entire supply chain into an independent echelon of connected systems. Activities in the supply chain such as procurement, planning, monitoring, enforcement, etc., are represented by the software agent. Great effort has been made to establish agent and multi-agent systems in managing supply chains, especially for applications such as - manufacturing, planning, procurement (Shen & Norrie, 1999; Jennings, Norman, Faratin, O'Brien & Odgers, 2000; Leung, Wong & Sculli, 2006; Wong, Leung, Mark & Fung, 2006; Fang & Wong, 2010). In such systems, each agent operates on the basis of their internal models and the need to cooperate with other agents in the network. For example, an agent who represents the warehouse can immediately send stock availability to another agent who represents the customer in order to inform the customer about the availability of stock prior to ordering goods. This process in the business takes a lot of time even without the use of technologies.

2. AGENT TECHNOLOGY APPLICATION

The term software agent is very popular in recent years. Public entities and private companies spend a considerable amount of time, effort and money for research - development and promotion of the idea of a software agent. It is rather surprising, because in essence, software agents are doing what is expected of an advanced computer program that is able to in their environment perform a specific task with a certain degree of autonomy (i.e. without permanent leadership and human intervention). However, the real potential of this technology comes into play when you put together a number of software agents in the same environment. In such a case, a set of agents is viewed as multi-agent system where the agents are focused on each other and coordinate their activities so that you can avoid negative interactions with other agents and take advantage of their combined capacity.

The agent itself is a computer system that interacts with the environment, is capable of flexible and autonomous actions in dynamic and unpredictable multi-agent domains. Agents are autonomous software modules with the possibility perceptions and changing the state of the environment. The whole activity of agents is related to the environment in which it is located, i.e. the environment is the source of its observation and the object of its actions. In the software sense, agents are typically implemented as examples of object-oriented classes, with appropriate identity, characteristics (attributes) and the rules of behavior (methods) - Figure 2. The behavior of agents can ultimately be reduced to a mapping of type perception → action, where the mapping mechanism can be encoded in different ways: a simple table, logical rules (IF... THEN), or other techniques of decision making (neural networks, fuzzy logic), and similar (Žujović & Petrović (2005)). Coding (and therefore the decision-making process) determines the degree of agent's intelligence, which can range from simple reactive elements (type actions - response), to the complex structure of decision-making mechanism based on artificial intelligence techniques.

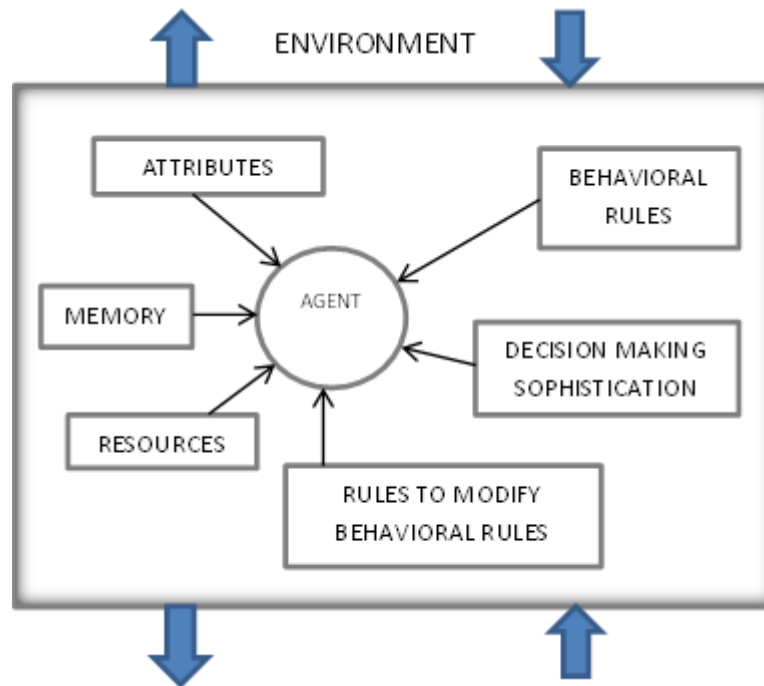
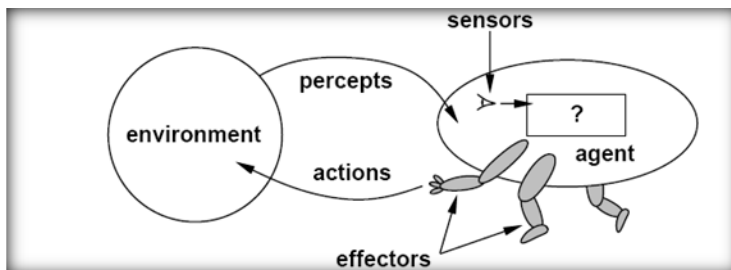


Figure 2: Schematic presentation of agent

For each agent one can observe the following elements (*Figure 3*): 1) the environment - managing environment or the environment under which the sensors are working, 2) sensors - allowing agents to perceive the environment, 3) effectors - which respond to the perception.



AGENT=ARCHITECTURE+PROGRAM

Figure 3: Agent's features (Russel & Norning, 1995)

To perceive the environment agent is using sensors to which the stimuli affect from the environment. The information gathered by the agent during the observation sequences is stored in the memory of the agent. The actions that the agent is able to perform depend on the sequence of observations. A mapping function is responsible for efficient and effective response of the agent. Mapping function maps the list of perceptual sequences during the action of the agent, and on the basis of this the table is compiled in response to each sequence of observations.

The program whereby the agent functions is a function on the basis of which the perception mapping is done in the course of action. A program that is selected must be compatible with the architecture of the agent. The architecture of agents is a determined methodology for building agents; it determines how the agent is decomposed into a series of modules and how these modules are connected. It is not only the structure of an agent but also shows the way in which modules perform their activities and link between the various agents. We cannot talk about the unique architecture of agents, but what it would be is dependent on the purpose of agents. Generally, the architecture of agents allows that the perception through the sensors be adjusted to the program, and to manage the program and pass the appropriate actions to effectors.

2.1 The importance of intelligent agents in the negotiation process

Often the term agent is used instead of the term intelligent agent - intelligence is defined as the presence of mechanisms of behavior aimed at solving a given goal. Due to the large amount of information that surrounds us in modern society, we need intelligent agents to enable efficient navigation. Intelligent agents (IA) are software that can automatically perform a task set to it by a person or other software (agent). When the agents are set once, they perform their tasks automatically, without further user intervention. These are most commonly used for automatic information search, for answering questions in the field of its knowledge, to inform users about interesting events (e.g. the emergence of a new article on the Internet, information on the possible occurrence of problems on the road between the initial and final destination, whether the given term appears somewhere on the web, etc.), for the current and personalized news, for intelligent decision-making process of users, to search the goods according to the criteria of most favorable price, for the provision of automated services such as checking of changes to web pages and the like.

The intelligent agent is defined as a program that aspires to the objectives and with minimal referrals, using intelligence or heuristic techniques. In addition to intelligence, the key features of intelligent agents are:

- learning - from the user, other agents, from other sources
- collaboration - working with other agents to achieve their goal
- mobility - the mobility of agents in the network, the realization on different computers
- personalization - the knowledge of their users, their interests and preferences
- adaptability - learning from different sources, from the user's actions. (Rudowsky, 2004)

These features facilitate the process of developing a complete system, helping to isolate abstract and irrelevant, and to focus on analysis and design of important characteristics of a particular problem (Garcia, Giret & Botti (2011)).

The role of IA is essential for successful communication process and negotiation between the company and suppliers; they provide us with relevant information to achieve objectives. The basis of negotiations is in reaching an agreement between the agents in providing services, and this approach has been used to manage conflicts that arise between the intelligent agents (Ito & Salleh, 2000). IA start with negotiations after defining the communication objectives, and end by making certain decisions during the process of using different strategies and techniques to generate the initial offer. They have high degree of self-determination and decide alone when, where and under what circumstances the actions will be performed. The interaction of agents can be directed to any particular action, change of the planned course of action and agreement on a common course of action. Interactions between agents enable rationalization and integration of the entire process of cooperation in the management of supply chains.

Figure 4 represents participants in the life cycle of negotiation: 1) the analyst and owner: describing and formalizing objectives, 2) designer: forming plans for achieving the goals of the agents through interactions, 3) implementer: implementing a designed strategy by using respective protocols and tools for achieving the goals. In the first step the life cycle of negotiation, the negotiation analysis suggests the need to acquire and model the individual settings for protocol and negotiation strategy. A negotiation mechanism of agent negotiation must have an adequate strategy and negotiation protocol (Fang & Wong, 2010; Chen, Peng, Finin, Labrou & Cost). Negotiation protocol is used to organize messages between agents, determine the flow and format of messages between the negotiating parties. On the other

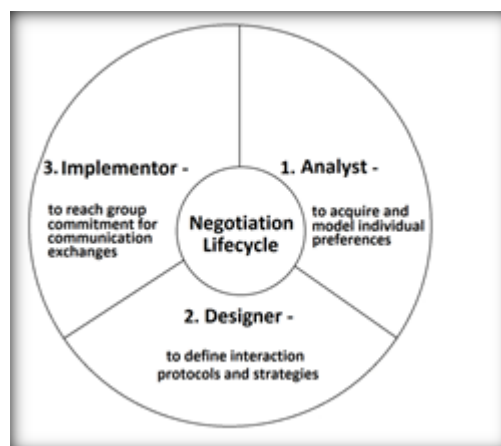


Figure 4: Life cycle phases of negotiations and participants in it (Ito & Salleh, 2000)

hand, the strategy of negotiating is a way in which negotiating party acts in order to achieve the best outcome of negotiation (e.g. what to assign - what you keep), so the strategy for each participant is personal. In the next step, designers tend to define strategies and protocols that will enable the achievement of objectives. In the final step, implementers are looking for group commitment through the communication exchange. IA work on behalf of its participants, and they have specific skills to manipulate other members according to their assignment using the plan and protocol of negotiation. When IA negotiates, it discovers its goals to the other members, identifies conflicts, seek solutions to conflicts and concentrates on finding the ideal solution for achieving their goals.

2.2 Evolution of multi-agent systems

The systems in which multiple agents work together to execute a task or solve common problem are called multi-agent systems (MAS). MAS represent an information technology that is rapidly developing as a result of agent technology, i.e. autonomous software modules that represent real-world objects. Such a system is in fact a broad network of software agents that collaborate to solve problems that are beyond the individual capacities or knowledge of any classical way of solving problems. Such systems are ideal for modeling problems for which there are several different methods for solving and multiple perspectives. In systems built in this way, instead of a control agent managing the process, the management is divided into several agents which according to their specialties assume responsibility in controlling the complex process. Using multi-agent system increases the overall security system in situations of cancellation of one of the agents, or the entire system can be automatically reconstructed or stopped in a controlled the way.

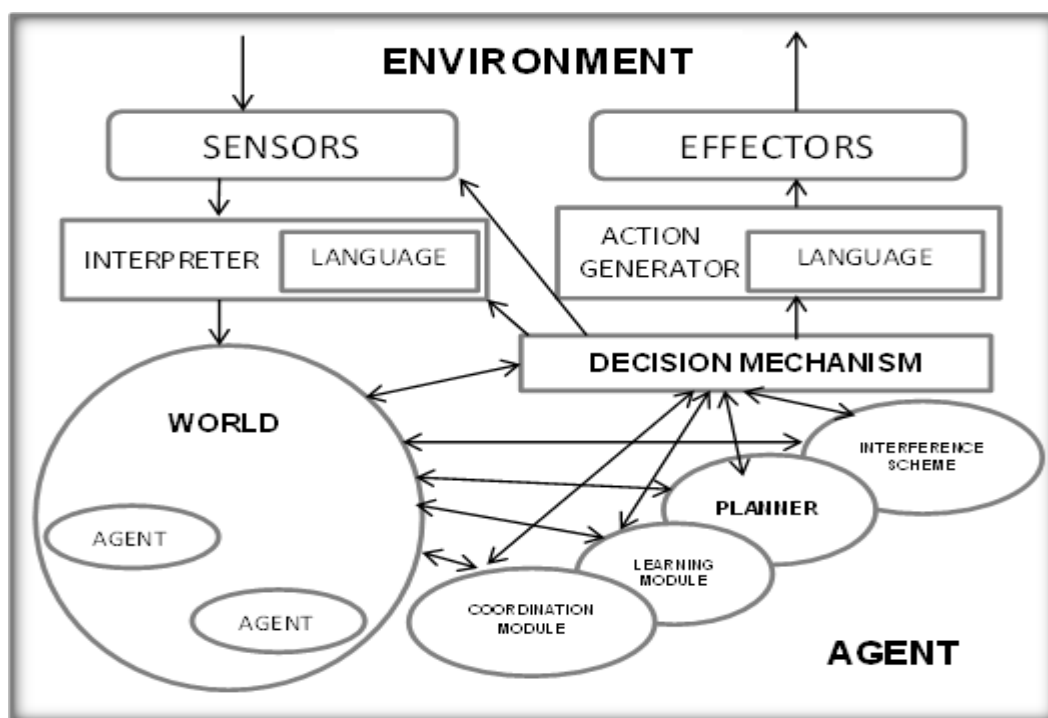


Figure 5: Architecture of agents: Components of agents in multi-agent systems

In such systems explicitly are modeled only the elements of the system, while the dynamics of the entire system is left to itself, i.e. it will arise spontaneously from the interaction of its own elements. Systems composed of agents consistently follow the system definition - a collection of elements in mutual interaction (Figure 5). This significantly facilitates the process of modeling, because the behavior of elements in most cases can be described precisely, whereas the behavior of the system is often so complex that it is impossible to express it in a formalized form. The overall aim of MAS is to create a system that specifically inter-connects agents and to allow the ensemble to function without the possibility of any individual adjustments (Ren & Anumba, 2003).

The conceptual basis of MAS is given in the theory of complex systems which rules are not explicitly defined, and there is no centralized element that governs the global dynamics (Zujovic, & Petrovic, 2005). According to this definition of the MAS we can exclude those systems where there is a central planner or designer that controls the decision-making processes of local agents. In other words, the MAS is defined as a completely decentralized system. Therefore, only systems that enable meaningful interaction between agents can be classified as true MAS.

MAS attracted great attention of experts from many different scientific fields, both in nature and in the social sciences. The growing interest in this type of networking occurs because of the possibility to ensure efficiency in solving problems in which the data, expertise and control are distributed. When designing MAS it is necessary to define the number of agents, a critical amount of time to perform the task, the dynamics of the arrival of the goals, communication costs, cost of failure, the impact of users, and the uncertainty of the environment. At the level of each agent the following should be defined: the initial state of the domain, the possible actions of other agents and the output actions of agents.

Multi-agent systems attempt to solve the whole problem by mutual cooperation and thus give a better answer to complex problems. This paper demonstrates how agent technology enables us to solve communication relationships in the distribution environment. Multi-agent simulations do not provide a solution to all problems, not necessarily make a replacement for the classic techniques of modeling and simulation. Instead, they should be treated as a complementary approach to conventional models, which are used when conventional techniques cannot give the desired results.

2.3 Application of MAS in SCM

Supply chain is a network that includes all the elements involved in materials transformation into a finished product and transporting it to the end user. Managing the supply chain becomes especially complex if it is based on outsourced functions which cover almost all activities from production, to sales and distribution. Such a situation introduces uncertainty into the business and results in delicate business relations, to be held and managed effectively. Therefore, MAS is trying to solve the whole problem by agents' collaboration. In the supply chains management to automate buyer-seller negotiation, as members of a supply chain the software agents are engaged (Kersten & Lo, 2003, Braun et al 2006). In this way, MAS can assist in solving complex problems and making decisions or support the people to decide. Agents are especially suitable for coordination in supply chains due to the following characteristics:

- Information, resources and control over data and resources are essentially distributed (Jenssen, 2004)
- The supply chain is adaptive and changes over time. Agents should serve as unifiers of components of supply chain management which is owned by the particular entity in the supply chain (Julka, Karimi & Srinivasan, 2002)

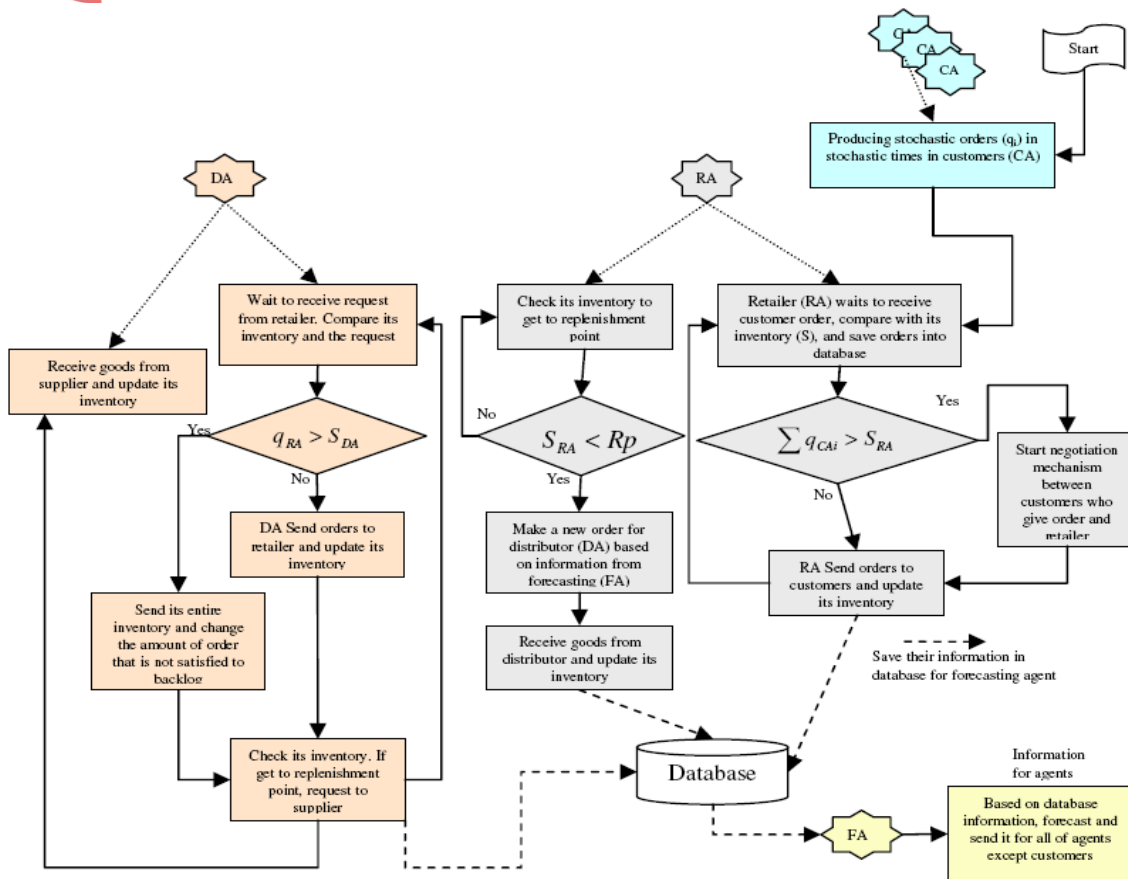


Figure 6: Schematic presentation of agents in SCM (Saberi and Charalampos, 2008)

The company is required to quickly and effectively respond to the order to meet customer requirements. However, an unexpected rush of orders causes delays in delivery and reduces efficiency. It is clear that to solve such problems one should develop a mechanism such as the MAS, which integrates various functions. In multi-agent environments, autonomous agents need to interact with one another to achieve their goals because reciprocal dependencies exist among them. In this context, negotiation is a fundamental tool to reach agreements among agents with conflictive goals in both competitive and collaborative scenarios (Monteserin & Amandi (2011)).

The proposed algorithm (Figure 6) demonstrates the concept of virtual markets and facilitates supply chain management in a dynamic environment. Although collaboration is a basic characteristics of virtual market (due to the changing environment and autonomous / heterogeneous nature of the members of the virtual market), it can only succeed if activities are properly managed in the supply chain. A schematic model follows the behavior of each individual agent (DA-agent distributor, RA- agent seller, CA-agent customer, FA-agent for the forecasting). It is evident that there is one database, which can be accessed by all the agents. Furthermore, agent for forecasting processes this information and forwards it to the agent seller and agent distributor.

3. EFFECTS OF APPLYING INTELLIGENT AGENTS AND MULTI-AGENT SYSTEMS

Technologies of intelligent agents and multi-agent systems represent one of the most promising directions for the development of a system based on the Internet and knowledge in logistics. Intelligent agents represent the organization within the logistics domain models and their logistics functions, processes, expertise and interaction with other organizations (Graudina & Grundspenkis, 2005).

MAS is currently used as an efficient way to solve a wide range of problems (Vallejo, Albusac, Mateos, Glez-Morcillo & Jimenez (2010)), in the field of planning, real-time control, robotics and many other industrial areas. Expansion of the use of MAS-based model of software engineering (Jennings, 2000) is based on: the use of autonomous agents that solve complex and distributed problems, use of language

(Bordin et al., 2006), or even making standards (Foundation for Intelligent Agents Physical, 2002). In other words, Agent programming is used to design a problem in cases where other approaches are insufficient and incomplete.

The reasons for the introduction of IA, and MAS in commercial systems are as follows:

- introducing this type of technology enables performance of various tasks such as making decisions, solving various problems that normally require the human intelligence, such as problem diagnosis, data classification, planning and negotiation;
- identify critical information with the input of resources, to monitor and take action based on the information context (information sharing, forecasting knowledge and use of the negotiating mechanisms);
- autonomously collect duties on behalf of users, this kind of programming does not require constant user intervention. Reduce human work by using the automated agents which act on behalf of the users. Spare the user from having to find, negotiate, and in general deal with buyers and sellers.
- such systems connect separate agents and create ensemble of functions that is beyond the capacity of any individual agent. This ensemble provides flexibility in the conduct of affairs, and is more efficient for solving complex problems;
- promote cooperation between members of the supply chain, although the interaction between the IA can lead to conflict and coalition. Negotiation techniques are used to overcome conflicts and coalitions in order to achieve agreement between agents rather than persuasion to accept the already existing solution. Negotiation is the core of many agent interactions;
- virtual pooling (virtual market concept) and *time-sharing* resources.

The positive effects achieved by the introduction of IA and the MAS:

- successful process of communication and negotiation between manufacturers and suppliers, based on what creates good communication networks that allow the satisfaction of customer requirements. MAS are inexpensive standardized communication infrastructure, which includes separate agents that interact in an open and *real-time* environment and provide transaction security;
- increases supply chain efficiency - integration and coordination of various systems and processes in the supply chain, facilitating the supply chains management in a dynamic environment.
- achieve an efficient flow of materials and total costs reduction - reduced consumptions of time and resources, the agents are faster than humans, using the automated agents can save the transportation and communication costs that human contact may incur (Linlan, Haigang, Xueguang & Hong (2011))
- reduction of the *bullwhip* effect – reduces oscillations of user requirements and improves the forecast level of reserves and resources. Thus determines the above demand and reducing the total operating costs.
- inventory control is enabled (e.g., an agent who represents the warehouse can stock availability information to other agents in order to know at any time stock availability)
- provide answers to uncertain market, merger and division of competence risk.
- increase the security of the system in situations of failure of one of the agents.
- such networks, regardless of the state, are always active and ready to respond.

A significant advantage in applying multi-agent model is in that it can be constructed even if the legality of the behavior of the whole is unknown (entire system). Multi-agent simulation capabilities are higher compared to conventional simulation models, using them to express more complex dynamics and structure. Agents in multi-agent simulation models are heterogeneous and thus enable a more realistic view. Also, these models are generally easier to maintain, because all of the updates made to the level of individuals - agents. Elements of multi-agent simulations are relatively faithful copies of objects from the real domain, which considerably facilitates communication between policy simulations (programmers) and end-users (experts in the subject area).

4. CONCLUSION

The area of autonomous agents and multi-agent systems is very diverse and represents an area that is rapidly expanding. It is a combination of several scientific fields such as distributed processing, object-oriented systems, software engineering, artificial intelligence, economics, sociology, organizational science. The methodology of the program based on agents provides a range of effective tools and

techniques that have the potential to significantly improve the technique of software ranging from conceptual design through to actual implementation. During the past two decades a significant number of improvements is evident in design and implementation of autonomous agents and how they interact.

Multi-agent systems introduce a new approach to modeling, which is reflected in the specific relationship between global and local (and elements of the system). The modeling is reduced to explicitly defining the elements of the system, while the dynamics of the entire system arises spontaneously from the interactions of the components. This significantly facilitates the process of modeling, because the behavior of elements in most cases can be described precisely, whereas the behavior of the system is often so complex that it is impossible to express it in a formalized form.

Agent technology has offered a powerful repertoire of tools and techniques that have the potential to significantly improve the way people conceptualize and implement many types of software. Agent technology is gaining in importance and it is used to solve real problems, and commercial applications. Agents are used in a growing, wide variety of applications - from small comparative systems, such as personalized *e-mail* filters to large, complex systems such as *air-traffic control*. Natural and simple is that so many different applications can be represented by agents, and that is what best explains impressed researchers and developers to given approach potentials (Sabeti & Makatsoris (2008)).

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RANKING STUDENTS FOR MASTER STUDIES USING LOGICAL AGGREGATION

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Abstract: *The aim of this paper is to investigate the model of ranking students for admission to master studies at the Faculty of Organizational Sciences. The current candidate ranking criterion is a weighted sum of the average grade and points scored in the entrance exam. This model has some deficiencies, listed and explained in this paper. There are two major problems: the model does not underline essential knowledge necessary for the wanted program and the weighted sum is unable to model a connection between variables. The suggested solution is to model a new criterion function, which includes few factors and the usage of logical aggregation based on interpolative Boolean algebra. That function is called pseudo-logical function. The results of the model based on pseudo-logical aggregation simulation are significantly different from the current model results. This is due to the emphasis on specific factors. This paper may be of particular value to university departments involved in student enrollment and to everybody dealing with any form of student ranking.*

Keywords: *ranking students, weighted sum, fuzzy logic, interpolative Boolean algebra, logical aggregation, pseudo-logical function*

1. INTRODUCTION

Since 2007 Faculty of Organizational Sciences has been enrolling students to master studies. The criteria of enrollment are entrance exam output and average grade at undergraduate level. Considering the differences between the courses existing at master studies at FOS, this universal ranking model may not be completely appropriate. The student's average grade is taken as indicator of previously acquired knowledge. That grade, as it is, does not show candidate's specific knowledge. For example, knowledge and grades gained at management domain should be additionally scored for enrolling in management departments. In this way the advantage at the enrollment would be given to the candidates who showed special interests in certain domain.

The propositions of enrollment, the current ranking model and its deficiencies are explained at Section 2. The details are underlined by description of necessary criteria considering the specific module. In Section 3 there is the proposition considering the usage of changed weighted sum, which includes several factors. One of them, the one which underlines required specific knowledge, is aggregated by fuzzy logic. There is also a theoretical introduction to fuzzy logic. The subject of Section 4 is Interpolative Boolean algebra (IBA) and Logical aggregation (LA). IBA treats negation differently from fuzzy logic. There is also a suggestion of pseudo-logical function as criterion function. One of the criteria is aggregated using logical aggregation, which is based on IBA. In fifth section there is an example of classical student ranking and the ranking using the function suggested at previous section. In final section of the work we give our conclusions.

2. MASTER STUDIES AT FACULTY OF ORGANIZATIONAL SCIENCES

Considering the proposition for student's enrollment to master studies the school year of 2011/2012, eight different study programs are offered for enrollment. Every single program is divided to modules or study groups that candidate enrolls. There are thirty six modules, which are the forms of additional guidance. Students are ranked in one of six rang lists depending on chosen program.

2.1. Master module Operational Researches

Module Operational Researches is a part of study department Operational Researches and Computer Statistics. Thirty five students can be enrolled to this module, and twelve of them have full scholarship. The qualification exam itself consists of thirty test questions with five offered answers each, but only one correct. The questions consider operational researches, statistics, software design, database and informational

systems. This kind of qualification exam (the same test and the same literature) is used for two more study departments – Informational Systems and Technologies, as well as Software Engineering and Computer Sciences.

2.2. Current ranking model

According to previous, the conclusion is that weighted sum of criterion

$$w_1 * u + w_2 * k = p \quad (1)$$

is used as a student ranking criterion. It contains the following variables:

- u – average grade gained at undergraduate level in the interval [0, 100];
- k – number of points on the entrance exam for master studies in the interval [0, 100];
- p – candidate's total points in the interval [0, 100].

Values w_1 and w_2 are weights in this model, whose values are predefined at the enrolment proposition, so the criterion function has the following form:

$$0.4 * u + 0.6 * k = p \quad (2)$$

This function is modeled by weighted sum considering only the values of variables. This way, it is not possible to model their conditionality or connection between the variables using the logical operators.

The qualification exam to module Operational Researches consists of questions considering different domains: informational systems, computer sciences, operational researches, and statistics. All the questions are scored the same way. This is illogical – it is wanted to have knowledge considering all of these domains, but knowledge considering operational researches should be the most important.

Average grade shows the general picture about candidate's success at undergraduate level. However, the grades in subjects which are focused to operational researches, statistics, mathematics, and system theory should be more important if enrolling this module. Analogous to that, subjects focused on informational systems, programming, database and data structures etc. should be underlined if enrolling the study program Informational Systems and Technologies.

The flaw is also restriction of weighted sum itself – it cannot be used to model logical expressions.

2.4. New model based on weighted sum

The first two comments, that the data aggregated using arithmetic mean and that total score at qualification exam does not underline characteristic data important for the program of master studies, can be solved by modeling new weighted sum:

$$w_1 * u + w_2 * u_2 + w_3 * k + w_4 * k_2 = p \quad (3)$$

Two new components figure in this expression, and they are:

- u_2 – average grade at undergraduate level at subjects which are focused on operational researches, statistics, mathematics, and system theory in the interval [0, 100];
- k_2 – points gained at qualification exam to master studies, but specifically in questions considering operational researches and statistics, in the interval [0, 100];

Values w_1 , w_2 , w_3 and w_4 are weights in this model. Values of this factors are 0.3, 0.1, 0.5 and 0.1, respectively, so the criterion function has the following form:

$$0.3 * u + 0.1 * u_2 + 0.5 * k + 0.1 * k_2 = p \quad (4)$$

The significance of specific knowledge, important for the enrolling master studies, is underlined by new variables. However, the criterion function defined this way does not solve the problem, because the subject

of interests is qualification exam achievement and appropriate subjects accomplishment, and not these two variables separately.

3. RANKING USING FUZZY LOGIC

The reason for introducing logic into consideration is the need of modeling conditions like following: “Candidate’s ranking on the list should depend on number of points on the entrance exam for master studies obtained on matters related to operational researches and statistics and the average grade at undergraduate level at subjects that are focused on operational researches, statistics, mathematics, and systems theory”. This condition implies that predefined variables u_2 and k_2 should be connected by conjunction. Weighted sum considers variables separately and can’t model interaction between them, so it is not sufficient to model this problem. It is necessary to introduce logic and logical operators, which can provide more options for aggregation.

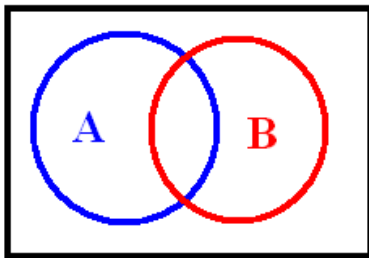


Figure 4: What can be modeled using weighted sum, representation using sets

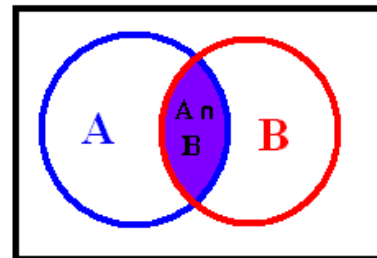


Figure 2: What can be modeled using fuzzy logic, representation using sets

Classical logic deals with variables that are either true or false, that are either 0 or 1. Values in described problem are decimal, so it is not appropriate. That is the reason for introduction of fuzzy logic.

3.1. Fuzzy logic

Fuzzy logic is generalization of classical logic – it can process all values in interval from 0 to 1. Fuzzy logic is not fuzzy. Basically, fuzzy logic is a precise logic of imprecision and approximate reasoning (Zadeh, 2008). Fuzzy logic is developed on fuzzy sets theory. It is particularly suitable for working with linguistic variables like *hot*, *very good*, *around twenty*, *not that busy*. Compared with conventional approaches, fuzzy control utilizes more information from domain experts and relies less on mathematical modeling about a physical system.

Functions that qualify as fuzzy intersections and fuzzy unions are usually referred as t-norms and t-conorms (or s-norms), respectively. The standard fuzzy intersection is min operator, and it produces the smallest membership value of all the t-norms (Ross, 2010). On top of that, algebraic product is used often as fuzzy intersection. The standard fuzzy union is max operator, and it produces the smallest membership value of all the t-conorms. Probabilistic sum is another operator often used as s-norm.

Conventional fuzzy logic is based on principle of truth functionality. In the general, it doesn’t follow the law of excluded middle, one of the Boolean laws.

3.2. New model based on fuzzy logic

The modified weighted sum is used to rank students. The third element of weighted sum is changed, and it is defined as: “Conjunction of average grade at undergraduate level at subjects that are focused on operational researches, statistics, mathematics, and systems theory and number of points on the entrance exam for master studies obtained on matters related to operational researches and statistics”. In accordance to that, weighted sum is:

$$w_1 * u + w_2 * k + w_3 * 100 * (u_2 \wedge k_2) = p \quad (5)$$

Variables u_2 and k_2 are normalized in the interval $[0, 1]$. Weights w_1 , w_2 and w_3 have following values - 0.3, 0.5 and 0.2. Product is used as t-norm. The third element in weighted sum is multiplied by 100, so all elements would have the same order of magnitude. In accordance to that, weighted sum has the following form:

$$0.3 * u + 0.5 * k + 0.2 * 100 * u_2 * k_2 = p \quad (6)$$

4. RANKING USING PSEUDO-LOGICAL AGGREGATION

4.1. Interpolative Boolean algebra and Logical aggregation

Interpolative Boolean algebra is a consistent multi-valued realization of Boolean algebra in the sense that it preserves all the laws which Boolean algebra relies on. It has two levels – symbolic and valued. On symbolic level all laws of Boolean algebra are valued indifferent. IBA element represents the analyzed object. IBA element on symbolic level is treated independently of its realization. All elements consist of one or more atomic element. Expressions are calculated based on the principle of structural functionality: Structure of any IBA element can be directly calculated on the basis of structures of its components (*Radojević, 2006*). This principle treats negation differently and that allows preservation of the law of excluded middle.

IBA is technically based on generalized Boolean polynomials (GBP). GBP uniquely corresponds to any element of Boolean algebra and any Boolean function can be transformed into corresponding GBP. Operators allowed in GBP are plus, minus and generalized product. Generalized product (GP) is any function $\otimes: [0,1] \otimes [0,1] \rightarrow [0,1]$ that satisfied all four conditions of t-norms: Commutativity, Associativity, Monotonicity, Boundary condition and Non-negativity condition (*Radojević, 2008A*):

$$\sum_{x \in P(\Omega/S)} (-1)^{|x|} \otimes A_i(x) \geq 0, S \in P(\Omega), A_i(x) \in [0,1], A_i \in \Omega \quad (7)$$

On a valued level the IBA is value realized – elements take values from an interval $[0, 1]$ and suitable operator for GP is chosen.

Consistent and transparent procedure based on IBA for aggregating factors is called Logical aggregation. The task of LA is the fusion of primary attributes' values into one resulting globally representative value using logical tools (*Mirković, Hodolić & Radojević, 2006*). It has two steps:

1. Normalization of attributes' values and
2. Aggregation of normalized values of features into one resulting value by logical or pseudo-logical function as a LA operator (*Radojević, 2008B*).

Pseudo-logical function, called pseudo GBP, is a linear convex combination of generalized Boolean polynomials. In this paper it is the proposed approach for aggregation.

4.2. New model based on pseudo logical aggregation

Two different functions are proposed as pseudo-logical function for ranking. Both are similar to the weighted sum presented in Section 3.3: first two elements and weights in sum are the same (0.3, 0.5 and 0.2 respectively). The third element in sum is the difference.

Case 1: The third element of weighted sum is defined this way: "If candidate's average grade at undergraduate level at subjects that are focused on operational researches and statistics is well, we are interested only in it. If it is not well, we are interested in the average grade at undergraduate level at subjects that are focused on mathematics and systems theory and number of points at the entrance exam for master studies obtained on matters related to operational researches and statistics."

Pseudo-logical function for ranking with this condition has the following form:

$$w_1 * u + w_2 * k + w_3 * 100 * (a \vee (\neg a \wedge d \wedge x)) = p \quad (8)$$

The third element is transformed on symbolic level:

$$a \vee (\bar{a} \wedge d \wedge x) = a + d \otimes x - a \otimes d \otimes x \quad (9)$$

After that, expression can be calculated. The operator of generalized product \otimes is product ($\otimes := *$):

$$w_1 * u + w_2 * k + w_3 * 100 * (a + d * x - a * d * x) = p \quad (10)$$

Case 2: The third variable of weighted sum is defined like this: “If candidate’s average grade at undergraduate level at subjects that are focused on operational researches is well, we are interested in the average grade at undergraduate level at subjects that are focused on statistics, too. If it is not well, we are interested in the average grade at undergraduate level at subjects that are focused on mathematics and systems theory and number of points at the entrance exam for master studies obtained on matters related to operational researches and statistics.”

Pseudo-logical function for ranking with this condition has the following form:

$$w_1 * u + w_2 * k + w_3 * 100 * ((b \wedge c) \vee (\neg b \wedge d \wedge x)) = p \quad (11)$$

The third element is transformed on symbolic level:

$$(b \wedge c) \vee (\bar{b} \wedge d \wedge x) = b \otimes c + d \otimes x - b \otimes d \otimes x \quad (12)$$

After that, expression can be calculated. The operator of generalized products \otimes is product ($\otimes := *$):

$$w_1 * u + w_2 * k + w_3 * 100 * (b * c + d * x - b * d * x) = p \quad (13)$$

Variables in presented expressions are:

- u – average grade gained at undergraduate level in the interval $[0, 100]$;
- k – number of points at the entrance exam for master studies in the interval $[0, 100]$;
- a – average grade gained at undergraduate level at subjects that are focused on operational researches and statistics, normalized in the interval $[0, 1]$;
- b – average grade gained at undergraduate level at subjects that are focused on operational researches, normalized in the interval $[0, 1]$;
- c – average grade gained at undergraduate level at subjects that are focused on statistics, normalized in the interval $[0, 1]$;
- d – average grade gained at undergraduate level at subjects that are focused on mathematics and systems theory, normalized in the interval $[0, 1]$;
- x – number of points at the entrance exam for master studies obtained on matters related to operational researches and statistics, normalized in the interval $[0, 1]$;
- p – candidate’s total points in the interval $[0, 100]$.

The third element in weighted sum is multiplied by 100, so all elements would have the same order of magnitude.

5. ANALYSIS AND COMPARISON OF PROPOSED MODELS

In this section suggested models are simulated and compared. Fifteen students’ data are used for simulation. Data were collected via internet survey. Eleven students have scored maximum on their qualification exam. Data on the exact number of points at the entrance exam for master studies obtained on matters related to operational researches and statistics do not exist, because it is not important for current ranking model. Students were asked to write their hypothesis about scored points at that study fields.

Total scores using different models are shown in the following table for 8 students. These students are chosen because their ranking differs by using different models. Student B and G are the first and the last on every ranking list.

Table 5: Score of chosen students using different models

Student	Current model	Model based on weighted sum	Model based on fuzzy logic	Model 1 based on pseudo LA	Model 2 based on pseudo LA
A	99.44	99.58	99.58	99.58	99.58
B	100.00	100.00	100.00	100.00	100.00
C	99.60	99.10	98.50	99.62	99.54
D	96.00	95.00	93.00	96.10	91.00

E	95.60	95.47	94.23	96.36	94.56
F	89.60	88.53	84.97	89.86	85.34
G	78.80	79.60	76.60	81.56	77.92
H	86.20	87.40	86.00	88.61	86.81

Students' rankings in the list are shown in the following table for 8 students.

Table 2: Ranking of chosen students using different models

Student	Current model	Model based on weighted sum	Model based on fuzzy logic	Model 1 based on pseudo LA	Model 2 based on pseudo LA
A	3	2	2	3	2
B	1	1	1	1	1
C	2	3	3	2	3
D	4	5	5	5	5
E	5	4	4	4	4
F	6	6	7	6	7
G	8	8	8	8	8
H	7	7	6	7	6

Rankings given by different models differ. The first model is an initial model, which is applying in practice. The second and the third model are transitional. Last two models are the final proposed models. Differences in students' ranking are caused by emphasizing specific factors and different method of aggregation. Users can model their own pseudo-logical function in according to their needs.

6. CONCLUSION

The master programs at Faculty of Organizational Sciences specialize students for different occupations – managers, programmers, analytics, database specialists, etc. The advantage at ranking should be given to students who showed great results at subjects which are related to chosen domains. That can be achieved by using the suggested models based on LA. LA is a technique that gives the user the most options in modeling, and treats negation in a proper way. Ranking students with pseudo-logical function gives results similar to current, but different enough to introduce these proposals and test it practically.

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SYSTEM DYNAMICS APPLICATION IN PROCESS OF IMPROVING POSTGRADUATE MASTER STUDIES AT FACULTY OF ORGANIZATIONAL SCIENCES

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Abstract: *This paper aims to determine whether system dynamics approach could be of potential use in the emerging field of research concerning the quality of postgraduate university studies. In our paper, significant weakness of the current postgraduate studies organization was determined and elaborated upon. We proposed a system dynamics approach, which proved to be a vital tool in the strategic decision-making process. Appropriate Causal Loop Diagrams were determined and thoroughly elaborated. Further, possible improvements of postgraduate studies organization were proposed and ideas for further research on this interesting issue were pointed out.*

Keywords: *system dynamics, decision making, higher education institutions (HEI), process improvement, causal loop diagram*

1. INTRODUCTION

System dynamics is a perspective and set of conceptual tools that enable us to understand the structure and dynamics of complex systems. System dynamics is also a rigorous modelling method that enables us to build formal computer simulations of complex systems and use them to design more effective policies and organizations (Sterman, 2010). Together, these tools allow us to create management flight simulators, micro worlds where space and time can be compressed and slowed so we can experience the long-term side effects of decisions, speed learning, develop our understanding of complex systems, and design structures and strategies for greater success (Sterman, 2010). The basis of the system dynamics method is to recognize that the overall structure of any system is just as important in determining its behaviour as the individual components themselves.

System dynamics could play in the “managerialization” of universities. System dynamics tools could allow academic decision makers to better keep under control the complex and dynamic university environment: in these terms, (Barnabe, 2004) suggests the use of modelling and simulation techniques in order to capture the complex and dynamic structure of the university system and to explore the consequences of the policies and decisions that academic managements are currently taking (Barnabe, 2004). Higher education organizations face today strong pressure from institutional environments to adopt renewed structures and management systems. The reason for the vast reform sweeping across European and non-European countries have to be found in a substantial lack of efficient and effective academic educational and research programmes and in a widespread financial crisis of the public sector. The global scenario is even worse because the number of students is decreasing due to demographic reasons (Barnabe, 2004).

Universities are increasingly large in size, with non-traditional students, inadequate student-teacher ratios, declining financial support from the state, increased competition for external funds and increased competition for limited student demand (Al Hallak et al., 2009). Managing university academic resources is a complex administrative problem. Typically, the admission capacity for a degree program is decided based on the availability of lecturers, total enrolled students, and the available facilities in the university. The common formula used is the lecturer to student ratio (Dahlan and Yahaya, 2010).

In this paper we use system dynamics approach in order to outline crucial components of educational system at Faculty of Organizational Sciences (University of Belgrade, Serbia). It is important to mention that Faculty of Organizational Sciences (FOS) provides degrees for the undergraduate and graduate (MSc and PhD). Competitive knowledge and skills, best practice experience from abroad, mobility and specialization abroad is basis for employment and advancement of Faculty's graduates. That is precisely the reason why Faculty attracts students from different faculties and universities, and it is getting more and more popular among students.

2. LITERATURE REVIEW

The process of deciding on the aims of the organization is at the heart of educational management. In some settings, aims are decided by the principal, often working in association with senior colleagues and perhaps a small group of lay stakeholders. In many schools, however, goal setting is a corporate activity undertaken by formal bodies or informal groups.

School aims are strongly influenced by pressures from the external environment. Many countries have a national curriculum and these often leave little scope for schools to decide their own educational aims. Institutions may be left with the residual task of interpreting external imperatives rather than determining aims on the basis of their own assessment of student need. The key issue here is the extent to which school managers are able to modify government policy and develop alternative approaches based on school-level values and vision (Bush, 2010).

A system dynamics perspective has a powerful logic that offers substantial improvements in dealing with issues in strategic management, whether one-off challenges or the continuous direction of enterprise strategy. First, successful strategic management of business and non-commercial organisations requires attention to how performance is changing through time. Since performance reflects the state of resources in any period, steering strategy requires policies and decisions that control the flow rates of those resources. Lastly, this is complicated by the additional dependence of these resource flows on the current state of existing and potential resources at each point in time - a dependence that gives rise to feedback. These principles can be organised into a rigorous approach to strategy that is grounded in solid evidence from the situation of concern. Important implications from this perspective include the unavoidable causal ambiguity caused by accumulating resources, and the value of explicit and quantitative examination of resource development prior to investigating feedback structures (Warren, 2005).

In research made by Mavroeidis (Mavroeidis et al., 2009) authors propose an accurate model of measuring business excellence by applying the theory of System Dynamics. This theory defines the interaction of system variables giving the opportunity of a reliable and fair score as well as objective decision-making with regard to the areas that are susceptible of continuous improvement (Mavroeidis et al., 2009).

System Dynamics is really important in today business and in order to compete in the global market, engineering organizations are under increasing pressure to design, develop, and deploy products in the market place as quickly as possible with first time quality. In order to achieve these objectives, it is necessary to streamline the design and development process, namely in an efficient and expedient manner. This, in turn, has led to the emergence of highly sophisticated simulation software applications that not only enable high-fidelity simulation of dynamic systems and related controls, but also automatic code generation for implementation in industrial controllers (Menghal and Laxmi, 2012).

Jay W. Forrester's original statement of the foundations of system dynamics emphasized four 'threads': computing technology, computer simulation, strategic decision making, and the role of feedback in complex systems. Subsequent work has expanded on these to expose the significance in the system dynamics approach of dynamic thinking, stock-and-flow thinking, operational thinking, and so on. But the foundation of systems thinking and system dynamics lies deeper than these and is often implicit or even ignored: it is the "endogenous point of view" (Richardson, 2011).

We have to focus on the challenges the field must face if it is to realize its potential. The first 50 years of system dynamics have established an introduction to the field. There is the great importance of achieving a better understanding of complex systems in nature and human affairs. Now, the field is on a plateau ready to launch the next great thrust forward. We can better understand the present status of system dynamics by comparison to professions that have developed earlier. We are now at about the same state of advancement that engineering was when MIT first opened its doors in 1865, or that medicine was in the late 1800s when the Johns Hopkins School of Medicine was established. We have as much to learn yet about high-order nonlinear feedback structures around us as those earlier professions have already learned about their fields in the last 150 years. Now is the time to plan how the next 50 years can start to close this huge knowledge gap. Like those early days in more mature professions, we do not yet have universities devoted to 4-year and 6-year programs in system dynamics. Like the older professions at their beginning, we do not yet have the equivalent of programs in science and biology in kindergarten through 12th grade education to prepare students for more advanced study at the university level. Nevertheless, there has been major progress in

system dynamics during the last 50 years just as there had been in those older professions before they became formalized in advanced educational programs and before they were publicly recognized (Forrester, 2007).

Higher education organizations face today strong pressure from institutional environments to adopt renewed structures and management systems (Oganisjana and Koke, 2012). The reason for the vast reform sweeping across European and non-European countries have to be found in a substantial lack of efficient and effective academic educational and research programmes and in a widespread financial crisis of the public sector (Gilpin and Kaganovich, 2012). The global scenario is even worse because the number of students is decreasing due to demographic reasons (Hallak et al., 2009).

There is interesting research made by (Liang et al., 2010) which is related to China's educational system. China education-economy system was analyzed by traditional region economic theory and complex social economic theory. The econometric equation of system elements interaction was built based on the Cobb-Douglas production function. The simulation model of China education-economy system was built by combining econometrics and system dynamics methods (Liang et al., 2010). Findings of (Fumasoli and Lepori, 2010) show that strategies of developing high education in Swiss are at the same time a matter of intentions and actions: first, they relate to current HEI's position within the national Higher education system—and to relevant normative models—as well as to the degree of institutional autonomy. Second, even within participatory governance structures, organizational strategies appear to be initiated by the academic administrators, then substantially shaped and subscribed by academics at different stages. In this perspective, the dynamic relation of formal and informal processes holds diverse functions from making academics accept a strategy, to controlling and coordinating decentralized organizational structures (Fumasoli and Lepori, 2010). In Serbia, there is the same situation. Ministers, policy-makers, politicians, institutional leaders or administrators, higher education researchers, members of the academic staff of universities and colleges and students are all professionally involved in higher education. It will include both mature and developing systems of higher education, covering public as well as private institutions (Meek et al., 2010).

The Interactive Network Platform is developed in the Support of a Dynamic Resource Repository of General Archives Education” on the basis of exploring general archives education — a new field. This Network Platform is able to solve many problems arising in the new field, which are difficult to tackle with traditional methods (Hu et al., 2011).

3. RESULTS

On Figure 5 we can see the most important elements of the high educational system in general, which are integrated through cause and effect relations. We identified various reinforcing and balancing loops which include number of internal and external elements.

Interest of students for elective courses depends on many factors, such as teacher's motivation, material complexity and quality of teaching. All these factors influence final average grade, which is one of the most important criteria for employment, and it is of crucial meaning for economic situation in general. Besides high average grade, employers are looking for practical skills and experience. It is really hard for students to have high average grade and extracurricular activities. For getting high grades, students have to study for hours, which don't allow them to have enough free time for social life and extracurricular activities. Students have to make decision how to make compromise solution. High average grade and extracurricular activities are crucial for employment, but they are in conflict. These three elements together with economic situation in country create negative feedback effect.

In the research made by (Thoms, 2011), author examine the design, construction, and implementation of a dynamic, easy to use, feedback mechanism for social software. The tool was integrated into an existing university's online learning community (OLC). The software was implemented at a US university in an introductory course on IS with the goal of fostering higher levels of learning and social interaction. A content analysis showed higher levels of system usage corresponded with higher course grades (Thoms, 2011). According to this research, we suggest implementation of software which could upgrade interaction of students and FOS.

Employment situation of college graduates is not optimistic, and it is a special problem related to high education. The main reason of producing the phenomenon lies in that practical ability of college graduates is not strong. The best way to solve this problem is to attract enterprises to participate in the many aspects of

higher education. But the enthusiasm of most enterprises participating in higher education is very low (Guo et al., 2011).

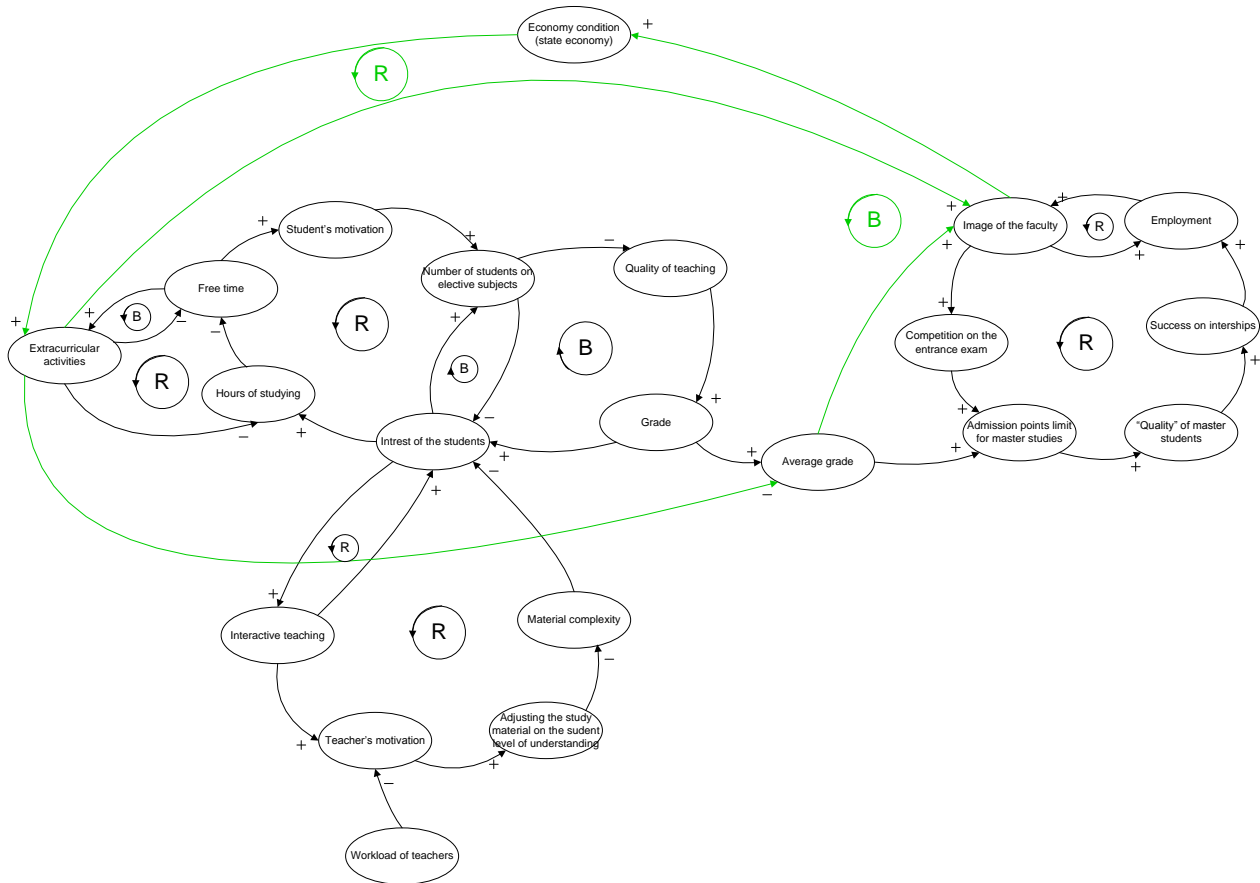


Figure 6 Figure 7: Higher educational system

Postgraduate master studies are important part of educational system and we would like to emphasize some facts about it. Positive image of FOS is created because of modern tools of learning, cooperation with prominent national and international companies and successes of its students at various competitions worldwide. Because of its positive image, many students from different faculties and universities are willing to attend FOS graduate master studies. Faculty has a problem to manage all students from different undergraduate studies, because they all have different prior knowledge. Postgraduate studies last only one year. Thus, there is not enough time to get complete knowledge related to that study topic. Because of this situation, quality of these students is not the same as quality of students who attended four years of undergraduate studies at Faculty of Organizational Sciences, which sometimes can have negative effect on image of Faculty.

Real systems are generally very complex and consist of many such feedback loops. The overall behaviour of the system is determined by the interaction of all these loops together. Solving these complicated interaction and determining the future behaviour of the system using pen and paper is neither feasible nor easy (Murthy et al., 2010).

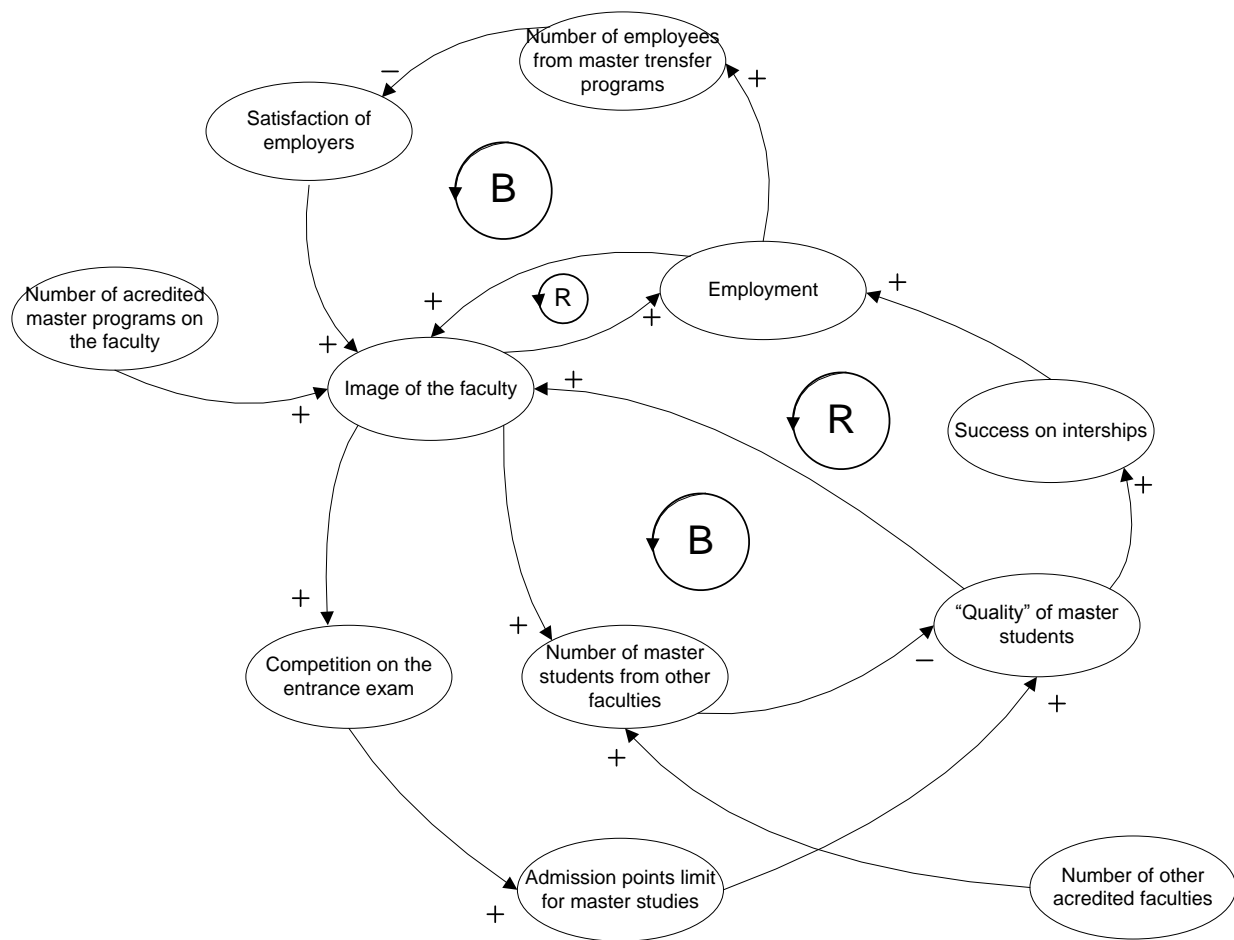


Figure 8: Master studies at FOS

On Figure 9 we identified reinforcing feedback loop that includes: image of the Faculty, competition on the entrance exam, admission points limit for master studies, “quality” of master students, success on internships and employment. This reinforcing feedback loop is being balanced by balancing feedback loop that include following elements: image of the Faculty, number of master students from other faculties and “quality” of master students. There are two external elements: number of accredited master programs at the faculty and accreditation of other faculties. We would like to point out another balancing feedback loop, which shows that number of employments of students who attended undergraduate studies at other faculties have negative effect on employer’s satisfaction. Since employers are not satisfied with students, that can cause negative image of Faculty.

An institution represents the ultimate knowledge organization. The rapid growth of data and technologies trigger the transformation of data to useful information known as ‘Knowledge’. To leverage knowledge, institutions need a knowledge sharing network that can meet the demands of changing knowledge. The knowledge sharing network is accomplished by sharing and capturing knowledge among faculty members and students (Rajalakshmi & Banu, 2012).

On Figure 3 we can see how these balancing loops influence the current image of the faculty. If the image is high the loops will strive to lower it down, and if the image is low the loops will strive to enhance it.

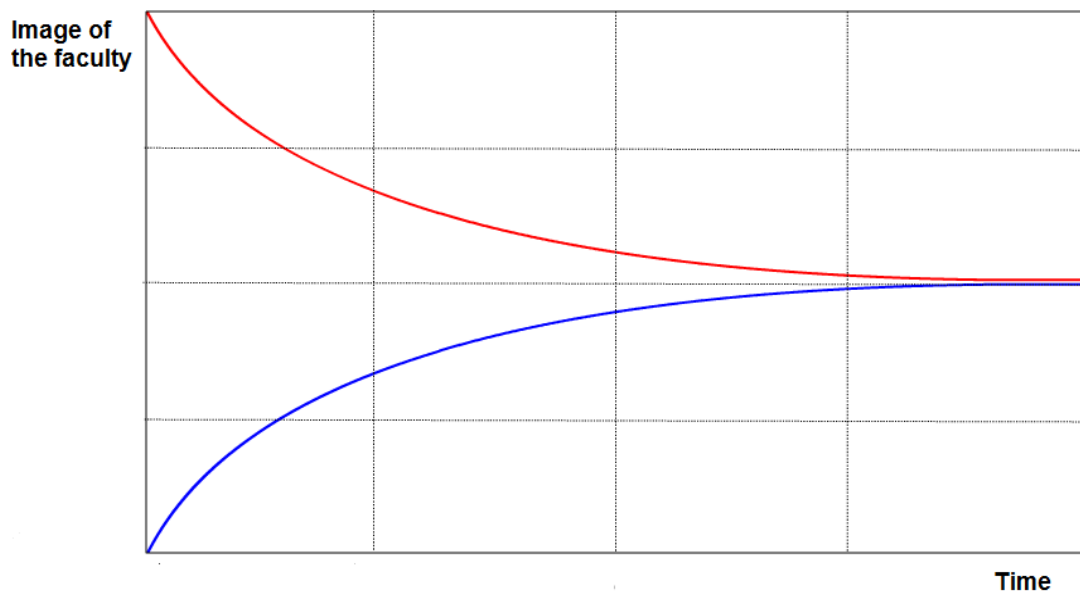


Figure 3: Image of the faculty through time

But we also cannot ignore the main reinforcing loop that will reinforce the change of the image in any case, either if it is lowering down or if it is growing up. So as a result of the impact of all these loops we can conclude that behaviour of the variable image trough time will be oscillatory (Figure 4).

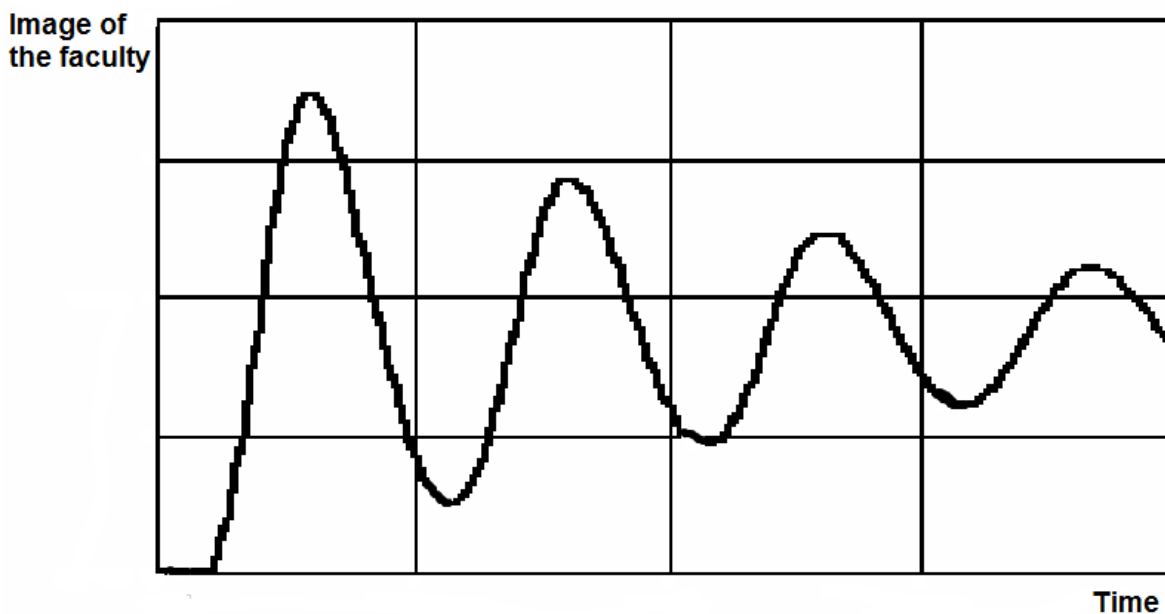


Figure 4: Balancing loop (Image of the faculty)

The image will oscillate around its balance level and our goal is to rise that level as much as we can. We can do that by influencing on some of the entities from the balancing feedback loops. If we try to maximize satisfaction of the employer for example, the best way to do that is to have good transfer master programs adjusted to the transfer students so they can gain as much of practical knowledge as they can from the area of studies they have selected. This will also influence the second balancing loop on the Figure 2.

4. CONCLUSION

This paper wanted to assess that there is many opportunities to improve the postgraduate master programs at FOS, as well as in the whole Serbian high education system. Filling that gap would strongly influence the Serbian economy in long-term.

One of the solutions for improving the “quality” of master students is to make multidisciplinary master transfer programs. New knowledge and skills that students would gain trough that master, should be correlated with the area and knowledge from their undergraduate studies. Here we are faced with the two problems. The first one is that there is not enough resources for this kind of master programs yet in Serbia, and the second one is that there is not enough skilled and educated staff for performing the teaching process for these multidisciplinary master programs.

Also, beside ministers, policy-makers, politicians, institutional leaders or administrators, higher education researchers, members of the academic staff of universities and colleges and students, businessmen from various areas should be included in formulating postgraduate master studies. They should express their real needs in practice.

In Serbia there are many programs from social science areas which offer some kind of similar education, as at FOS, so the competition is high. The number of people with master diploma is growing, but the number of vacancies is growing slower. On the other side, in the technical field of research there is a lack of experts. University representatives should update the entering quotes, but here we are faced with the usual problem which is the lack of resources.

By using system dynamics we can see what would happen if a certain policy was changed, or how would we distribute existing resources into different parts of the system. System dynamics offers us a theoretical tool to analyze such a structure, and gain an understanding into the performance of the system.

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AUTOMATION OF DATA PROCESSING IN DECISION MAKING IN RESOLVING CRISIS SITUATIONS

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Abstract: *Main characteristics of decision making in crisis situations are suddenness, uncertainty and time pressure (lack of time). These characteristics arise from the very nature of crisis situations, which usually develop rapidly and lead to various disturbances in the functioning of natural and social systems. Efficient and effective resolution of crisis situations depends on the speed of data collection, the quality of collected data, the speed and quality of data processing in obtaining information and the stability of the established integrated management system in emergency situations.*

Since time pressure is one of the key characteristics of crisis situations, from the aspect of this paper it is important to consider how the automation of data collection and processing reflects on the management efficiency in crisis situations. Frequent and rapid situation changes in the field certainly impose a need for flexible and adaptive situation assessment and decision making. What is significant is fast and reliable distribution of information, as well as monitoring decision implementation and effects.

Keywords: *crisis situation, data, information, automation, data processing, decision making*

INTRODUCTION

Crisis situations can be defined as incidents that occur quickly and include any kind of threat to a country, its territory, citizens, the armed forces, property, or vital interests. They can happen at local, regional, national or international level. Crisis situations can be caused by natural events or under man's influence. Some examples of emergencies encompass natural disasters (floods, fires, earthquakes, snowfalls, ...), terrorist attacks, industrial incidents, epidemics and pandemics, acts of external armed aggression, riots and protests of the population, etc.¹²

In resolving crisis situations decision makers are expected to know the standard operating procedures and they must do the following as soon as possible:

- have all current information from the field;
- process available data and information about the crisis situation in a qualitative way;
- bring qualitative decisions that will contribute to minimizing the negative impact of the crisis and contribute to the normalization of the situation.

The basic feature of decision making in emergency response is uncertainty and the lack of time. Efficient and effective emergency response depends on the speed of data collection, the quality of collected data, the speed and quality of data processing in the process of obtaining information and the stability of the established integrated management system in emergency situations.

In order to prevent or reduce the negative effects of the crisis in terms of the lack of time (time pressure), there is a need to work and make decisions very quickly. This increases the importance of prompt data collection, their automated processing and the appropriate use of information gathered in the decision making process.

¹² http://csi-aba.com/index.php?option=com_content&task=view&id=31&Itemid=1, doc. dr sc Korajlić, N., Krizni menadžment – pojam kriza.

1. DATA AND INFORMATION

Data and information are often used as synonyms in everyday life, as a result of misunderstanding of the essence of meaning of these two terms. Data is an objective category, whereas information is a subjective category that depends on how you interpret or use the data presented.

Data processing is an activity that enables understanding of the situation in the region and it creates basic conditions for the functioning of decision making process. For better understanding of the theory of data processing and automation capabilities, conceptual definition and main characteristics of data and information will be first explained.

1.1. Data

Data is simple, unprocessed and isolated fact that has some meaning. It is intangible and exists in people's minds, while describing the status of an object by defining: the meaning (name or description of meaning of certain properties), the value (measure or the amount of) and time (any form of appearance: astronomy, time ...). In short, everything that is raw data (fact), event or idea in a particular record (statement), we call data. This is a coded representation of some property, a concept, object, fact or event in the real system.

Data classification can be done according to a number of different criteria. At the highest level of the generality, it is important to consider the following two criteria:¹³

- A. **Who is the data user** in communication or among whom is data exchanged. There is a difference between these two forms:
 - 1) **semantic units of data and**
 - 2) **physical units of data.**

A-1): **Semantic units of data** are used in communication between people. They differ by their role in communication, its complexity, size and organization. In terms of hierarchy they can be structured as follows:

- **A sign is the smallest semantic unit of data**¹⁴ which includes besides alphanumeric characters, mathematical and logical operators, punctuation and other special characters.
- **The terms** represent a combination of physically adjacent characters.
- A **segment** is formally composed of groups of terms that can be united in the concept of a higher level of abstraction.
- A **record** consists of a group of logically related terms that refer to a particular object type and its properties.
- **The file** is usually the set of the same records related to all individuals of a certain type of object.
- A **database** is a set of files, each logically bound, related to a problem domain.
- A **data warehouse** is a special type of database customized to search extremely large amounts of data. The existing data are not changed, but updated.

A-2): **Physical data items** are a form of data which use computers and other electronic devices and systems in their work. Different physical forms are as follows:¹⁵

- **Bit** is the basic physical unit of data, and in information theory it represents the unit of measurement for the amount of information. It can have one out of two possible values which we denote "1" or "0".
- **Tetrada** is a greater physical unit of data consisting of combinations of four bits. Refers to the physical representation of semantic character hexadecimal number system.
- A **byte** is the next physical unit of data consisting of a combination of eight bits (or two tetrads). It is commonly used for the physical representation of the full set of semantic signs, establishing a relationship of one character - one byte.
- A **word** is the basic physical unit of data used by a computer at the central unit, or CPU. It is usually a combination of four bytes. Depending on the feature of the processor used, there are possible combinations of two bytes (half word), or a combination of eight bytes (double word).
- A **block** is a more complex physical unit of data that a computer uses to exchange data between central and peripheral units. It is formed as a combination of "N" bytes.¹⁶

¹³ http://www.efst.hr/nastava/27/7_PodaciInformacije.pdf , Poglavlje 7.1. Podaci.

¹⁴ Semantics comes from the greek semantikos - "significant meaning," derived from sema - sign. Semantics is a part of linguistics that is traditionally defined as the science of the meaning of words, phrases, sentences, and texts, the whole or any part (Wokabular).

¹⁵ http://grdelin.phy.hr/~ivo/Nastava/Numericke_metode/predavanja/02_pred.pdf (Vrste podataka)

The **file** can be viewed as a physical and semantic data unit. When treated as a physical unit of data, it means the amount of memory on which a larger semantic unit is deposited.

B. In comparison to data structuring, it can be distinguished:

- 1) **formatted and**
- 2) **unformatted.**

B-1: Formatted data structure is determined by the structure (position, data type and their length). Semantic meaning of formatted data can be established only if it the exact description of their structure is known. The use of formatted data dominates in information systems because it simplifies and accelerates data processing on a computer.

B-2: Unformatted data structure has no fixed structure and it occurs mostly in the form of media. Semantic meaning of these data is based on the very data. This is a great advantage from the position of a user, but data of this form are not suitable for automation of processing and application in business information systems.

1.2. Information

Information is created as a product of analysis and organization of data in a way that gives a higher level of knowledge about occurrence. The information consists of data that are given meaning by establishing mutual relational connections and organized in a manner that provides a better understanding of phenomena and processes. The meaning of information can be useful, but not necessarily.

1.3. Data processing

The concept of transforming data into information is given in Figure 1.

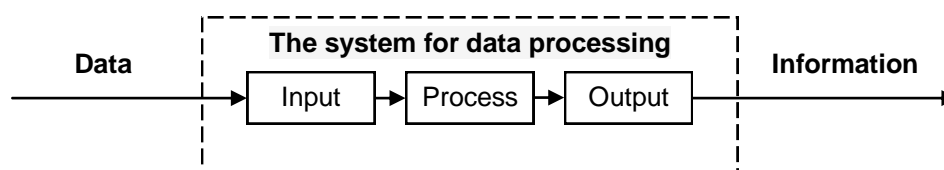


Figure 1: The concept of transforming data into information

Regardless of the perspective on the concept of information, its key feature is informational value. In this context all other properties of information are interpreted. It can be concluded that the more valuable information are those accurate and reliable, available at the right time and linked or related to the current problem.

The value of information is determined by the degree of reduction of uncertainty and ambiguity of a problem, based on the following criteria:

- timing and actuality,
- relevance and
- accuracy and reliability.

Timeliness and topicality are time dimensions of information. Timeliness means that information is available when needed, when it has the highest value. If the information is available with a delay, its value is significantly reduced. Figure 2 represents the change in value of information in comparison to event (at time T) to which it relates.¹⁷

¹⁶ The value of N - block size depends mainly on the performance of peripheral devices. What are these devices faster, carries large amounts of data.

¹⁷ http://www.efst.hr/nastava/27/7_PodaciInformacije.pdf , Poglavlje 7.1. Podaci.

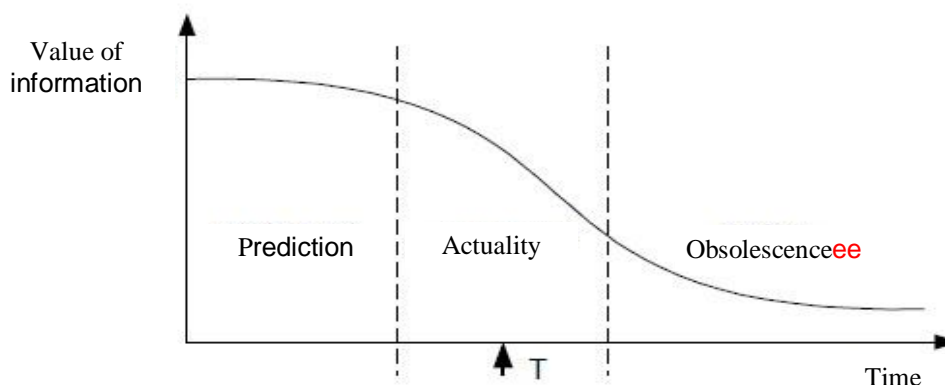


Figure 2: Changing the value of information as a function of time

As you can see in the picture, the information has the greatest value if it provides a prediction of an event. Its value decreases continuously in the time interval after current events, and rapidly loses value in the period after an event, or in the period of obsolescence. We are talking about the period of time, not a moment of time because the event itself has certain pace and duration.

2. INFORMATION SYSTEMS

Information systems (IS) are an integrated set of the components for collecting, recording, storing, processing and transmitting of information. The development of information technology and management has resulted in business enterprises and other organizations and individuals in modern society to depend on information systems for managing its activities. Modern corporations are entirely dependent on computer information systems through which they control their operations and business transactions, and also carry out human and material resources management. Recently, various organs of executive power and government, are increasingly using information systems to perform a variety of services with residents. In addition, individuals use information systems to improve their knowledge, to purchase, manage bank accounts and transactions, as well as for communication and data exchange.

The rapid development and availability of new information technologies (IT) results in expansion of existing and emergence of new application possibilities. It can be concluded that information systems enable a variety of human activities which had an effect on society: acceleration of everyday activities performance, effect on the structure of organizations, changing the ways of supply and demands, and ways of working and understanding. Information and knowledge are today a vital economic resource.

2.1. Databases

The database can be defined as a well-structured collection of data organized for rapid search and access, which last relatively long and are used and maintained by multiple users or programs (applications)¹⁸. From the perspective of users, the data are in some way logically connected. They are aspects of the real world. Users access the database directly through queries. By using keywords and classification of commands you can quickly find, correct, group and select data and receive the necessary reports. Data are presented in a uniform way (eg. in a relational database data are organized in tables), which simplifies access and use by external programs. Thus, a variety of programs written in different programming languages can use one database.

Computer memory is used for storage and data processing. The main task of the first designers of IS was to develop a type of software that would enable locating specific data stored in secondary memory (stored permanently) and their effective load into working memory in order to be processed. The basic structure of an IS consists of sets of files that are permanently stored in a secondary storage device. The software that includes file management system supports the logical separation of files into records. Each record describes

¹⁸ Lazarević, B., Marjanović, Z., Ančić, N., Babarogić, S.: Baze podataka, Univerzitet u Beogradu, Fakultet organizacionih nauka, Beograd, 2008., str. 1.

a state consisting of a number of fields. Each field gives the value of a particular feature (attribute) to given units.

The negative experience of classic organization of data and attempts to reach an integrated information system by connecting applications led to defining a new approach for the implementation of integrated information systems. The new approach is based on the idea that we should integrate the data, not applications. The result of integrating files of different applications is called the "Database" (DB) and represent a new approach to data management.

Basic concepts of database settings are as follows:

- All data are integrated into one IS in a physical structure (large "file") or the database;
- The data are stored with minimal repetition - redundancy;
- All programs use data from the database, or update DB by using services of special software product - database management system (DBMS).

The relationship between database, database management system and user applications is presented in Figure 3.

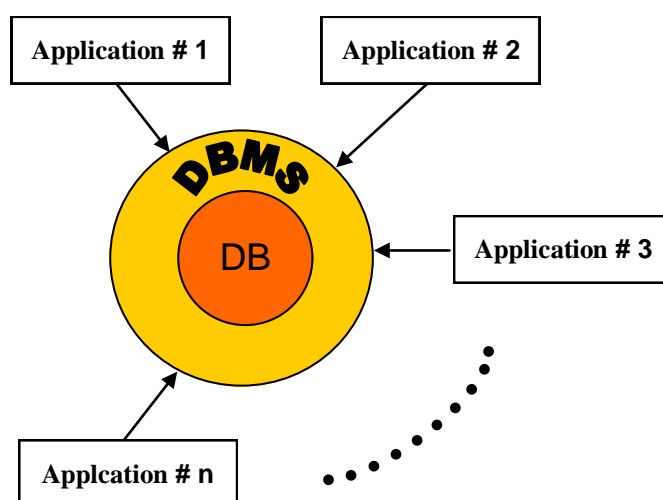


Figure 3: The relationship between DB - DBMS - Applications

The disadvantages of conventional data processing were warrant for important technological changes in this area. Database belongs to a central place in the structure of information systems. Applications (IS subsystems) that perform specific tasks through its programs are connected on it.

2.2. Decision Support Systems

Decision support systems support all stages of decision-making process from problem formulation phase through the design phase, selection phase and all the way to implementation. Decision-making and resource management in resolving crises in modern conditions impose the need for processing large amounts of information, which includes the use of information technology (IT) in all stages of decision making. The basic idea of applying IT in the beginning, was associated to the need to increase the efficiency and effectiveness, and it was carried out through the implementation of information systems that are able to support current operation. Further development of IT, on one hand, and increasingly complex operational procedures on the other hand, led to the development of decision support systems – DSS (Decision Support System), whose main goal is to exploit all the potential that IT has to help the command/staff and provide timely and comprehensive information for decision-making process. Initially, the DSS focused on structured, periodic reports, and today are part of a complex concept called "business intelligence".¹⁹

Decision support systems (DSS), based on the data (Data-driven decision support systems), are today called by various names, such as: data warehousing, business intelligent systems, information systems aimed at executors, spatial GIS (geographic information system) and systems with multiple dimensional databases.

¹⁹ <http://www.scribd.com/doc/6815525/7-SISTEMI-ZA-PODRSKU-ODLUCIVANJU>

Construction and implementation of such systems is very expensive, but their effectiveness justifies their introduction in operational use. They are interactive computer systems that provide decision-makers with a relatively easy use of large databases.

There are four basic types of DSS based on the data, as follows:

1. *data warehouse*,
2. *OLAP (on-line analytical processing)* systems with the multiple dimensional databases,
3. information systems aimed at executors (*Executive Information Systems*), and
4. spatial (geographic) decision support systems (*Spatial DSS ili GIS*).

Systems for decision support promote and support a decision-maker in the decision making process by providing information needed for finding and troubleshooting. For this purpose it uses databases and quantitative models, but it does not replace decision-makers in judgement, insight and heuristic functions and they do not make decision-making process to be automatic (PK Hough). They use models and analytical techniques with providing an easy access to information and choice of their presentation.²⁰

Systems for decision support are particularly implemented in times of crisis when decision makers are overloaded with information. The growing number of available information leads to problems how to transform them into useful information for support decision-making and get the "right information at the right time."²¹

3. AUTOMATION OF DATA PROCESSING

The fundamental question regarding the automation of any of the process (management) is to define the goal of automation. In the process of setting goals it is necessary to answer the following questions:

- why manage (what we expect from automation)?
- what do we automate (what is the processing amount)?
- how to automate the process (define algorithm automation)?

In response to these questions, defining the objectives of process automation should ensure: the safety of work process, efficiency, compliance with standard operating procedures and defining the content of output files. During designing system to automate the process, it is necessary to analyze the process in order to determine which parts of the process makes sense to automate.

Depending on the level of automation there can be following levels of automation:

- *Off-line operation with a very low level of automation;*
- *On-line work in open loop with the high level of automation;*
- *On-line work in closed loop with a high level of automation.*

Off-line operation is characterized by the process personnel leading the operation without mutual coordination, so the work does not contribute to increasing the level of automation. A computer is used in individual configuration and it can perform certain segments of the process without a mutual exchange of information. Entering data into a computer and defining the output data is done in a manner typical of general-purpose computers.

On-line work in the open loop automation systems means that the process is also left to personnel, while a computer is used for monitoring the process. Information on the status of the process is transferred to a computer in real time, creating better conditions for high quality data-processing and document output.

In contrast to the off-line operation, process personnel receive better information about the current state of the process. When operating in open loop, control system largely depends on the experience and personnel's knowledge of operating procedures. Improving the quality of open loop can be achieved by improving the database installation of empirical knowledge and by developing expert systems (knowledge base).

²⁰ Balaban, N., Z. Ristić, J. Đurković: Principi informatike, Savremena administracija 1994.

²¹ Keenan, P.: "Using a GIS as a DSS Generator", http://www.ucd.ie/misys/staff/pkeen/gis_as_a_dss.html.

On-line closed-loop operation includes automatic entry of input data from separated sensors, automatic data processing by predefined application definition and output data. This mode requires high standards and it is not suitable for the optimization of decision making in response to crisis situations due to the high level of unpredictability. If the input data can be quantified, it is possible to apply the methods of operations research from heuristic approach. Moreover, the organization of the closed loop carries increased security risks considering the fact that the response of the system would be automated, so there could be sub-optimal use of resources and deliberate obstruction in the case of system compromise.

For automation of technical processes process values (variables) are of primary importance and they need to be managed. In technical processes we distinguish between three types of process variables:

- Continuous process variables (eg, data of geo-space, the demographic situation on the ground, communication lines, transportation infrastructure);
- Discrete process variables (information about the causes and manifestation of a crisis);
- Objects with oriented process variables, which join the individual objects (eg. resources that are available).

In accordance with this division of process variables, appropriate types of processes are defined:

- Continuous (dynamic) processes,
- Sequential processes (discrete event type processes),
- Management processes directed towards the object (object type discrete processes).

While managing the complex technical systems, be sure to apply the **principle of hierarchy** between the administrative and executive levels. Higher levels of management mainly perform tasks of decision making, direction and control, while the executive organs execute the decisions of higher level management. Also, at lower levels of hierarchy, in quantitative terms, the dominant source is (raw) data. At higher levels of management, the amount of data about the process is reduced without compromising quality. Higher levels of management handle information you have converted from the more specific information content.

The essential task of automation system is that a large number of functions are performed automatically, but in an acceptable manner in terms of safety and rational use of resources.

4. CONCLUSION

Crisis situations and crisis management preoccupy many theorists and practitioners involved in the process of crisis management. Whether the crisis is due to natural disasters or human activity, it can be concluded that there are some basic characteristics that define them as follows: suddenness, uncertainty and time pressure. These characteristics are primarily manifested negatively in the decision making process, which is a real skill. Decisions taken in these circumstances have far-reaching consequences.

Data processing creates basic conditions for successful decision-making process. Information is created as a product of successful data processing and give us a higher level of knowledge of data and provide an adequate understanding of a situation. It can be concluded that the information consists of data given meaning by establishing mutual relational connections. Organized data are arranged in a manner that provides a better understanding of phenomena and processes. The key feature of any information is its information value which is assessed by user, that is the fact whether the content recognised in some data can be used in a useful way.

From the point of time, the information important feature is its timing and actuality and that it is available when it is needed most. If the information is available with a delay, its value is significantly reduced. In terms of lack of time as the important characteristic of crisis situations, there is a need for a quick decision. This highlights the **importance of automated data processing**. Automation processing of data can significantly save time and simultaneously bring timely and rational decisions that can prevent or reduce the negative effects of crisis. By automating data processing in emergency situations there should be an aim to have as many functions performed automatically due to larger savings of time. These time savings at the expense of increased automation of data processing should not affect the accuracy and reliability of the information obtained because an inadequate decision due to misleading information in a crisis situation can have major negative consequences. Automation must also be controlled because of frequent changes of situational factors on the ground in the crisis. The "on-line operation in closed loop" can constitute an adequate solution since it takes into account the high pace of situational change.

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- <http://www.forum.ftn.uns.ac.rs/index.php?act=attach&type=post&id=2643>
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EXTENDING GENERIC DECISION TREES WITH MULTIVARIATE SPLITS

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Abstract: *Many decision tree algorithms have been proposed over the last few decades. A lack of publishing standards of decision tree algorithm software has produced a large time gap between algorithm proposals and their wider application in practice. Non-existence of a common repository for storing algorithms and their parts has led to a need for algorithm re-implementation from scratch when they have to be implemented on a different platform. This makes the comparison between algorithms and their partial improvements vague. In addition, combinations and interactions between different algorithm parts haven't been analyzed thoroughly. Reusable component design of decision tree algorithms has been recently suggested as a potential solution to these problems. In this paper we extend the reusable component based repository for the generic decision tree design with components for the creation of multivariate (oblique) splits. These components are implemented as a part of WhiBo environment and the evaluation is conducted in RapidMiner: an open-source system for data mining.*

Keywords: *algorithm; component; classification; decision tree; architecture; Rapid Miner*

1. INTRODUCTION

Decision trees (DTs) are among the most commonly used classification techniques since they have significant advantages (Tsipitis & Chorianopoulos 2009):

- They generate simple, straightforward, and understandable rules,
- They are fast and scalable and they can efficiently handle large number of records and predictors.
- They integrate a field of screening process which permits them to narrow the set of predictors by filtering out the irrelevant ones.
- They are not affected by the possible correlation between predictors and the presence of multicollinearity.

Several DT algorithms have been identified as most popular data mining algorithms (Wu et al., 2008), which have successful applications in many areas like medicine (Samanta et al., 2009) (Jovic & Bogunovic, 2010), bioinformatics (Emekci et al., 2007) (He et al., 2006), social network analysis (Hadjidj et al., 2009) (Jung, 2009), and finance (Sun & Li, 2008) (Chang et al., 2011).

Development of DT algorithms is based on two approaches (Zeileis et al., 2008). In the first approach an exhaustive search is performed over all possible splits in every recursive step. Attribute (predictor) that shows best split by some evaluation measure is selected for branching the tree. This procedure is recursively iterated, until a stop criterion is met. Well known algorithms from this class are ID3 (Quinlan, 1986), C4.5 (Quinlan, 1993), CART (Breiman et al., 1984), etc.

In the second approach, statistical tests serve as the basis for recursive partitioning. Selection of attributes for tree branching is based on testing the significance of association between input attributes (predictors) and the output attribute (class). Well known algorithms from this class are: CHAID (Kass, 1980), FACT (Loh & Vanichsetakul, 1988), QUEST (Loh & Shih, 1997), CRUISE (Kim & Loh, 2001), GUIDE (Loh, 2002), CTREE (Hothorn et al., 2006), etc. Most of these algorithms represent small incremental improvements over a seminal algorithm.

Suknovic et al. (2011) analyzed the aforementioned two groups of decision-tree development approaches and proposed a generic decision tree (GDT) algorithm that allows combining algorithmic reusable components (RCs) from the original algorithms into new algorithms. By assembling components users can either reconstruct original algorithms and/or design a myriad of new component-based DT algorithms. Delibasic et al. (2011) evaluated this idea and showed that combinations of reusable components (RCs) extracted from existing algorithms and their improvements can yield significantly more accurate algorithms compared to popular DT algorithms. Vukicevic et al. (2012) proposed an architecture for component based DT algorithm design with RC repository that allow easy extension and implementation of new RCs. Architecture is implemented as a part of WhiBo plug-in (www.whibo.fon.bg.ac.rs) for RapidMiner (Mierswa et al., 2006): an open-source system for data mining.

In this paper we extend an RC repository for design of generic DTs with RCs for creation of multivariate (oblique) DT splits. Also we evaluated performance of these RCs and compared with standard techniques.

Present architecture for building DTs with reusable components (RCs) proposed in Suknovic et al. (2011). The basic idea is to enable the reuse of components from existing algorithms and their improvements, and to allow collaborative.

The paper is structured as follows. Section 2 will present standard DT algorithm and GDT components. In Section 3 multivariate DTs are explained and RCs are identified. In Section 4 we evaluate performance of integrated RCs and Section 5 explains the directions for our future work.

2. GENERIC DECISION TREES

Suknovic et al. (2011) present that RCs for DT design were proposed (Table 1). Classification DT algorithms were analyzed and algorithmic parts with the same functionality (algorithm sub-problems) and algorithm components (RCs) used for resolving sub-problems were identified. This type of algorithm decomposition opens a way for “white-box” design and testing of DT algorithms. Every sub-problem has standardized I/O structure, and can be solved with one or more RCs (Table 1).

This enables interchange and combination of RCs originating from various algorithms.

Table 6: Sub-problems and RCs identified in Suknovic et al. (2011)

Sub-problem	Reusable component	Parameters	Input	Output
Remove insignificant attributes	CHI SQUARE / ANOVA F TEST	alpha (def. 0.05, min 0, max 1)	Dataset in current node	Dataset in current node (reduced)
Create split (Numerical)	BINARY		Dataset in current node	Split candidates
Create split (Categorical)	BINARY			
	MULTIWAY			
	SIGNIFICANT	merge alpha (def. 0.05, min 0, max 1)		
		split alpha (def. 0.05, min 0, max 1)		
Evaluate split	ALL		A split candidate	Evaluation of the split
	CHI SQUARE			
	INFORMATION GAIN			
	GAIN RATIO			
	GINI			
	DISTANCE MEASURE			
Stop criteria	TWOING		Current tree model	Signal for stopping tree growth in current node
	MAXIMAL TREE DEPTH	tree depth (def. 10, min 1, max 20)		
	MINIMAL NODE SIZE	node size (def. 30, min 1, max 1000)		
Prune tree	LEAF LABEL CONFIDENCE	confidence (def. 0.95, min 0, max 1)	Current tree model	Pruned tree model
	PESSIMISTIC ERROR PRUNING (PEP)	confidence (def. 0.25, min 0.1, max 0.5)		
	COST COMPLEXITY PRUNING (CCP)	use-1stdev (def. 0, min 0, max 1)		
	MINIMAL ERROR PRUNING (MEP)	mParameter (def. 2, min 0, max 1000)		
	REDUCED ERROR PRUNING (REP)			
	MINIMAL LEAF SIZE (MLS)	leaf size (def. 30, min 1 max 1000)		

Additionally, this approach allows better understanding and characterization of algorithms and their parts than traditional “black-box” algorithms. In component based (“white-box”) approach in DT design, algorithm flow is defined by a generic decision tree algorithm (GDT) (Figure 1). Sub-problems, corresponding RCs and the GDT algorithm for building hybrid DTs is presented in Figure 1.

To enable implementation of the component-based GDT algorithm one needs to define a common structure of sub-problems with standardized inputs and outputs (Table 1); we propose an architecture which will be described in the following sections. Here we offer a brief description of sub-problems and their possible solutions (RCs) that are currently integrated in GDT architecture.

3. MULTI ATTRIBUTE DECISION TREES

Here we extend RC-based analysis of decision trees to multivariate (oblique) decision trees. We explain the algorithms and the motivation for their integration with DTs and how can these algorithms be integrated in the GDT structure.

Gama (1997) proposed one way of enhancing DT models, where the author discusses the usage of multi-attribute (oblique) splits within each tree node (p.187-198). In each node, this algorithm, called LTree, can build new attributes based on linear combinations of the previous ones. Gama (1997) gives an example that illustrates a possible new oblique attribute (p.187-198).

$$\text{Linear_attribute_7} = -16.6 - 3.5 * \text{Sepal_length} - 5.5 * \text{Sepal_width} + 6.9 * \text{Petal_length} + 12.4 * \text{Petal_width} + 0.03 * \text{Linear_attribute_5} - 0.03 * \text{Linear_attribute_6}$$

If the “best” orthogonal axis involves one of the new attributes, then the decision surface is considered oblique. The new attributes are propagated throughout the tree branches, so the number of attributes considered in each node is variable. Since the tree searches for linear combinations of attributes, this strategy is applicable only to numerical attributes. The same author goes further in his next research (Gama, 1999), where he proposes extending this strategy beyond linear models. This extension includes quadratic discriminant and a logistic discriminant.

Additionally, there are more approaches in deriving new multi-attribute splits as tree nodes. Murthy et al. (1993) introduce an algorithm OC1 that creates hyper-planes which separate classes in each node, by applying search heuristics with additional randomization (p. 322–327). The authors contrast this with the former approach by Heath et al., (1993) that used simulated annealing for the search of the appropriate separating hyperplane. There are also more recent approaches of finding a good separating hyperplane, including evolutionary algorithms (Canti-Paz & Kamath, 2003).

Interestingly, all these strategies could be encapsulated and viewed as components for solving the “Create split (numerical)” sub-problem of our architecture. Since the other parts of the proposed oblique algorithms are quite typical for a decision tree algorithm (e.g. LTree uses GainRatio as a split evaluation measure), these new components could be included in the WhiBo framework, and used in conjunction with existing WhiBo components. In Table 2 we summarize new sub-problems and RCs identified from the analyzed algorithms.

Table 2. Sub-problems and RCs identified from analysis of oblique and hybrid decision trees

Sub-problem	RCs
Create split (numerical)	Linear discriminant, Quadratic discriminant, Logarithmic discriminant, OC1, Evolutionary Hyperplane, Sim. Annealing Hyperplane, Equal Width Interval Binning, 1R Discretizer
Enhanced leaves	Linear threshold Unit, Naive Bayes, Neural network
Stop criteria	Diversity, Linear separability
Evaluate split	Cross validation

4. Evaluation (Experimental setting)

In order to provide initial evaluation of usefulness of multivariate splits in RC based decision trees we implemented “Linear discriminant” RC as a part of WhiBo framework. Our main goal was to inspect if “Linear discriminant” splits are competitive with “Binary numerical” splits which are most often used in decision tree design. Additionally we evaluated if synergy of these two RCs can give competitive results when they are used in the same algorithm. For generalization of the results we used RC based design to build 150 (2x3x5x5) algorithms with different RCs from different sub-problems. Sub-problems and RCs used for generalization are showed in Table 3.

Table 3: Sub-problems and RCs used for building DT algorithms

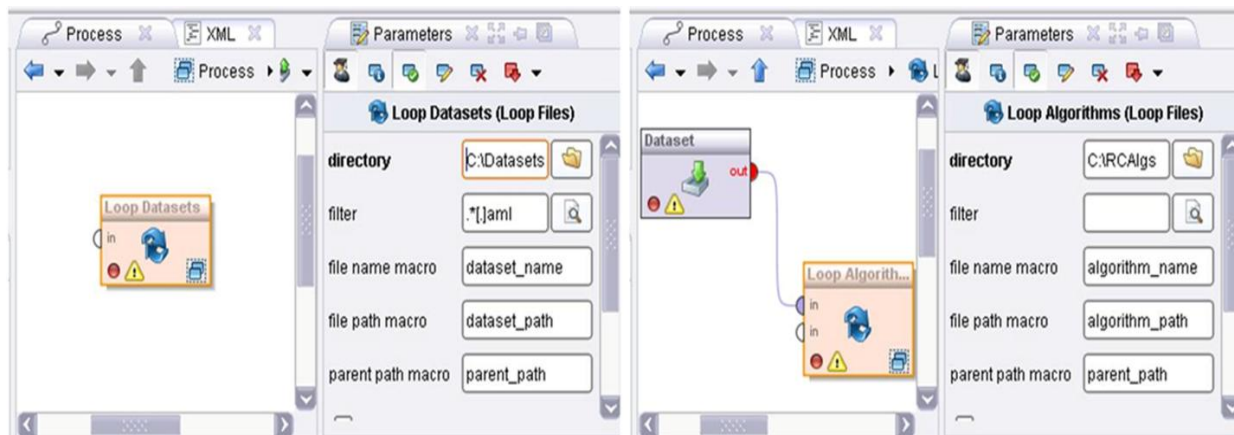
Sub-problem	RCs
Remove insignificant attributes	Yes, no
Create split numerical	Binary, Linear discriminant, All (Binary+Linear discriminant)
Evaluate split	Chi square, Distance measure, Gain ratio, Gini index, Information gain
Prune tree	Cost complexity, Minimal error, Pessimistic error, Reduced error, none

We evaluated all algorithms on 6 real world data from UCI repository. So we conducted 900 (150x6) experiments in total. Datasets and their basic characteristics are showed in Table 4.

Table 4: Datasets from UCI repository

Dataset	No. Of attributes	No. Of records
Breast cancer wisconsin (bcw)	10	699
Breast cancer (bre)	9	286
Hayes-Roth (har)	5	160
Hepatitis (hep)	19	155
SPECT Heart (spe)	22	267
Teaching assistant evaluation (tae)	5	151

Experiment is conducted in RapidMiner as its inner operator structure allows easy setting up of the experiment. The experimental process was organized in 3 levels. On the first level of the process we used an operator that loops through all datasets in a folder (Figure 1.a). On the second level we set up an inner operator for looping through all algorithms over every dataset defined on the first level (Figure 1.b).


Figure 10: (a) Iterating through datasets (b) Iterating through algorithms

On the third level (Figure 2) we measured classification accuracy of every algorithm which is evaluated through 10-fold cross validation. We used the operator "X-Validation with log" from WhiBo operator group because it enables logging of the results (average as well as detailed results for every fold) in a .csv format.

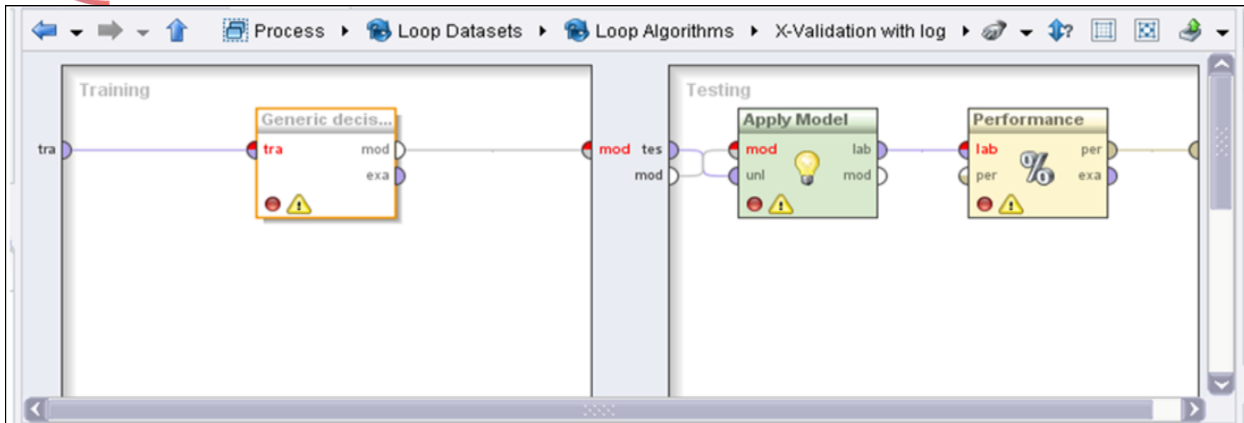


Figure 2: Inner operator structure of the “X-validation with log operator”

In each iteration, the GDT operator uses one of the predefined 960 algorithms on level 2 for training a DT model (left part of Figure 2). In the right part of Figure 2 standard RapidMiner operators for applying a generated model on a test set and measuring classification accuracy are used.

This experimental setting enables complete reproducibility of the results: all datasets are saved as .aml (i.e. RapidMiner dataset format) and algorithms with parameter settings are saved as .wba files and are available on www.whibo.fon.rs. Also, this setting allows logging of all results (in this case 150 algorithms x 6 datasets) in one execution.

It can be seen from Figure 3 that “LinearDiscriminant” RC didn’t give the best accuracy on any dataset. Still, on two datasets it showed better accuracy than “BinaryNumerical” and on 3 datasets the best accuracy is achieved with synergy of these two components (“AllNum” RC).

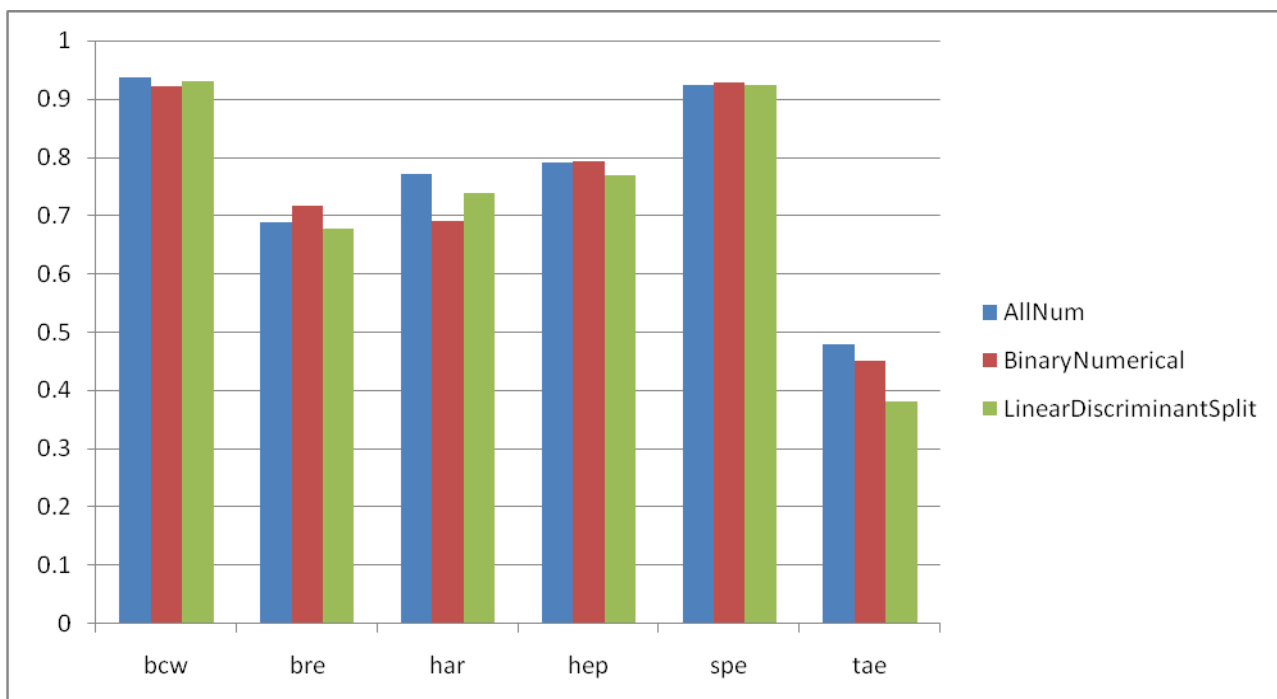


Figure 3: Inner operator structure of the “X-validation with log operator”

From the preliminary results showed on Figure 3 it can be concluded that “Linear discriminant” split is competitive with “Binary numerical” when used for building Generic DTs, and also that their synergy often can give best results.

Table 5 shows detailed accuracies of algorithms on every dataset for different “Create numerical split” RCs. Best accuracy for every dataset is marked in bold.

Table 5: Classification accuracies for different “Create numerical split” RCs on every dataset

Dataset	AllNumerical	BinaryNumerical	LinearDiscriminant
bcw	0.937	0.922	0.930
bre	0.688	0.716	0.677
har	0.771	0.689	0.739
hep	0.791	0.792	0.770
spe	0.923	0.929	0.924
tae	0.479	0.452	0.382

6. CONCLUSION AND FUTURE RESEARCH

In this paper we conducted a preliminary analysis about usefulness of oblique (multivariate) splits in design of generic RC based decision trees. “Linear discriminant” split is implemented as an RC for building generic DTs as a part of WhiBo environment. This RC is compared against most “Binary numerical” splits. Generic design of DTs also allowed to examine influence of synergy of these two RCs (“All numerical”). For generalization of the conclusions we designed 150 DT algorithms that contain aforementioned splitting RCs (“Linear discriminant”, “Binary numerical”, “All numerical”). Experimental results showed that there is no dominant RC and that synergy of RCs often allow design of well performing algorithms. Based on these results we plan to implement other oblique split RCs and to examine their influence on the performance on Generic DT algorithms on more datasets.

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IDEA MANAGEMENT IN A DEVELOPING COUNTRY WITH TRANSITION ECONOMY: GOOD INTENTION, BAD COMMUNICATION

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Abstract: *Employees in any organization can be a useful, continuous and inexpensive source of ideas needed to innovate. This paper explores the state of idea management in companies from Serbia as a developing country. First, the developing country with transitional economy context is analyzed. Next, the idea management basis and previous research in this area are discussed. A survey has been conducted, asking company managers about their beliefs and communication habits regarding idea sharing.*

Serbia is found to be a country whose companies have not surpassed many in its innovation efforts, where cultural specificities and a collectivist culture often inhibit employees' readiness to think about improvements and to share their ideas. Idea sharing communication among managers is found to be random and unorganized, with no structured idea management systems found in the observed sample. Ideas are preferably transferred orally, with little chance to be realized and often followed by inadequate feedback from managers. This research may serve as a basis to implement or improve different idea management systems in countries with a similar development context.

Keywords: *idea management; communication; innovation; developing country*

1. INTRODUCTION

Ever since Denny's shipyard in Dumbarton, Scotland, in 1871 (Brown et al., 2005), employees have been considered to be not only a source of work force, but a source of suggestions that could improve their company's business. The idea behind employee's involvement in improving the ways in which their company is doing its job is simple: they are the people "who get their hands dirty", which means they are the closest ones to the working processes that should be improved. Being the closest ones, they are most likely to notice what needs to be improved. Besides that, they don't cost as much as external consultants and they are here to stay, which means they have considerably more time to look for the small improvements. Methods used to harvest ideas not only from employees but also from companies' clients are various, starting with simple idea boxes and ending with high-priced network-based software idea systems.

Companies in countries that have changed their economies from government control to free market had the same challenge to harvest ideas successfully. But in addition, they became faced with sudden rush of competing foreign companies offering similar products. These companies also became faced with new ways to improve their business, showing unequal success and varying from great usage of their employees' ideas to a complete ignorance or neglect of employees' cognitive potentials.

This research, conducted in Serbia, aims to identify managers' views where cognitive potentials of one side should be used by the other one. A number of interesting questions related to idea management systems in transitional economies arise, with special accent on: (1) do these companies use idea management systems and if they do, how do they use them? (2) If these companies do not use idea management systems, why not and what are the potentials for implementation? An empirical exploratory research was conducted in order to gather relevant data to answer these questions.

There are few studies in literature which present relevant data from transition economies, and even then every transition economy has its own specificities. Serbian scenario portrayed in steps "totalitarian regime – civil war with foreign intervention – democratic government and open economy" could be, at least to some extent, applicable to other developing countries who had or will have similar history.

2. LITERATURE REVIEW

2.1 Transition economy and innovation background

Serbia's integration into global market was a slow and hard process knowing that the country's industries were partially destroyed or outdated during disintegration of Socialist Federative Republic of Yugoslavia and the civil wars 1991-1995 and NATO intervention in 1999. With political changes which followed soon, there were also economic changes, opening some of the country's markets to global companies in the year 2000. The consumers had begun looking for western goods which they were deprived of for decades, but the

process of transition also implied higher inflation, uncertainty and higher unemployment (Manrai and Manrai, 2001) which possibly made employees reluctant to participate in improving their organizations. This opening of markets and the introduction of global and multi-national companies changed the competitive landscape significantly. As well as in other countries where domestic industries got rapidly exposed to international competition which forced firms to rethink and reconfigure their models for manufacturing and management (Barnes et al., 2001), Serbian organizations had to evolve. While political and economic changes started happening fast, human resource aspects in these organizations evolved at slower rate, making a gap between companies' goals and possibilities.

Some South, Eastern and Central European countries, as well as others around the world, had transition changes over last 15 years. These countries moved, or are moving, from a state-planned economy to a social order based on a market economy. While some of them changed quite quickly, adapting to global market demands with little problems, others seem to progress at a slower pace. Eight of these transition countries have been integrated into the European Union, some others have the status of candidate countries, while others are still waiting for that status (Albania, Bosnia and Herzegovina, Macedonia and Serbia). Serbia is proven not to be a fully developed market economy (Linz and Semykina, 2010). According to the transition indicators published by the EBRD (2009), Serbia significantly lags in both large-scale and small-scale privatisation, which results in significant number of organizations being stuck in some stage of transition and managerial approach change. This context of unclear ownership structure and poorly defined management functions can lead to numerous obstacles in innovation processes.

Research in this area is scarce and often country specific. Furthermore, there is difference between innovation research in developing versus developed countries. Previous research from developing countries mention topics like "R&D management" and "technological change and development" which are not often present as research topics in developed countries, while developing countries lack research on topics like "technology strategy", "new product development" and "design innovation" (Cetindamar et al., 2009).

Political and economic changes in transition countries seem to have a significant impact on organizations capabilities and success in doing their business (Kubes and Benkovic, 1994). These changes from a centrally planned and government controlled economy to a open market driven economy were radical and resulted in the inability of organizations to simultaneously change internally and cope with external changes effectively. Past economic and political systems did leave a unique legacy in the transition economies by creating a peculiar cultural syndrome at the enterprise level with its distinct set of values, norms and standards based on the notation of the communist theoretical conception of collectivism (Leskovar-Spacapan and Bastic, 2007). This collectivism culture was shown to be less oriented to customers (Huff and Kelley, 2005), thus being inferior in 21st century global and dynamic environment. Furthermore, while in individualistic cultures speaking one's mind is a virtue, collectivist culture prefers harmony over sharing one's ideas (Carayannis and Sagi, 2001). There is a growing realization that the dominant orientation towards laissez faire enterprise privatization and macroeconomic stabilization has not affected economic growth in transition countries as was expected, and has instead threatened their economic integration (Svarc, 2006). The cumulative output decline index, which is an indicator of the harshness of the transition affecting resource allocation towards innovative activities, identifies Serbia as country which has not successfully surpassed the level of development that most developing countries achieved in last ten years (Krammer, 2009). Research findings from Serbia suggest that both the incompetence of HR managers and professionals, as well as a slow-moving transition, need to be carefully considered to explain the distinctiveness of human related aspects in transition economies organizations (Milikic et al., 2008), such as involving employees in improvement activities.

2.2 Idea management – basis and previous research

Innovation is commonly perceived as a key driver of industrial and firm competitiveness (Damanpour and Wischnevsky, 2006). It is one of main sources of achieving a sustainable competitive advantage, conversing ideas to useful applications (Afuah, 2003).

Innovation is broadly defined as "implementing new ideas that create value" (Linder et al, 2003.). Obviously, these new ideas serve as basis to innovate in different ways, such as product development, the deployment of new technologies, or utilizing new management practices (Zott, 2003). This research is interested in one of the sources of these ideas, analyzing organizations' employees patterns of behavior that lead them to share ideas, as well as organizations managers' underlying beliefs regarding usability of those ideas.

Employees' potentially useful ideas (as well as those of organizations' customers) can best be harvested, evaluated and implemented through some form of an organized idea system. Previous research confirms that idea management systems can be used to introduce and strengthen the innovation capability of an organization (Nilsson et al., 2002). Especially, the importance of forms of shop floor activation, which effectively mobilize the ideation and problem-solving behaviour of majority of the workforce is present in literature (Pfeffer and Veiga, 1999). In a neighbouring transition economy (Croatia) there is evidence that radical product innovation is related to implementing corporate changes, while incremental innovation is more related to implementing new organizational structures (Radas and Bozic, 2009).

Employee collaboration and common innovation infrastructure are thought to be the most important triggers of organizational innovation and creativity (Damanpour, 1991). However, there is a significant difference between an idea management process and an innovation process in an organization. Idea management system includes sub-processes of generation, collection, development, evaluation and selection of submitted ideas, whereas innovation infrastructure includes the processes for supporting research, as well as mechanisms in place for the cumulative 'stock' of technological knowledge and developing and commercialising new ideas (Brachos et al., 2009). Idea management can be observed as a sub-process of innovation management (Brem and Voigt, 2007). It is shown in recent research that in a developing country (Turkey) idea quality and idea generation are important determinants of (especially large-scaled) organizations' innovative capacities (Koc and Ceylan, 2007). In both phenomena, quality communication in organizations seems to be the prerequisite for effective usage of employees' ideation potential. A proper idea management system allows management to communicate effectively its' needs for good ideas, to motivate employees to engage in creative ideation behavior and it also harvests the resulting ideas in a way they can be used as basis for improvement and innovation. As a condition, idea management system as a part of continuous improvement must not be set as a binary state or a short-term activity, but as the evolution and aggregation of a set of key behavioural routines within the firm (Bessant et al., 2001). More extreme approach even sees idea management as a political strategy, where ideator has to sell his/hers idea (Bakker et al., 2006).

Process of idea generation is often found to be complex and delicate. Idea submitters need to bridge the gap between current situation and an ideal, employing their creative thinking to come up with a possible solution. Creative thinking seems difficult for ordering, which doesn't stop organizations trying to order creativity (Nov and Jones, 2006). Effective organizational communication should motivate employees to think about possible improvements. Organizational communication should also direct employees' creative thinking in a defined course and should motivate them to share resulting ideas with their organization. In other words, idea generation and therefore technological innovation can be represented as a complex net of communication paths linking the various stages of the innovation process (Rothwell and Robertson, 1973). Even the number of communication connections between employees is shown to result in a higher proportion of high quality ideas provided by individual employees: the possibility to interact with other employees (but individually, not in form of different groups) increases ideators' proportion of good ideas (Bjork and Magnusson, 2009). If the improvement or innovation task cannot be simply evaluated and requires interactions between idea creator and idea evaluator, high richness media channel would be preferred. Face-to-face meetings and video conference communication channels are preferred for these tasks that require creativity and immediate feedback. Similarly, low richness communication channels should be preferred where the ideation tasks are predominantly analyzable and have more predictable outcomes (Oke and Idiagbon-Oke, 2010). If group idea generation software is used in ideation processes meetings, it is identified that full benefits might not become evident until the number of participants has reached about six (Aiken and Wong, 2003).

Internal communication is found to be a critical point in idea and innovation management, because information timing is a crucial element to the cooperation between technology improvements and market (Brem and Voigt, 2009). It is shown that a well-designed, game-like system for generating and evaluating ideas can motivate evaluators to participate in constant ideation and idea evaluation activities (Bothos et al., 2008). However, it must be pointed out that centralised idea management systems discourage external partners like suppliers and customers to participate. These external sources of ideas tend not to work efficiently, as they lose ideas and delay their evaluation and implementation, implying that integrated idea management must be a system with a sophisticated and holistic approach (Brem and Voigt, 2007).

There are no relevant research results found in Serbia regarding idea management usage. Indirectly, a recent research has shown that earnings are positively related to employees internal locus of control and preference for challenge in Serbia (Linz and Semykina, 2010), where internal locus of control and preference for challenge can be seen as prerequisites for ideation and problem-solving behaviour.

3. RESEARCH METHODOLOGY AND SAMPLE

The data were gathered from six companies, during years 2009. and 2010., with intention to cover different ownership and management structures. The sample was constructed with explorative approach in mind, knowing that there was no similar research conducted in the country and trying to achieve diverse sample regarding bigger organizations. It must be pointed out that transitional economy context in Serbia seems to have made many organizations reluctant to take part in academic research: additional seven organizations which were contacted rejected to take part in this study, and another two organizations let their employees be surveyed, but the employees were not motivated to complete the questionnaire, mostly stating that their salary and work conditions were “not enough to cover their extra effort”.

The sample consisted of 66 employees identified as top level managers and mid-level managers, who were asked about their opinion on usefulness of employees' ideas. Also, they were asked about motivating employees to create and share ideas when they emerge. In this sample there were 17 female managers and 49 male managers, with 18 having high school diploma and 46 having their college degree.

Data used to investigate patterns of communication related to ideas for improvement were gathered using a survey instrument, and analyzed with descriptive statistics. The written questionnaire consisted of 9 general questions and 15 questions about idea usefulness and motivating styles. Only questions that derived most interesting conclusions were observed in further analysis. Since it was recorded that none of the observed companies had a formal idea management system, there was no method for obtaining objective data regarding number of shared ideas, their acceptance rate and implementation.

4. SURVEY FINDINGS

4.1 Managers view on employees' ideas

This section presents the overall findings from the managerial perspective.

The preferred method for majority of managers to receive ideas from employees is through direct conversation with submitters, as shown in table 1. After that, managers believe that ideas should be directly submitted to a potential idea officer, or at staff meetings. It is interesting to see that only 13% of top and mid level managers believe that written methods of sharing ideas via pen and paper or a software system would be the most effective. Additionally, 71% of surveyed managers reported that they predominantly receive ideas to resolve ongoing work-related difficulties and efficiency problems (question not shown in table form).

Table 1: Managers opinion on communication media effectiveness

Question: What means of communication do you think would be the most effective to gather employee's ideas?	
answer	frequency (percent)
in direct conversation with myself as a manager	27 (41%)
in direct conversation with a person whose job would be to manage ideas	16 (24%)
on a staff meeting	9 (14%)
talking to any of the top managers	5 (8%)
through a form put in a suggestion box	5 (7%)
via some software or internet	4 (6%)

Table 2 shows managers' opinions on potential idea evaluators. It is apparent that co-workers of the proposer are perceived as most effective in idea evaluation, while 47% managers do believe that top managers could effectively evaluate ideas. This finding shows a good sense for potential evaluators, but managers should be warned that top managers may not be effective evaluators considering their time available, as well as the fact that they are often not familiar with shop floor level activities.

Table 2: Managers opinion on valid idea evaluators

Question: Do you believe the following persons could effectively evaluate employees' ideas? (count for "yes")	
answer	frequency (percent)
co-workers from the same sector	46 (70%)
top managers	31 (47%)
external consulting experts	14 (21%)
all the interested employees, regardless of their job description	9 (14%)

Managers' initial reactions when faced with a new idea are shown in table 3. In most cases, managers ask for clarification, which is in fact a fairly common reaction in most conversations. The bad side of this approach may be that managers need to memorize proposers' explanation for further decision making process. Also, reaction of 29% of managers is not to ask for clarification, but to either immediately express their estimation of idea feasibility, with or without explanation, or not to answer at all.

Table 3: Managers' reaction to suggested ideas

Question: When you are presented with employee's new idea how do your most frequently answer?	
answer	frequency (percent)
I ask questions to clarify the idea	39 (59%)
I immediately give my opinion about the idea's feasibility	13 (20%)
I don't get any ideas	8 (12%)
I give a short answer without further explanation	3 (4.5%)
I don't answer for some reason	3 (4.5%)

According to table 4, majority of managers see giving feedback as an encouragement for further ideation. Smaller number of managers feel that the main purpose of their feedback is to improve employees' cognitive and ideation processes. A small number gives feedback mainly as a courteous reaction.

Table 4: Managers' motives to give feedback for suggested ideas

Question: What is the main reason to give feedback to employees when they share ideas?	
answer	frequency (percent)
to encourage further ideation	40 (61%)
so the employee should know if his way of thinking is good or not	16 (24%)
as a human gesture for his suggestion	8 (12%)
there is no reason to do so, feedback should not be given	1 (1.5%)
something else	1 (1.5%)

Table 5 shows managers perception of idea utilization. The alarming fact is that only 15% of respondents believe almost every good suggested idea will be realized, which implies that observed companies have problems converting ideas to innovations. There are no significant differences in answers to this question between companies. When asked if they follow accepted and realized ideas to learn how to further develop ideation and idea sharing, (only) 53% managers said that they do a follow-up of implemented ideas, which suggests that almost half of managers tend not to improve their idea harvesting and evaluation activities.

Table 5: Managers estimation of chances that good idea has to be realized

Question: When an employee gives a good idea, what chance does that idea have to be realized?	
answer	frequency (percent)
there is about half a chance	25 (38%)
unlikely	19 (29%)
almost every good idea	10 (15%)
answer to this question is highly variable across parts of organization, there is no unique answer	10 (15%)
there is no chance	2 (3%)

Table 6 shows what is managers' preferred method to encourage employees for further ideation. It can be observed that 50% of managers prefer income bonuses, 20% would give free days, 11% would prefer to motivate with other privileges, 11% with private praises and 8% public accolades. Other suggested possibilities were not chosen by any manager.

Table 6: Managers' reinforcement strategies for idea sharers

Question: How do you instigate and motivate workers to share their improvement related ideas?	
answer	frequency (percent)
bonus payments	33 (50%)
free days	13 (20%)
other privileges	7 (11%)
private praises	7 (11%)
public accolades	6 (8%)

Managers were also asked about readiness to engage one or more of their employees in idea management processes. As it can be seen from table 7, most of the managers from the sample believe one person should be enough to tackle this processes, without full time engagement. Less than one third of the managers believe one person with full time should be enough to manage the idea system, while only 14% believe more than one person should be trusted with these issues.

Table 7: Managers' readiness to conduct in-house idea management

Question: Would you be willing to engage an employee to organize idea management?	
answer	frequency (percent)
yes, one person with part-time employment	30 (45%)
yes, one person, full-time employment	19 (29%)
yes, two or more persons	9 (14%)
I would rather engage external expert to manage that	8 (12%)

5. DISCUSSION

The above results suggest general conclusion that idea management in observed Serbian companies is rather different than known systems in developed countries, but there are potentials to adopt such systems. First of all, no real "idea management" as a structured system was identified, and only simple oral idea sharing behaviours were found and analyzed. Managers in these companies lack good judgment regarding ways to harvest ideas, since they prefer to receive ideas orally. This method is suboptimal since it cannot receive more than a few ideas daily, and it requires from the idea recipient to remember all the ideas he has received. A significant number of these managers tend not to give a proper detailed feedback to suggested ideas, but they do have a good sense of why the feedback should be given. Nearly half of surveyed managers do not follow up accepted ideas, where that follow-up could serve as a good feedback to improve their own idea adoption decision making process.

On the other side, managers have a good perception of potential that ideas have. They have partial insight into who are good idea evaluators. Managers share belief that income stimulations should be the dominant method of encouraging employees for further ideation (which is in conjunction with previously mentioned research in part 2.2 that found positive correlation between earnings and internal locus of control and preference for challenge in Serbia), and that also free days and other privileges should be used to motivate sharing behaviours. Verbal appraisals are not among first choices for either side, which can be explained with the fact that relatively low average income and standard of living in Serbia impose other significant motivators, mainly material ones. This lack of verbal stimulation can be a serious issue since sustainable idea management should be based on intrinsic motivation, which is achieved through verbal communication, not through material rewards.

It is identified that observed companies have problems realizing ideas, and that if an idea is evaluated as a feasible and useful one, it still does not have big chances to be realized. Since none of these companies have an idea management system, most of ideas probably get lost in some managerial levels, especially since they are predominantly shared orally.

6. CONCLUSION

In this paper a developing country with transition economy context has been discussed. It was shown that this context may jeopardize companies' innovation efforts, and that collectivism culture and inefficient privatization place big challenges in using employees' creative thinking. With open market and harsh competition companies must stay innovative, using every good idea which they can find. Unfortunately, in most cases underdeveloped company strategies and Human resource departments have yet to learn how to effectively harvest their employees' creative thinking. Researches in this topic are scarce, and further research should provide more insight into employees patterns of behaviour and managerial strategies related to idea management.

The lack of idea management systems in Serbian companies presents another obstacle to utilize employees' knowledge and experience to the full extent. Ideas are randomly given and they are rarely written, so they have big chances to be forgotten, changed or misinterpreted when evaluated and realized. Previous research has shown that electronic idea management systems play a crucial role in the process of idea generation and selection within organizations (Bakker et al., 2006). Companies in Serbia should embrace these systems in order to more effectively utilize employees' ideas.

Current state of idea management communication in Serbian companies is predominantly unordered. Employees share their ideas orally and managers respond right away, without any objective evaluation process. Furthermore, one number of managers tends to immediately evaluate received ideas, without asking additional questions for clarification, which may additionally jeopardize ideas and employees' motivation. Communication habits of both sides need to be changed in order to ensure that every idea is securely transmitted, stored, evaluated, realized and to ensure an appropriate feedback. Employees should be asked not only to identify problems, but to suggest possible solutions. Feedback should provide them information on their idea's quality and feasibility. Suggestions for further ideation should be provided. Appropriate software solution should be implemented to maximize efficiency of idea sharing and evaluation activities, where employees should be strongly advised to use that software. Managers should be discouraged to receive ideas orally.

When implementing idea management systems, every company must pay attention to its organizational context and national culture. When implementing idea management systems in a developing country which struggles with transition changes, every company must also pay attention to its inherited frameset and legacies of the central planning system that suggest local adhocracy where no rules have been set. Culture specific communication behaviours of all participants should not be left unattended, as they are both tools for stimulating creative thinking and tools for sharing useful ideas.

7. LIMITATIONS AND FURTHER RESEARCH

The observed sample was predominantly conditioned by companies' willingness to participate in this research. The fact that half of the companies from the initial sample did not want their employees to be surveyed may demonstrate lack of intention to achieve improvement on scientific cooperation. Furthermore, this study only includes data obtained in Serbian companies, which should be taken into consideration when generalizing its results to other developing and transition countries.

Further research should determine how companies in developing countries could be more motivated to participate in research about their employees' potentials. Further research should also examine the conditions present to implement idea management software and specificities in targeted companies.

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CONSUMER ETHNOCENTRISM RESEARCH: FIRST FINDINGS¹

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Abstract: *Consumer ethnocentrism is a tendency to favor the purchase of domestic-made products over imported ones. Ethnocentric consumers believe that in this way they promote the economic development of their country and thus contribute not only to the economic but also to the general social and political prosperity. This paper analyzes the survey data for the consumer ethnocentrism research conducted in 2011 on a sample of 425 respondents. Data were collected through the CET scale. The paper establishes total scale value - 60.51 and the mean value of the whole scale - 3.56. This is located within the limits of moderate ethnocentrism, which corresponds with the findings of earlier research in Serbia. We also performed factor analysis and there are four isolated factors: consumer patriotism, politically motivated consumer ethnocentrism, ethical ethnocentrism and radical ethnocentrism.*

Key words: *Consumer ethnocentrism, CETscale, consumer behaviour, market, domestic-made products*

1. INTRODUCTION

One in a series of sociological and psychological factors that influence customers' decisions in choosing which goods to purchase, when enter the marketplace, is consumer ethnocentrism. Ultimately, the ethnocentrism, generally, means the point at which their own national culture, lifestyle based on it and socio-cultural patterns are superior in regard to others. It is the value orientation aspect, syndrome of social attitudes which has a form of national attachment that characterizes national isolation and exclusion in the final sum (Schatz, Staub and Lavine 1999), putting their own ethnic group in the "world center" which produces a conviction of the superiority of their own ethnic group and not rarely express contempt for the others. This is especially true if there are grounds for the sense of national vulnerability. The presence of such attitudes lead to a selective approach in social interactions by the principle of us-them which means bias and lack of trust in relation to everything that comes from other ethnic groups and developing the need for "compacting ranks" which one's own ethnic group is seen as a reference framework for personal identification.

Marketing perspective, consumer ethnocentrism is the tendency to give priority in purchasing domestic products over imported. Ethnocentric consumers believe that in this way they promote the economic development of their country and thus contribute not only economic but also the general social and political prosperity. It is the tendency of the population of a society to purchase domestic products, and it shows what the consumer behaviour is morally acceptable in a given society (Shimpo Sharma, 1987: 100), or the reverse what behaviour is unpatriotic (Klein, 2002: 346). However, it should be noted that the moral attitudes are relative, that they make sense only when they are brought in a certain context.

Opening of a society means accepting external influence through various channels. Economic opening involves the penetration of market competition. The problem is that most of our companies are not yet ready to adapt to market conditions and the competitive struggle. Of course there are those small numbers, mostly new-formed companies that have already embarked on the competition. It is therefore understandable that there is public interest to recognize the limits of consumer ethnocentrism in our region because it is possible to prepare a long term strategy for market penetration based on these findings, not only for individual companies but entire national economy; it is also important for those who want to sold their own goods sold at our market.

There are many reasons why ethnocentrism effect on consumer behaviour. Conditions that affect the strength and intensity of its action can not be generalized. It is a large number of factors that may be the result of historical and cultural specificity but also the global economic situation, level of economic

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development and the current economic situation, the dominant value system, the degree of openness of society and individuals to external influences.

2. RESEARCH OF CONSUMER ETHNOCENTRISM

It is evident that different segments of the population differ in the expression of consumer ethnocentricity. Greater propensity to purchase domestic products show senior, those with lower education, pensioners, unemployed, less traveling (abroad), generally those with lower incomes. On the other hand are not ethnocentric those who are younger, better educated and with higher income and higher probability of being employed, who more travel abroad and have positive attitudes towards other nations. They are characterized by better assessing imported products than domestic, and that they are better informed about brands and their origin (Veljkovic, 2009: 100).

To think about consumer ethnocentrism, it should be noted that the concept of domestic consumers is extremely wide so that we included a narrow segment of the consumer body in the study, i.e. youth specifically urban population of students of management. This segment of the consumer bodies have chosen considering that they are future business leaders, people who will be available for several years in positions of business manager, i.e. those who will have to make important economic decisions. Hence, it is important to know what their position is in the determination of the domestic and imported products. The study included a sample of 425 respondents. We used the internationally recognized CETscale developed by Shimp and Sharma (Shimp Sharma, 1987). CET scale is based on seventeen allegations of different aspects of purchasing domestic versus foreign products. Compliance with the claims of the responses is recorded from 1-7 where 1 means complete rejection of ethnocentrism and 7 means its full acceptance. The values of consistent with a given scale are in the range of 17-119 with the result 17 what represents the theoretical minimum value of the absolute non-ethnocentric consumers and 119 what represents the theoretical maximum value of absolute ethnocentric consumers. It will be applied factor analysis in the paper to determine what dominant factors make consumer ethnocentrism in our sample.

Table 1: Item Statistics

	Mean	Std. Devia tion	N
1. Serbian people should always buy Serbian-made products instead of imports.	4,05	1,607	425
2. Only those products that are unavailable in Serbia should be imported.	4,68	1,731	425
3. Buy Serbian-made products. Keep Serbia working.	5,55	1,260	425
4. Serbian products, first, last, and foremost.	3,94	1,606	425
5. Purchasing foreign-made products is un-Serbian.	1,96	1,182	425
6. It is not right to purchase foreign products, because it puts the Serbian people out of jobs.	3,12	1,460	425
7. A real Serbian should always buy Serbian-made products.	2,69	1,472	425
8. We should purchase products manufactured in Serbia instead of letting other countries get rich off us.	4,19	1,618	425
9. It is always best to purchase Serbian products.	3,28	1,555	425
10. There should be very little trading or purchasing of goods from other countries unless out of necessity.	2,99	1,564	425
11. Serbian people should not buy foreign products, because this hurts Serbian business and causes unemployment.	3,19	1,362	425
12. Curbs should be put on all imports.	4,38	1,677	425
13. It may cost me in the long-run but I prefer to support Serbian products.	3,92	1,511	425
14. Foreigners should not be allowed to put their products on our markets.	2,34	1,271	425
15. Foreign products should be taxed heavily to reduce their entry into Serbia.	3,17	1,546	425
16. We should buy from foreign countries only those products that we cannot obtain within our own country.	4,55	1,632	425
17. Serbian consumers who purchase products made in other countries are responsible for putting their fellow Serbians out of work.	2,51	1,470	425

The total value of the scale is 60.51 and the mean value of the whole scale is 3.56. This result is within the limits of previous studies in which the recorded value of the scale was 62.6 (2005) and 57.0 (2008.)

(Veljković, 2009: 100). In a study from 2010, the value of the scale was 63.35 and the mean value of the scale was 3.72 (Marinković, Stanišić and Kostić, 2011: 53). The data shows that our respondents express moderate consumer ethnocentrism. There is an evident tendency of its slight increase, which can be explained by the economic crisis in recent years but it may be the result of campaigns to provide subsidized loans to purchase some local products. Viewed individually by variables from the scale, association of purchasing domestic product and employment expresses the highest acceptance of the variables. There is the claim "Buy Serbian-made products. Keep Serbia working" in the first place with the mean score of 5.55. This claim was also first-ranked in previous studies (Veljković, 2009: 100). This is the only claim in our sample with a high grade 5 and up, in the previous study it was the only claim with an average grade above 4.5. High grade mean above 4.5 have a claim "Only those products that are unavailable in Serbia should be imported" (4.68) and "We should buy from foreign countries only those products that we cannot obtain within our own country" (4.55). Similar trends were noticed in some previous studies, which expresses the belief that it is necessary to pursue the policy of import regulation to be based on regulation of quantities and types of imported products and generally to reduce imports and import of those products that we can not supply in our own country or at least not in sufficient quantity. Claims given for the opposition to the ban on the import or purchase foreign goods as well as attitudes about buying local products only are at the bottom of the list of acceptance. It is particularly rejected the claim "Purchasing foreign-made products is un-Serbian" (Mean 1.96) but the last ranking claim in previous research was the view that foreigners should be completely forbidden to sell their products on our markets (Lovreta, 2011).

Table 2: Rotated Component Matrix

	Component			
	1	2	3	4
1. Serbian people should always buy Serbian-made products instead of imports.	,737	,236	-,163	,053
2. Only those products that are unavailable in Serbia should be imported.	,664	-,052	,159	-,021
3. Buy Serbian-made products. Keep Serbia working.	,727	,016	,190	-,069
4. Serbian products, first, last, and foremost.	,653	,386	-,130	,066
5. Purchasing foreign-made products is un-Serbian.	,248	,738	,067	-,195
6. It is not right to purchase foreign products, because it puts the Serbian people out of jobs.	,282	,459	,567	-,135
7. A real Serbian should always buy Serbian-made products.	,426	,604	,091	-,091
8. We should purchase products manufactured in Serbia instead of letting other countries get rich off us.	,543	,367	,344	-,016
9. It is always best to purchase Serbian products.	,502	,378	,031	,142
10. There should be very little trading or purchasing of goods from other countries unless out of necessity.	,230	,138	,617	,280
11. Serbian people should not buy foreign products, because this hurts Serbian business and causes unemployment.	,158	,399	,691	,135
12. Curbs should be put on all imports.	,185	,065	,241	,702
13. It may cost me in the long-run but I prefer to support Serbian products.	,572	,234	-,073	,399
14. Foreigners should not be allowed to put their products on our markets.	,163	,640	,151	,381
15. Foreign products should be taxed heavily to reduce their entry into Serbia.	,201	,481	,018	,576
16. We should buy from foreign countries only those products that we cannot obtain within our own country.	,540	-,030	,369	,330
17. Serbian consumers who purchase products made in other countries are responsible for putting their fellow Serbians out of work.	,108	,703	,138	,203

Extraction Method: Principal Component Analysis.
Rotation Method: Quartimax with Kaiser Normalization.

We determine presence of four factors which the consumer ethnocentrism consists of by Factorial analysis (using Quartimax rotation) which cover 57.226% of variance.

Table 3: Factors

factor	% of Variance	Cumulative %
1. Consumer patriotism	34,954	34,954
2. Politically motivated consumer ethnocentrism	8,707	43,661
3. Ethics ethnocentrism	7,357	51,019
4. Radical ethnocentrism	6,208	57,226

The first factor is called consumer patriotism. It covers 34.954% of the total variance and it is a real and positive ethnocentrism. The essence of this factor lies in the fact that, whenever possible, we should buy local-made products in order to Serbian citizens were employed and the country prospered. This factor is defined by principal claims that it is good to buy local products. The claim "Serbian people should always buy Serbian-made products instead of imported" has the largest factorial saturation (0.737) and it was followed by the statement that "Buy Serbian-made products. Keep Serbia working "(0.727).

Another factor we have called a politically motivated consumer ethnocentrism. It is a negative sharper dimension of consumer ethnocentrism. The claim "Purchasing foreign-made products is un-Serbian" has the largest factorial saturation (0.738). It was followed by the statement that "Serbian consumers who purchase products made in other countries are responsible for putting their fellow Serbians out of work" (0.703). The rejection of buying foreign products because this is not the "national interest" is here an ideology based on consumer ethnocentrism.

The third factor we have called ethics ethnocentrism. It is a principled ethnocentrism, which is clear from the claim with the highest saturation factor "Serbian people should not buy foreign products, because this hurts Serbian business and causes unemployment" (0.691). The essence of this factor lies in the fact that imported products do not need to buy because it is harmful to our economy, and domestic products should be bought for the common good because it is the only possible way to maintain economic stability.

The last factor is called the radical ethnocentrism. This is an exclusive and xenophobic ethnocentrism which can lead to economic isolationism. Practically, it is the economic chauvinism as an extreme form of ethnocentrism if it is consistently poured into practice. It is known for its extreme refusing import products come to our market in general. The claim "Curbs should be put on all imports" has the largest factorial saturation (0.702) and it was followed by the statement "Foreign products should be taxed heavily to reduce their entry into Serbia" (0.576).

3. CONCLUSIONS

Previous studies of value orientations have found that authoritarianism, dogmatism, ethnocentrism, Machiavellianism and conservatism are interrelated phenomena (Schramm, 2006: 201; Eysenck, Wilson, 1978) and they build a receptive personality to political and other manipulation in their mutual interacting. The first point at which the manipulation sets is the insistence on the importance of national identity. Research has shown that national identity is just appearing as one of the most important drivers of consumer ethnocentrism. Translated to the sphere of economic relations this would mean that national identity is operationalized by "patriotic consumer behaviour", i.e. buying domestic products (Vida and Dmitrović, 2008: 336).

Consumer ethnocentrism is often highly correlated with the campaigns of national economic and political entities to buy domestic products in order to achieve economic and social stability i.e. to avoid reducing economic activity and employment. On the one hand, consumer ethnocentrism, from the standpoint of national economy, may be considered as desirable at the time of reduced economic activity, particularly in countries with low exports and high imports. In this context, emphasizing the ethnocentric behaviour makes sense considering that demand for domestic products enables maintaining economic activity. (Granzin and Olsen, 1998: 39). On the other hand, it is possible that imported products are better than domestic. In this case, viewed from the perspective of consumer, ethnocentrism is pointless considering that the consumer does not get the desired quality for the current price. In the case of a relatively stable economic relations

consumer ethnocentrism appears as a factor that suppresses effects of the market laws, which seeks to balance price and quality through the free competition.

Moderate ethnocentrism established in this study is generally positive phenomenon. On the one hand, domestic producers of consumer goods are protected and, on the other hand it, gives a positive signal to foreign producers that our market is open to imports and ready to compete. Capital and markets do not know borders in the global economy. The penetration of foreign capital and foreign goods on the domestic market may lead to healthy competition and encourage the fight for quality, low cost production and a competitive, low, price. Of course, the fear of uncertainty that brings new opposes this.

Long-term trends are announcing the victory of global over local. This means that we should not oppose the arrival trends of foreign capital and foreign goods, but that their arrival should be used to enhance the quality and market competitiveness of its products. Consumer ethnocentrism makes sense in periods of crisis and creating new market conditions. In stable times, it can have negative effects, especially if the centers of social and especially political power insist on it. Political campaigns for the purchase of domestic goods can cause resistance of foreign producers and their countries which may render the counter-measures on the basis of reciprocity. Of course, we should always keep in mind that the foreign companies and brands can become a national if in our region launch export-oriented production.

The issue of the extent and modalities of the consumer ethnocentrism acceptance is a thing of value positioning between conservatism and liberalism. Higher ethnocentrism involves higher conservatism and more isolation of the domestic market for the foreign products but also it means a higher closeness of foreign markets for our products. For a society like ours, which has not yet completed the transition process, turning to consumer ethnocentrism would mean a slowdown in economic, technical and technological modernization of society and the slowdown of connecting with the world and involvement in European integration. On the other hand, we should not allow our market is flooded with large quantities of goods that we produce too, because it would represent an attack on our production.

Given the research findings, it can be concluded that the tested population has a reasonable attitude towards consumer ethnocentrism and that viewed it largely in the context of preserving the functionality of domestic production rather than in the context of national isolation. This finding seems encouraging, considering that these are people who will in the near future enter into active social life and start as business leaders to take responsibility for economic decisions that should be a matter of rational choice rather than the emotional and value commitment.

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CONCEPT OF ORGANIZATIONAL JUSTICE IN THE CONTEXT OF ACADEMIC ACHIEVEMENT

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Abstract: *The aim of this paper is to introduce and empirically validate the applicability of the concept of organizational justice, developed by Greenberg for the purpose of studying in organizational settings, in the domain of students' achievement. As organizational justice refers to the perception of fairness in a working context and has influence on other organizational aspects including work outcomes, it is reasonable to presume a relation between perceived justice and achievements at school, and later at university. Theoretical considerations of this paper included acknowledging particularities of the organizational justice construct, its multidimensionality and dependence on different situational and personality variables. Also, some results from previous research that linked justice theory with academic achievement were presented. Two main hypotheses were tested empirically using a modified Colquitt's four-dimensional scale (Colquitt, 2001) expanded with 30 items of actual unjust experiences in the school setting. The first hypothesis, referring to a positive correlation between all dimensions of justice and school achievement, is proven, while the second one, where a positive correlation between justice perception and university grades had been expected, was significantly correlated only with the distributive aspect of organizational/school justice. Two concurrent explanations for these findings were offered, one based on the postulates of equity theory and the specifics of educational settings, and the other focusing on a lack of correlation between university grades and procedural, interpersonal and informational justice that was assessed based on high school experiences. So, it was presumed that these experiences were more situational and therefore less transferable to a new context. Finally, some dilemmas concerning the construct were mentioned with the purpose of opening questions for further research that would clarify and enrich the topic.*

Keywords: *organizational justice, distributive justice, procedural justice, interpersonal justice, informational justice, academic achievement*

1. INTRODUCTION

In this paper there is an endeavor to apply concept of organizational justice, well known and mainly established in organizational settings, in new domain of interest. As a matter of fact, organizational justice, introduced by Greenberg (Greenberg, 1987), and originally created in domain of organizational behaviour could be seen in a new perspective as more complex and interdependent factor, as some contemporary researches imply (O'Neill, et al., 2011; Rupp, 2011). Even Colquitt (Colquitt, 2006), one of the scholars, the most engaged in not only in theoretical but also in empirical conceptualization of the phenomenon, has recently gave indices that the notion of organizational justice could be abridged by some personal variables applicable at non organizational environment.

Also, there is an ongoing debate of multidimensionality of construct, with the two, three or even four factor models of organizational justice (Cropanzano, 1997). Here, we adopt the four factor model of justice (Colquitt, 2001) and try to apply it and validate in a context of academic achievement.

In one word, organizational justice is a construct that explain an individual experience in an organizational setting in terms of fairness based on situational and personal factors (Colquitt, 2006) with evident consequences on employees behaviour (Cropanzano, 1997). Therefore, it is well established and valuable concept in lot of studies, sometimes as predictor of organizational outcomes (Zapata-Phelan, et. al, 2009), sometimes as a consequent variable of other organizational factors (Liao, Rupp, in press), but mainly as a moderator between concrete behaviour and more fundamental personality dimensions (O'Neill, et. al, 2011).

2. CONTENT AND MULTIDIMENSIONALITY OF ORGANIZATIONAL JUSTICE CONCEPT

Organizational justice is a term mainly used in researches in the domain of organizational behaviour where it is concerned with the ways in which employees perceive fairness of treatment at the workplace and its influence on other organizational aspects: work attitudes, satisfaction, work outcomes, perception of their supervisors (Moorman, 1991). Studies of organizational justice revealed that distinction should be made between, at least two, three, or even four dimensions of justice (Greenberg, 1987). Distributive justice refers to the perception of fairness of work outcomes an employee receives (Cronpanzano, 1997). Even when the outcome is perceived as fair, the way used to reach that result may be unfair. So, procedural justice assess the extent to which the system that determines work outcomes is accurate, consistent, correctable, unbiased, representative, based on prevailing ethical standards and open to employee input (elements of fairness) (Greenberg, 1987). Sometimes, this formal aspect is seen as independent from the perception of the way that employees are treated in concrete communication during the implementation of the procedure, so interactional justice is seen as one more dimension of organizational justice, describing the level of respect and dignity in employee's treatment by the authority figures (Zainalipour, 2010). Third organizational justice dimension is occupied with the fairness of interpersonal treatment received during the implementation of a procedure and emphasizes the importance of truthfulness, honesty, sensitivity, respect and justification as fairness criteria of interpersonal communication (Erdogan, 2002). In this facet of justice, researchers often see two distinct aspects, interpersonal that captures the sincerity and respectfulness of authority communication and informational justice that is concerned with the use of open and adequate explanations for decisions (Colquitt, 2001).

Multidimensionality of organizational justice construct is justified by the researches which show that, although all dimensions refer to the role of fairness, they have diverse impact and personal and organizational correlates (Zainalipour, 2010; Cohen-Charash, Spector, 2001). Briefly, distributive justice is proven to be related to the personal-referenced outcomes (pay satisfaction, promotion satisfaction, individual self-concept), while procedural justice was found to relate to system-references outcomes (organizational commitment, loyalty toward organization, cooperation, task, supervisor and co-worker satisfaction, trust in organization, willingness to exert effort on behalf of organization, lower absenteeism and turnover intentions and interactional justice was regularly linked with organizational citizenship behaviour and trust toward supervisor (DeConinck, 2010). Researches also suggest that employees evidently make a distinction between fairness of organizations and supervisors (Rupp, Cropanzano, 2002; Erdogan, 2002).

Theoretically and methodologically, organizational justice is commonly conceptualized as three dimensional construct, others combine interactional with procedural because of their high inter-correlations and similar consequences (Cronpanzano, 1997), while Greenberg (1987) and Colquitt, (2001) suggests four-factor structure due to the idea that the respect and sensitivity aspects might be viewed as interpersonal facets of distributive justice as they have a potential to alter reactions to decision outcomes and can compensate unfavorable outcome.

However, empirical studies gave inconsistent results regarding the dimensionality of organizational justice concept arguing that employees often consider fairness issues in a holistic manner. As a matter of fact, recent research indicated that overall justice predicts overall job satisfaction better than specific justice dimensions and influence some other organizational phenomena (Holtz, Harold, 2009). It is obvious that specific justice dimensions influence overall justice but the question remains is it useful to make a differentiation between them and to what extent every dimension participate in a general construct. Nevertheless, according to Johnson (2006), various theorists agreed that justice is anything from a single dimension to four dimensions.

3. PERSONAL AND ORGANIZATIONAL CORELLATES OF ORGANIZATIONAL JUSTICE

Greenberg (1987) identified organizational justice as a construct that has a potential to explain many organizational behavioural outcome variables. *Moorman (1991) says that organizational justice conceptualizes "ways in which employees determine if they have been treated fairly in their jobs, and the ways in which those determinations influence other work-related variables" (p.845).*

As previously has been said, organizational justice has been constantly related to organizational decision making (van den Bos, 2002), job and organizational satisfaction (Rezaiean, et al., 2010; Zainalipour, et. al, 2010; Johnson, et al. 2006), organizational citizenship behaviour (Rezaiean, et al, 2010), organizational commitment (Rezaiean, et al, 2010; Johnson, et al, 2006), trust (Johnson, Lord, 2010; DeConinck, 2010), job and task performance and work outcome (Liao, Rupp, in press; Zapata-Phelan, et. al, 2009), achievement (Peter, et al., 2012; Elovainio, et al., 2011), contra productive work behaviour (O'Neill, et. al, 2011; Johnson,

Lord, 2010), leader-member relations (DeConinck, 2010; Johnson, et al., 2006). Cohen-Charash and Spector (2001) also recognized the importance of differentiating forms of justice, since they are *related yet distinct constructs*.

Although organizational justice has been shown to have behavioural consequences, there remains a surprising amount of variation in how individuals react to fair and unfair treatment (Colquitt, 2006). Therefore, Rupp (2011) insists that understanding of justice phenomenon is not possible without concerning individual differences, affective, cognitive and social processes, as well as contextual influences and all that in the proper time perspective. Johnson and associates (2010; 2006) gave an empirical evidences that justice is inseparable from one's self-concept due to the fact that individuals perceive fairness based on specific aspects of self. He argued (et al, 2006) that "*justice concerns become salient when the self and some aspects of it is engaged*" (p. 176). He goes further and found that activation of self-identity mediated the effects of justice on trust and on cooperative, as well as on counterproductive behaviour (Johnson, Lord, 2010). Different studies take different personal variables into account with the idea to recognize the most influential dimension of personality (Colquitt, 2006), as well as the specific power of construct compared with other factors (O'Neill, 2011; Colquitt, 2006). For example, Colquitt (2006) analyse the effects of big five dimensions (conscientiousness, agreeableness, neuroticism, openness, extraversion), trust propensity, risk aversion, equity sensitivity and trait morality, while O'Neill (2011) add honesty-humility trait to big five dimensions.

Also, there is an endeavour to study effects of motivational factors in its mediating role between justice and task performance (Zapata-Phelan, et al., 2009). On the other hand, some scientists analyse the role of affects on perception of fairness in treatment (Barsky, Kaplan, 2007).

4. ORGANIZATIONAL JUSTICE AND ACADEMIC ACHIEVEMENT – EMPIRICAL APPROACH

The aim of this research is to test the idea that organizational justice could be applied in a context of academic achievement, along with questioning (reassessing) the narrow perception of potential cast of it, as some could infer from the previous field of research and theoretical frameworks, as well as from the existing instruments measuring the concept.

Although literature is full of researches of organizational justice in a work context, there are only few examples of implementing it in a school (Elovainio, et al., 2011; Zainalipour, et al, 2010; Horan, Myers, 2009) or academic environment (Berti, et al., 2010), especially concerning its relation with student achievements (Peter, et al, 2012).

In recent research of Peter and associates (2012), it was found that teachers' experience of organizational justice mediate students' achievement by promoting the atmosphere favorable for development of personality disposition variable of believing in a just world. Elovainio et al. (Elovainio, et al. 2011) used organizational justice as a dimension of the psychosocial work climate in school setting. They assumed that perceived justice among school personnel might be a potentially important predictor of overall school atmosphere that could have some impact on students' achievement, satisfaction, absenteeism and their well-being. Results prove that low level of relational justice among teachers was in correlation with poor academic performance and absenteeism, and frequency of psychosomatic and depressive symptoms as well.

The important findings for this research are results of several studies concerning schools and academic context that showed the importance of justice perception for some aspects of students' life. While distributive justice, defined as the allocation of educational outcomes affects learning motivation and well-being (Dalbert, Maes, 2002), procedural justice affects motivation, rule compliance and trust toward teachers (Chory-Assad, 2002). Since consistent with the researches in social justice, these results are sort of confirmation of idea that organizational justice is an applicable concept in other settings than organization.

Accordingly, the main goal was to bring the concept originally defined in organizational psychology and applied mainly in human resource management domain, in connection with academic performance. So, we tried to find if there is a correlation between perception of organizational justice in high school, and measures of high school and faculty achievements (grades).

Organizational justice is operationally defined by four subscales of distributive, procedural, interpersonal and informational justice (Colquitt, 2001). Variable of academic achievement is measured by the average grades at the end of the first semester at the faculty and then analyzed relative to the organizational justice assessments and high school achievement. We were interested in possible effects of organizational justice in high school on later academic achievements (at University). Although nature of that particular relation is not a subject of this paper, it is possible that experience from the high school could shape subsequent attitude toward other educational settings. Also, we should not forget the impact of broader dispositional

variables that could explain potential covariance of achievement and justice perception. In both cases link between school justice and academic achievement is expected.

In this particular study we hypothesized that:

Hyp.1. there is a positive correlation between high school achievement and all four dimensions of school justice; previous researches of organizational justice and achievements, especially in an educational context support this hypothesis (Elovainio, et al., 2011; Zainalipour, Fini, Mirkamali, 2010)

Hyp.2. there is a positive correlation between academic achievement and all four dimensions of school justice; although there are only few studies that analyze possible influence of justice on later achievement in other organization (Peter, et al., 2012), we believe that it might be useful to explore this possible relation.

5. METHOD

5.1 Participants and procedure

Participants were 253 first year students of Faculty of organizational sciences, drawn from different departments, who were taking psychology course during school year 2011/2012. Mean age of the sample was 19.2 years. 138 participants were woman and 115 men (54.5% woman). They received a course credit for participation in psychological research. Participants were guaranteed protection of their personal data and identity, so the answering sheets were coded (signed by number codes).

Students completed 50 items school justice scale (Kovacevic&Zunic, 2011) based on Colquitt organizational justice scale (Colquitt, 2001), and adapted for school setting. Participants also completed questionnaire regarding demographical data and their high school grades.

5.2 Measures of school justice

20 items were based on Colquitt organizational justice scale (Colquitt, 2001) grouped in four factors: procedural justice (7 items), distributive justice (4 items), interpersonal (4items) and informational justice (5items). These items were adapted for school context. There were 30 original, new items related to specific examples of unjust treatment in high school (measuring justice on its negative extreme for school context – perceived teachers misconduct). This subscale was based on results of preliminary research in which we obtained spontaneous reports from students based on their negative experience in school. After the content analysis, typical themes were transformed into a Likert type scales. Finally, we had a 50 five-level Likert type items scale, with five subscales, measuring school justice. Demographical questionnaire consisted of items regarding sex, age, previous school and school type, previous place of residence and high school accomplishment (grades). Average university grades after first semester were obtained from faculty database.

Table 1 provides reliability indicators of newly introduced school justice measure – school specific unjust events scale. Cronbach's Alpha and Guttmann's Lambda coefficients are presented.

Table 1: reliability of specific unjust events scale

	Number of cases	Number of items	Cronbach Alpha	Lambda 1	Lambda 2	Lambda 3	Lambda 4	Lambda 6	Lambda 7
Valid	252	30	0.863	0.801	0.870	0.863	0.863	0.851	0.887
Omitted	1								

Conclusively, reliability of newly introduced scale is good. It was actually somehow surprising to register that level of internal consistency, considering that specific items of the scale are not at all redundant and refer to very specific, different events or particular examples of unjust (unfair) teacher's conduct.

6. RESULTS

6.1 Descriptive statistics

Table 2 provides the means, standard deviations for all school justice scales. Interpersonal and distributive justice scales manifested significant deviations from normal distribution ($Z = 1.934$, $p < .01$, and $Z = 1.63$ $p < .01$ respectively, Kolmogorov–Smirnov test for normality of the distribution) so they were treated non-parametrically for subsequent analyses.

Table 2: The means and standard deviations for school justice scales

Scale	Mean	Standard deviation
Procedural justice	3.45	0.60
Distributive justice	3.68	0.75
Interpersonal justice	3.76	0.69
Informational justice	3.85	0.72
Specific unjust treatment	3.14	0.69

Table 3 provides the frequencies of school achievement categories. Selection effect of university admission criteria diminished variance of high school grades (result is absence of cases in fair and poor categories in our sample) and distribution was not assumed normal.

Table 3: Frequencies of school achievement categories

High school achievement	Frequency	Percentage
Exceptional (max. average marks)	54	21.3 %
Excellent	130	51.4 %
Very Good	65	25.7 %
Good	4	1.6 %
Fair	0	0 %
Poor	0	0 %
Total	253	100 %

Average students grade after first semester was **8.06** ($M=8.06$; $SD=0.997$). Kolmogorov–Smirnov test for normality of the distribution showed significant deviation $Z = 2.013$, $p < .01$ as a consequence of relative peak in number of failed or missed exams (which was actually expected considering short time spent on university - after one semester in the faculty).

Table 4 provides correlation matrix between high school achievement, average university grades and school justice scales. Because of the obtained results of normal distribution testing, only nonparametric Spearman's rank correlation is presented here (although, Pearson correlation coefficient gave similar figures)

Table 4: Organizational justice, high school and academic achievement correlations

		1.	2.	3.	4.	5.	6.	7.
Achievement	1.High school achievement		0.38 **	0.19**	0.43 **	0.14 *	0.19 **	0.15 *
	2.University achievement	0.38 **		0.10	0.30 **	0.07	-0.01	0.06
School justice	3.Procedural justice	0.19**	0.10		0.48**	0.58 **	0.60 **	0.55 **
	4.Distributive justice	0.43 **	0.30 **	0.48**		0.35 **	0.46**	0.42 **
	5.Interpersonal justice	0.14 *	0.07	0.58 **	0.35 **		0.48**	0.56**
	6.Informational justice	0.19 **	-0.01	0.60 **	0.46**	0.48**		0.53**
	7.Specific unjust events	0.15 *	0.06	0.55 **	0.42 **	0.56**	0.53**	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Significant correlations were found between high school achievement and all dimensions of school (organizational) justice: $\rho=0.19$; $p<0.01$, with procedural justice, $\rho=0.43$; $p<0.01$ with distributive justice, $\rho=0.14$; $p<0.05$ with interpersonal justice, $\rho=0.19$; $p<0.01$ with informational justice, $\rho=0.15$; $p<0.05$ with subscale of specific unjust events. On the other side, university achievement, that is in a significant

correlation with the high school achievement ($\rho=.38$; $p<.01$), is in correlation only with distributive justice ($\rho=.30$; $p<.01$). Obtained relation between academic achievements with only distributive justice may imply more stable character of phenomenon. This is interesting finding considering the fact that two different educational settings are in question. It seems that the perception of distributive justice created in the high school was somehow transferred to new academic environment. Although it seems to be in a collision with the results of previous researches where the more pervasive character of procedural justice was found, it is sound when we consider that those researches were conducted in the same organization. Here, achievement was measured in two completely different organizations in the moment of transition – at first semester.

7. DISCUSSION AND IDEAS FOR FUTHER RESEARCHES

The whole study was based on the idea that concept of organizational justice is applicable in education and relevant for assessment of the effects of justice perception on educational outcomes. As school justice was differentiated into four dimensions of justice: procedural, distributive, interpersonal and informational (Colquitt, 2001), we analyzed correlations between achievement and all four aspects. Also, we created one new subscale designed for measuring school injustice experience – consisting of specific examples of unjust treatment and teachers' misconduct.

In concordance with the previous research findings we postulated the existence of positive relation between justice measured in school context and educational achievement (Peter, et al., 2012; Elovainio, et al., 2011; Zainalipour, Fini, Mirkamali, 2010). Two hypotheses were specified: the positive correlation between school justice and school achievement (hyp.1.), and the positive correlation between school justice and university grades (hyp.2.).

First hypothesis is confirmed for all five subscales, with the highest correlation intensity between distributive justice and school achievement. This is not surprising if we understand the concept of distributive justice which is by definition directly related to work outcomes (grades in school context). Also, this is coherent with the previous research in academic context, where authors analyze distributive justice in the framework of learning motivation and well-being effects of educational results (Berti, et. al, 2010). The perception of justice in an educational context is mainly determined by the estimation of relative proportion between learning effort and result, as well as with some social referent (Cropanzano, 1997). For such a strong correlation among distributive justice and high school achievement, at least two different explanations impose. Unlike the organizational situation, where outcomes of referent to compare are not always transparent, in school surrounding performance and rewards of others are more visible and susceptible to reassessment. So, direct comparison and injustice awareness are easier. Other possibility is that students interpret fairness mainly according to their own outcomes. If they achieve more they tend to perceive situations as more just. Also, it is possible that low performers rationalize their position evoking the injustice. On the other hand, in some previous researches (Horan, Myers, 2009), interpersonal and informational justice, were seen as the most important determinants of fairness in the classroom context.

We found that correlation between school achievement and procedural justice could be explained by the motivation as a potential mediator (Zapata-Phelan, et al. 2009), where those who believe that teachers' practice is inconsistent, inaccurate, biased, unethical and closed to students' input are prone to be less motivated and consequently less successful. The possible impact of one's abilities cannot be ruled out, so this relation could be at least partly explained by mechanism of rationalization. Similar concurrent explanations are feasible for other two dimensions of school justice: interpersonal, that refers to the fair treatment in direct communication with school personnel and informational, that implies the use of adequate and prompt clarifications for school decisions and demands.

The second hypothesis is also confirmed but only for distributive justice. Academic achievement is found to be in a positive correlation with the perception of the distributive justice during previous educational period. This temporal stability of association between educational outcome and distributive justice factor across the different educational surroundings could be explained by the fact that other justice dimensions are situational specific and dependent on concrete interpersonal treatment, in contrast with the distributive justice which is always focused on outcomes (rewards and punishments). In school and university outcomes are very similar. So, transfer of experience among two settings is facilitated. One plausible explanation might include an existence of broader and more stable personal disposition that is connected with both phenomena.

More stable manifestation of procedural justice compared with distributive reported earlier by Saunders and Thornhill (2003) should be understood as an indicator of different study circumstances. Measures of procedural justice were compared in the same organization at different time points. Our assessment of procedural justice referring to the school experience was acquired retrospectively at the first semester of

university education. On the other hand, in our study, outcome measures represent the school and university achievement as well.

Procedural, interpersonal and informational justices are not in a significant relation with university achievement, as well as scale of specific unjust events. Absence of this relation might be against interpretation of direct and durable motivational effect of negative experience during the high school on later attitude toward subsequent education. Their too specific and situational character is likely responsible for the low levels or lack of correlation with outcomes. Nevertheless, this problem of situational or dispositional nature of organizational justice and its relationship with different organizational constructs is beyond the scope of this discussion but could be an object of further researches, especially because two measures of achievement, school and university grades are also significantly interrelated. It additionally emphasizes possible importance of dispositional variables impact on those phenomena.

Eventually, there are some ideas for further research. Dispositional measures derived from cognitive ability, as well as from the personality, especially those previously mentioned, should be included in analysis of organizational justice concept. The main idea is not to reduce this concept to more basic constructs but to clarify its relative impact on consequent variables in a comparison with those constructs. In the educational context there are inspirations to test the stability of measures at later periods of studies and to include other aspects of student behaviour (cooperation, cheating, dropping out), similar to the behaviours already studied in organizational context (organizational citizenship behaviour, counterproductive work behaviour, etc).

8. CONCLUSION

Using academic achievement as outcome variable, this research demonstrated viability and applicability of organizational justice construct in specific context of educational organization. However, peculiarities in organizational conditions gave rise to somehow different accent regarding components of organizational justice. Namely, strong focus on grades and more transparent, frequent and sharpened comparison with other pupils in school (than it is usual in working organization with co-workers), brings distributive aspect of justice in the forefront of school justice perception, relative to procedural, interpersonal and informational facets.

Also, interesting finding of the temporal stability of the phenomenon -persistency of association between distributive justice perception in school and later achievement, even after transfer to university, brings possible concurrent explanations in consideration. Whether there is exceptionally strong negative motivational effect of perceived unfair grading, or, which we find more plausible, some more fundamental dispositional variables (cognitive abilities and/or personality traits) can explain co-variation between later university achievement and school justice perception. Apart from dispositional measures, further research should include other behavioural outcome variables, relevant for educational context (student cooperation, cheating, dropping out, etc).

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THE IMPORTANCE OF EMOTIONAL INTELLIGENCE FOR CONTEMPORARY BUSINESS

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Summary: *The aim of this paper is to analyze the influence of emotional intelligence (EI) on career and business in modern organizations. Education, or even work experience, frequently cannot provide employees with the most important skills that affect business success. This paper aims to present the relationship between emotional intelligence and business dedication, the impact of emotional intelligence on organizational leadership and the importance of emotional intelligence for high business performance. By analyzing the literature, we come to the conclusion about the impact of EI on successful business from the organizational and individual aspect. The growing importance of emotional intelligence in modern enterprises is a result of a growing need for teamwork, which requires employees to successfully control emotions, to be able to communicate effectively and collaborate with colleagues and superiors.*

Keywords: emotional intelligence, modern organizations, capabilities, leadership, teamwork, emotions.

1. INTRODUCTION

„Emotional intelligence matters twice as technical and analytic skills combined for star performances. And the higher people move up in the company, the more crucial emotional intelligence becomes.”

Daniel Goleman

As a new sort of intelligence, emotional intelligence (EI) has come a long way from scientific verification and adjudication. Although emotional intelligence is not completely accepted in the scientific circles, as equally important with the other types of intelligence, its success is obvious in the last two decades. Mayer, Caruso and Salovey, gave the unquestionable scientific contribution to the concept of emotional intelligence, developing the model that meets the requirements of the common types of intelligence. The concept of emotional intelligence starts with the importance of defining the meaning of emotions and their utilization as the foundation for understanding and solving the problems. We start from the fact that person with these abilities possesses a substantial advantage in comparison to the ones not having it, in relation to the emotional and social functioning.

2. THE CONCEPT OF EMOTIONAL INTELLIGENCE

“Emotional intelligence” construct emerged in the nineties of the 20th century and led to controversies in the psychology of that period, where emotions and intelligence were being observed as two completely different and incoherent terms. As a result of the ascending recognition of this concept in the scientific circles, the number of researches was increased, but only after publishing the book “Emotional intelligence” by Daniel Goleman in 1995, this term became popularized. Goleman demonstrated the important link between sense and expressing of emotions on one side, and special abilities of self-regulation of communication and social techniques on the other side.

Emotional intelligence refers to the ability of an individual to be aware of personal emotions as well as the emotions of others, to distinct them and use such information as a guideline for personal behaviour and thinking (Salovey & Mayer, 1990). Being the consultant in the organizations, Goleman (1998) concluded that the emotional intelligence matters twice as technical skills and intelligence quotient (IQ), when it comes to the professional success on all levels.

Most researchers agree on the fact that emotional intelligence is connected to other types of intelligence, but differs from the common concept of intelligence. Certain authors believe that emotional intelligence consists of various abilities in relation to the emotions such as perception, identification, understanding and controlling the emotions (Mayer, Caruso, Salovey, 2000). Others believe that emotional intelligence is connected to the key competencies essential for the effective social interaction such as empathy, time management, decision

making and team work (Ashkanasy, Daus, 2002). List of statements representing the integration of different views on emotional intelligence, i.e. resume of the know facts on emotional intelligence (Ashkanasy, Daus, 2002) is as follows:

- Emotional intelligence differs from other types of intelligence, but is connected with them.
- Emotional intelligence differs from person to person, where some of them are more gifted.
- Emotional intelligence develops during the life time of a person and it can be improved by training
- Emotional intelligence refers to the ability of an individual to identify with and recognize emotions within (oneself and the others), as well as possessing these abilities that allows the understanding and successful control of such emotions.

Models of emotional intelligence can be divided in two categories (Mayer, Caruso, Salovey, 2000): models of emotional intelligence as mental abilities and mixed models. Difference between these two groups of models is in the way of understanding the emotional intelligence, whether the emotions are being perceived through their connection with the cognitive aspect or with other characteristics of a personality, as well as motivation and mental abilities being included in the concept of EI. Three EI models are mostly present in the literature, with the two of them being the mixed ones by Bar-On and Golemana, where the model by Mayer and Salovey is a typical example of emotional intelligence perception as a mental ability separated from the characteristics of a personality and meeting the conditions of common intelligence. Whereas the model by Mayer and Salovey is focused not only on the relation between emotions and cognition, model by Goleman and Bar-On includes features such as trust, optimism and altruism.

Emotional intelligence can be measured by self assessment and performance. It is possible to use other people's assessment, but this technique is characterized by a large number of disadvantages, since such an assessment depends on the perception of the viewer. In case the viewer does not own developed emotional intelligence, he or she will not be able to assess the emotional intelligence of another. Assessments of the other people may be used solely as sources of interesting information considering other people's image of us, and other people's understanding of our abilities and skills, but in the scientific sense, they cannot be considered a justified instrument for measuring emotional intelligence.

Initially, in the process of investigation of emotional intelligence, self-assessment scales (based on the model by Mayer and Salovey) are being used, starting from the fact that people act in concordance with their way of thinking and opinions (Bandura, 1977). There are more than ten such scales. When it comes to the concept of emotional intelligence being a mixed model including motivation, features, social interaction, etc., apart from intelligence and emotions, self-assessment scales are commonly used for forecasting the business performance. Self-assessment scales are constructed for the purpose of assessing the believes and perceptions of an individual in relation to his or her competencies in particular fields. However, these scales are based on self-understanding and self-perception, where, in case of a low result, we have a low self-perception of an individual, and not the true level of emotional intelligence development.

Some authors accent the advantages of assessing the emotional intelligence as an ability using the tests where the subjects are demanded to solve a particular task. Examination of the emotional intelligence using tests, i.e. direct assessment of the emotional intelligence is being performed using psychological instruments constructed for the purpose of measuring the problem solving abilities of an individual, where the response of the subject is being assessed based on the set criteria. However, if we start with the fact that emotional intelligence should be considered as a dynamic, instead of a static category, it is necessary to take into account that it is actually contextual and dependable upon the circumstances (Gardner, Sough, 2002). Problem with current instruments for measuring the emotional intelligence is that those are based on the consumptions that emotional intelligence expression is invariable no matter the current situation. Current instruments do not consider the social habits, norms, power or the other relations being a part of most of the emotional reactions. The most important constraint in relation to the emotional intelligence tests is that these do not consider the differences between the personalities of subjects in question. The best solution of a particular life situation for a shy person is most certainly not the best solution for an aggressive individual. Also, the results of measuring the emotional intelligence in family relations may substantially differ from the results of emotional intelligence based on working relations. Therefore, people in family relations presented as emotional intelligent individuals may not necessarily be of same skills when it comes to working spaces and vice versa. Also, the tests of emotional intelligence do not measure the potential of a person, as much as the current skills of that person, that may develop during the life.

3. EMOTIONAL INTELLIGENCE AND COMMITMENT TO WORK

Series of researches found the universal forms of commitment to work: promotion of the work ethic, commitment to career, affective commitment to the company, continual commitment to the organization and taking part in the work. Concept of organizational commitment consists of three different constructs: affective, duration and normative commitment. Duration is defined as a measure of employees being committed to their organizations, based on the damage they believe will be caused in case of them abandoning the organization. Affective commitment to the organization is the positive feeling of identification and connection to the organization and work within that organization (Mayer, Alen, 1984). Normative commitment refers to commitment based on the feeling of obligation towards the organization. Employees with strong affective commitment remain in the organization because they want to, as opposed to the employees with strong normative commitment, who remain in the organization because they think it is the right thing to do.

Emotional intelligence may improve altruistic behaviour, since it permits employees to understand their colleagues, their emotions and react in a more successful way than people with lower level of emotional intelligence, due to their abilities to easily go from feeling bad to feeling good. Positive mood is crucial to altruism, since it permits the employees to keep the positive state of mind. People in a good mood are more socially interactive in comparison to people usually in a bad mood. The more satisfied people are with their work, the more motivated they will be for helping their colleagues

4. EMOTIONAL INTELLIGENCE AND EFFECTIVE LEADERSHIP

Aspects of emotional intelligence such as ability of assessment and expression of emotions, using the emotions for the purpose of improving the cognitive processing and decision making, knowledge of emotions and management of emotions, contribute to effective leadership (George, 2000). A vast number of researches gravitated towards pointing the connection between emotional intelligence and leadership, i.e. examination of emotional intelligence influencing leadership abilities of an individual. The leadership is a process with an individual influencing other, for the purpose of meeting a certain goal, as well as a form of managing the organization so that it becomes more coherent and compact. It is a process where an individual endeavors to influence others so that they do what he or she desires, and the influence that such an individual has on others is stronger in comparison to the formal authority. Leaders should be more mature, energetic, intelligent, motivated, competent, etc. It is not enough to solely possess the emotions, it is necessary to learn to recognize them, as well as to evaluate them. Such individuals have the ability to feel, understand and apply the power of emotions in an efficient manner.

There is a positive influence of emotional intelligence on an individual's work success. This is of particular importance if we believe that emotional intelligence can play a crucial part in creating the efficient leadership. Aspects of emotional intelligence such as ability of assessment and expression of emotions, using the emotions for the purpose of improving the cognitive processing and decision making, knowledge of emotions and management of emotions, contribute to effective leadership (George, 2000).

Emotional intelligence does not fit the scheme of typical historical leadership models, which are connected to important figures of history of army, being the charismatic or despotic personalities. However, people are now using the adjectives such as brave, courageous, with a strong sense of purpose, and decisive. This does not concur with the present needs and the reasons for that follow:

- Contemporary work force do not accept the autocratic style of leadership most commonly used in the past,
- Leadership is developed in direction understanding the sense of democracy and independence within work force.,
- Employees nowadays have more options and choices in comparison to the soldiers from the past back then.

Nowadays, leaders are in position to manage and lead the "reinforced" work force overcoming consultative, cooperative and democratic styles. These new conditions include:

- Consultation and engagement – however, leaders are still criticized for their lack of communication with the employees in relation to the overall vision and goals.

- Autonomy and freedom – leaders are still expected to take the complete responsibility in case the things go in the undesired way.
- Ability for growth, challenge and glory – however, leaders must be available to employees as their trainers and mentors, and motivate them to develop their potentials.
- Engagement and team spirit - but the employees still expect the individual recognition and acknowledgement.

Unfortunately, there is a lack of sufficiently talented individuals that can fulfil all the conditions above. Research conducted by the Center for creative leadership in 2003 showed that the high level of emotional intelligence is connected to the better performance in the following fields:

- participative management,
- calming the other employees,
- self-confidence,
- balance between personal life and work,
- honesty and composure,
- developing and improving the relations,
- preparedness to be completely engaged to work,
- decisiveness ,
- coping with problems,
- change management.

These results show that managers not feeling the responsibility towards others, are not able to efficiently function under the stress, are not aware of own emotions, lack the ability to understand others, easily break under the stress and lose their temper due to problems occurring during working with people.

Successful leaders possess the experience, as well as the strength to recognize themselves, abilities to harmonize the values, intuition and skills of creating the vision. In case the leader is able to share the power, influence and control, there is a possibility of creating one of the main skills and features of a successful leader – shared power, since it permits the fulfillment of main human needs for success and self-respect. Self-knowing is one of the important features of a leader, since it means knowing your own advantages and disadvantages. A successful leader must have the ability to present different, improved, new conditions, situations and ways, and it is of great importance for the leader to possess the vision in order to accomplish them. Intuition is also an ability that a good leader must have, since it means having the overall perception of the situation, forecasting the events, right decision making and accepting the responsibility for possible risks.

5. EMOTIONAL INTELLIGENCE AND BUSINESS PERFORMANCE

Ability to control the emotions and stress is crucial aspect of success, in relation to emotional intelligence. Emotional intelligence influences the time and manner of expressing the emotions and their control.

An interesting research was conducted by Barsade in 1998 on the Yale University. There was a group of volunteers with the task of playing the role of a managers that come together to the group to share the bonuses with their subordinate. In this group, there was an actor, and that information was not shared with the participants. Actor always spoke first. However, he had a role to show different behaviours in different groups: enthusiasm and good mood in the first group, warmth and calmness in the second group, depressive behaviour in the third group or hostile irritability in the forth group. The results showed that the actor “infected the group” with his emotions, where the positive feelings led to the improved cooperation, justice and overall performance of the group. It was also concluded that the happy groups distributed the money in a better and honest way, helping the organization (Barsade, 1998).

Goleman and Mayer, Salovey and Caruso (Mayer, Salovey, Caruso, 2000) believed that the emotional intelligence itself probably is not the strongest predictor in relation to the work performance. It mostly insures the foundation for the development of competencies. Goleman tried to present this idea by making the difference between emotional intelligence and emotional competency. Emotional competency refers to personal and social skills leading to superior business performances. These are connected and based on emotional intelligence, and a certain level of emotional intelligence is needed for obtaining the emotional competencies. For example, ability to precisely recognize the feelings of another, leads to developing special competencies such as influence. People with a better control of their emotions are more prone to developing competencies such as initiative or ambitiousness (Cherniss, Goleman, 2001). In order to adequately forecast the work performance, it is necessary to identify and measure precisely these social and emotional competencies.

6. CONCLUSION

The idea of EI was in shadow of researches directed towards cognitive intelligence, until the nineties of 20th century. Today, almost same importance is given to both types of intelligence. However, numerous authors believe that emotional intelligence is more important for coping with daily problems and stressful work situations. No matter the profession, emotional intelligence makes a difference between individuals successfully coping with stress, establishing satisfying relations with their colleagues and successfully work in a team. Within contemporary companies, team work is given a substantial importance. This team work demands for the employees to successfully control their emotions, successfully cooperate and communicate with their colleagues and superiors and successfully identify personal emotions. Although it is a fact that some of the questions considering emotional intelligence and its measuring will be solved in the future, emotional intelligence has positive implications towards leadership and team work.

Emotionally intelligent people are “optimistic”, they posses a feature that permits them to focus on the decision making more than on the thinking. Work in any modern organization presents problems that can lead to the feeling of frustration. Emotionally intelligent people would know that the organization is not responsible for every feeling of frustration, and are capable of positioning themselves in positive affective conditions, making the destructive consequences less important. This particularly stands for senior managers that must reconcile feelings of frustration and conflicts of interest groups within and outside the organization. This can be achieved solely in case the managers are able to put themselves in a positive state of mind. Apart from that, emotionally intelligent people will know how to avoid disfunctional emotions and use adaptive ways for reducing the feeling of frustration. Therefore, emotional intelligence is expected to enhance the level of affective commitment to organization

In relation to commitment to career, employees may face numerous obstacles for their career growth, which may lead to disfunctional emotions. Emotionally intelligent individual is expected to recognize, manage the emotions and use their emotions to eliminate such obstacles and improve the goals of the career, in a better way in comparison to the ones with lower emotional intelligence. It is defined when particular profession includes the high level of complexity. Highly complex management may be extremely demanding leading to higher levels of stress. Emotional intelligence permits people to control such stress and efficiently impede the negative effects on the attitude towards their profession

Work participation is a description of the current business and it refers to the believe an employee has in relation to the extent to which that work satisfies his or her needs. Employees do not relate to the work solely

based on the need to fulfil personal rational interests, but also based on some of their feelings. Commitment to work is commonly a consequence of emotional rather than rational needs. Manager work is frequently complex and dynamic. Senior managers with high emotional intelligence are often engaged in challenging situations. They stay longer on their work, after the end of working hours. This is due to their desire to overcome the complex tasks that provoke intensive emotional experiences.

Some of the discussions in relation to the concept of EI certainly have a scientific background. This refers to insufficient reliability of certain scales and inability of giving the right and wrong answer when the test is in a form that not include one correct answer. However, these deficiencies are often pointed out as advantages of the concept of emotional intelligence, since some of the authors believe that in this particular way the problems of common intelligence tests, that often do not consider the real life circumstances and situations that do not have one correct answer, are solved. It is completely realistic to expect that the concept of emotional intelligence will be theoretically shaped in the future, in concordance with the results of objective tests and evaluation of the present scales. In this way, EI will find its place in numerous theories of personality features and common intelligence.

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EMOTIONAL LEADERSHIP

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Summary: *There is a common world-wide belief that leadership is a key to efficiency in organizations, sports, politics and other human activities. In recent years, both in theory and practice, there has been more insistence on the emotional intelligence of leaders, which is defined as the ability to understand and manage not only one's own emotions and feelings, but other people's emotions and feelings too. Emotionally intelligent leaders are resonant leaders and they will be more and more important in the future, because they put the emphasis on emotional, human aspects, rather than solely on success. Emotionally intelligent leaders are an important source of competitive advantage and success of an organization.*

The paper stressed the importance of emotional intelligence in leadership, pointed out its structure and presented one approach to the formation of resonant leaders.

Key words: *leadership, emotional intelligence, structure, resonance, self-determined learning.*

1. INTRODUCTION

The role of the leader is different from the role played by the classical manager who was not much different from the bureaucrat. Leadership is related to behaviour, or action, but not necessary to position. The essence of leadership is to win people to gather around a single idea, to direct their creative energies, knowledge and abilities in the direction of implementing the goals of organization. Organizations without effective leadership will have very limited chances for success and for the solving of claims and problems, that globalization of the world economy brings in the third millennium.

Leaders' jobs are full of challenges, conflict situations, disappointments, and excitement, and in these unpredictable situations it is necessary to make and implement decisions that are crucial for the realization of the goals of the organization. The complexity of the tasks and duties is a great challenge and a leader who is not ready for such challenges, can not manage successfully. Great leaders are those who are able to attract people with their ideas and vision, to awaken the passion, emotion, optimism and hope, and to direct the whole energy of the group towards a common goal. If emotions of the people are encouraged to grow in enthusiasm, performance can be extremely increased, and vice versa. One of the reasons why emotionally intelligent leaders attract high-quality co-workers is because the work in their presence is a pleasure. Optimistic mood enhances creativity, improves decision-making skills and provides better results in work. Therefore, it is necessary for them to have passion and skills of emotional impact on people and their activities.

The aim of this paper is to present more detailed concept of emotional leadership, makes the structure of emotional intelligence clearer and stress the importance and role of emotional leader in modern organizations. Because it turns out that the competitiveness of the organization to a large extent depends on the emotionally intelligent leader who can develop and are not born as such, there will be a need to sustain those claims by some research. The result of this work should be an understanding of emotional leadership and a presentation of one approach how one can become emotionally intelligent leader.

2. EMOTIONAL INTELLIGENCE IN LEADERSHIP

Emotions (anger, fear, love, shame, sadness, etc.) are vital for survival, they encourage and direct our energy and give meaning to our lives. For a man's success in life, school, work, family, marriage, relationship with friends, intelligence is not enough, it is emotional intelligence that is important, often crucial (Goleman, 1997). Developing emotional intelligence does not end in childhood, but develops and strengthens the whole life. Emotional intelligence includes more specific abilities such as (Goleman, Bojacis and Maki, 2006):

- the ability to understand oneself (self-observation and insight into self needs, affects, conflicts);
- the ability of emotional self-control (containment of affects, and braking ability to transform our emotions in line with the demands of reality and social norms);
- sensitivity to the problems and needs of others (helpfulness);

- self-confidence (self-esteem, optimism);
- the ability to understand other people's feelings (empathy);
- interpersonal conflict resolution skills;
- ability to establish harmonious friendly relations;
- leadership skills.

Comparison between the people in senior leadership positions who are very successful and those in low positions whose results were average, showed that about 85% of the difference between these two groups can be attributed to factors of emotional intelligence, and only 15% pure cognitive ability and expertise (Goleman, 1998).

David Makliland developed a "competency model" of leadership, which serves to identify, train and encourage those who might become extraordinary. As the benefits of highly successful leaders, four competencies of emotional intelligence were distinguished: striving to achieve success, the ability to take initiative, capacity for cooperation and teamwork, the ability to manage a team.

All leaders need appropriate intelligence of analytical and conceptual thinking, but the intellect itself does not make leaders. They have to motivate, guide, encourage, listen and persuade. Albert Einstein pointed out: "We must be careful that the intellect does not create a God. Intellect is certainly powerful, but it is impersonal. He can not lead, he can only serve." If the leader succeeds with his vision to convey optimism and enthusiasm to the group members, if he awakens in them the best skills and encourages the positive emotions, that means that he is a *resonant* leader. The word resonance comes from the word *resonare* which in Latin means echo. According to English Dictionary, the word resonance refers to the reinforcement or extension of the sound due to "refusal", or more precisely, "synchronized vibrate." Similarly, synchronized to the vibrations between people occurs when two people find themselves emotionally on the same wavelength, or when they feel "harmonized". Speaking frankly, in accordance with his own values, the leader establishes a resonance with the emotions of the attendant. Their passion, enthusiasm and energy resonate through the entire group. Group members feel secure, understanding, support, and are closely connected emotionally.

Dissonant leader draws in group only destructive, toxic emotions such as fear, worry, apathy, hate, and the group operates unadjusted and inefficient. The word dissonance in music and in human terms refers to the unpleasant and deafening sound, and the lack of harmony. Tactless criticism from superior causes emotional breakdowns that are transferred from work to family, and stress hormones are circulating through the body for hours later (Gottmann, 1993). Dissonant leaders produce despair in the workplace, but they do not realize how destructive they are or they just do not matter. A. Maslov, based on his research, claims that the successful leaders are more democratic, more compassionate, more willing to help and loyal, compared to less successful leaders. They are the parents-minded and have the ability to enjoy self-realization and development of others. But they are also able to endure to be unpopular, unloved, to see the objective requirements of the situation and respond to them.

The structure of emotional intelligence consists of four domains (areas), as follows: 1) self-consciousness, 2) social awareness, 3) self management, 4) management of others (Goleman, 2006). These domains are not innate talents, but skills that are taught and each individual contributes to a leader to be more resonant, and thus more efficient.

1) Self-consciousness is the basis of overall emotional intelligence and includes three characteristics: emotional self-awareness, accurate self-assessment and self-confidence. For successful leadership are necessary to understand own feelings, needs, opportunities, constraints, values and weaknesses. Self-aware leaders are honest with them and with others, understand their own goals and dreams and they are able to laugh their own shortcomings. They have a strong sense of urgency and intuitive decision-making, when it is necessary to make a fast decision based on lack of useful data. The results of the Hart's research (1999 and 2001) show that if a leader is more unsuccessful, then he more often overestimates his own leadership competencies. The higher position of manager is, the bigger self-deception and more drastic difference between the self-assessment and evaluation of leadership by his subordinates.

2) Social awareness includes empathy, which is a leader's ability to empathize with another man, and move others to action, or the ability to motivate other people, even for strenuous activity. Empathy is not a need for leaders to adopt other people's emotions, nor to please everyone, but to pay attention to the feelings of employees, and making smart decisions with due consideration for these feelings. The leader by his authentic feelings achieves harmony with the feelings of group members, thus reducing tension, anxiety and

motivate group members to constructive action. The main characteristics of social consciousness are: empathy, awareness of the organization and helpfulness.

3) The leaders' self-management does not allow them to be derailed and obstructed in clear thinking and proper decision making by harmful or disturbing emotions. If leader is not able to manage his own emotions, he is not able to manage the emotions of members of his group also. Leaders who somehow allow their disturbing emotions to cause chaos, are not able at the same time to create a positive atmosphere around in which is best to work. Those who control their emotions and impulses, create environment filled with trust, pleasantness and serenity. The basic characteristics of self-management are: transparency, emotional self-control and complaisance.

4) Relationship Management is the positive directing of people, regardless of whether it comes to marketing premise compliance strategy or enthusiasm to some new project. Inspirational leaders with their vision stimulate group members on a common mission and greater commitment to work. They establish a resonance with a wide circle of people that become activated when action is needed.

3. DEVELOPMENT OF RESONANT LEADERS

The subordinates often deprive leader with accurate information about matters of vital importance. They usually retain the bad information because of fear of his anger, especially if the leader's basic leadership style is based on the imposition of command and tempo. Whatever the motive, the leader remains deprived of the information about what is happening around him. Top leaders usually get the least reliable information about what they themselves were doing. The analysis of 177 separate studies that included more than 28,000 managers, found that feedback on the results become less consistent as a manager position was senior, or if his role was more complex (Goleman, 1997). Leaders' self-awareness and the ability to accurately understand their abilities, are important as well as feedback they receive from others. A survey was conducted on a sample of 787 persons in different organizations occupying positions ranging from low to high levels (Burckle, 2001). The results showed that high-ranking executives, compared with those in lower positions, were more likely to evaluate themselves more generous in relation to the twenty competencies of emotional intelligence than the others have evaluated them about these competencies. As they were at a higher position, they more exaggerated than it was thought about them in their surroundings. The difference between how managers see themselves and how others see them, was the highest among those at highest positions. Exact information about leader's abilities can be of great importance to his awareness of himself, and thus for his development and effectiveness.

Emotional intelligence has some genetic component, but education plays an important role also. People may differ in the initial stage of their abilities, but everyone can improve that abilities. Recent studies show that mastering the art of management is same as mastering other skills, such as playing basketball, learning to play the violin and so on. The research results of the European Institute for Education (EIE) show that over the life, people naturally tend to develop their emotional intelligence competencies. As they get older, they are becoming better and better are estimated by the others. For the development of resonant leader, it is very important to accurately determine the advantages and disadvantages of that person. It is known that any learning takes place in the brain, that is capable of producing new nerve tissue and new neural connections and pathways until the end of life. Only adult man takes more effort and energy to adopt new knowledge than in younger years when it was more easily and quickly adopted. It is necessary to remove harmful and adopt new habits. In all periods of life, neurological connections that are used constantly strengthened, while those that are not used, get weaker (Edelman, 1987).

4. SELF-DIRECTED LEARNING

An emotionally intelligent leader becomes by self-directed learning. *Self-directed* implies a systematic and planned development of certain abilities or skills in order to become such as what kind of person we want to be. Model of self-directed learning involves five discoveries, and was developed by Richard Bojacs².

²Richard Bojacs has worked for 3 decades as researcher on leadership skills development. This model describes process of involvement in programs for leaders education, and since 1990. in MBA program in Weatherhead Management School. Use of this model can be found in book: Cary Cherniss and Mitchel Adler, Promoting Emotional Intelligence in Organizations: Make Training in Emotional Intelligence Effective, Washington, 2000.

1) *Discovery of an ideal myself* (who I want to be?). The vision of the ideal self-image, is capable to awake a constructive energy, courage, hope and passion for change, which is neither easy nor certain. The most important thing is to discover your ideal yourself - what kind of person you want to be, including what you want in life and work. When you find an ideal image of your own personality, you are motivated to develop your leadership skills.

2) *Discovery of "no make up" me, the real me* (who am I and what are my strengths and weaknesses?). Since the routine causes the gradual changes that eventually prevailed, the reality of one's life is often very difficult to understand, and when you uncover the truth it can be painful. We realize that we have become exactly what we never wanted to become.

Emotionally intelligent leaders are breaking through the communication quarantine around them and ask directly for negative and positive feedback. The picture of the actual personality and leadership competencies provides a method called "360 degrees". Using this method in the evaluation of leaders involved different people - superiors, peers and subordinates. A variety of different opinions, for different situations by different people, is giving a more complete picture. Each group separately (superior, subordinates, colleagues) give different views of leadership abilities. One study found that the opinions of subordinates were most indicative in terms of actual leadership effectiveness (McEvory&Beaty, 1989). During long-term research in an organization, it appeared that the evaluations of subordinates was the closest to what the leaders managed to achieve two and four years later. Even after seven years, scores of subordinates were matched with what was accomplished by leader - much more accurate than from leaders' superiors.

By getting feedback, leaders should consider their advantages and disadvantages, taking into account the equal of both. Usually the benefits are neglected and disadvantages are exaggerated. Focusing exclusively on the disadvantages cause depression and demotivate.

3) *Creating my own learning plan* (so I can develop my own advantages and at the same time to diminish disadvantages?). For a radical change in management style and personality, a elaborate, detailed, practical and feasible plan is required, which is necessary to acquire new leadership skills, strengthen my good qualities and to release from destructive and harmful habits. The plans must be flexible and manageable. For the success of the plan, you need to feel "inside" that that it fits into your daily life and work and in what you want to learn. Best results are achieved when learning objectives relate to what motivates a man and encourages him in his abilities. Imposed targets reduce motivation because they cause anxiety and doubt about it if you can improve yourself, and therefore does not necessarily increase the quality of work (Locke & Latham, 1998). For rejection of acquired habits and adoption of new knowledge, a firm decision and a permanent reminder are needed.

4) The fourth discovery was *experimenting and practicing new behaviours, thoughts and feelings to perfection*. The radical changes in leadership style and way of life can be reached by persistent and long-term exercise of new patterns of behaviour, thoughts and feelings. Old, bad habits are changing very slowly and it takes to consistently practice the new ones. Large sportsmen spend much time training and a little time incompeting, as opposed to managers who do not devote the time to training. Professional musicians practice until they become able to play without thinking, just feeling. For leaders' training, courses or seminars are not enough to initiate the change process. To start the changes, they are needed to learn by doing other things, thus applying the strategy of "imperceptible teachings". Acquisition of essential leadership skills requires a radical transformation of personality, not only intellectual but also deep emotional sphere. Leadership skills can be significantly improved by using mental exercises. Studies have shown that by using mental exercises, one can increase the temperature of a body part, and to slow down breathing and heart rate. Through mental exercises leaders visualize their success, imagining the realization of an ideal situation and constantly focusing on that image. In this way the brain motivates us by a picture of what we aspire to.

5) *Developing social and emotional relationships* that will provide support and confidence and enable change is the fifth discovery. To acquire new skills and new emotional mental habits, others are needed and a positive and safe social environment also. Development of leadership can be exercised only within the relationship with other people, which confirm or deny the progress made and without which there can be no lasting change. The utmost importance for the leaders might be psychological safety for the acquisition of authentic knowledge. They often feel insecure because they are aware that they were viewed critically by others. The result is increased stress of uncertainty, which further hinders the practice of new behaviours. Because of this, the positive groups in which the relations are friendly and honest, enable people to change positively. For the development of leadership qualities, mentors or coaches can be recruited. The relationship between a leader and mentor (coach) must be based on honesty, trust and support.

5. CONCLUSION

In the old way of managing, the emphasis was put on functionality, and took no attention to the human dimension. The best leaders today avoid to manage on the basis of power only, but also foster relationships with people, establish cooperation and encourage innovation. The key to emotionally intelligent leadership is resonance. The most important competencies for a vibrant quality of leadership are offered by emotional intelligence. Intelligence is to some extent driving exceptional results in cognitive skills (width of thinking and the long-term vision) that are significant, but to achieve brilliant results of higher order critical role of emotional intelligence competencies is needed. Systematic and planned development of certain abilities or skills, or, self-directed learning can affect the development and creation of emotionally intelligent leaders. Emotionally intelligent leaders know how to manage emotions, they are flexible and think clearly under pressure. They are cooperative, less official, know how to listen to, honest, open, visionaries, and take account of the careers of his associates.

The conclusions and results that are derived from the research presented in this paper are important for both theory and practice of management. At the conceptual level, the study of emotional intelligence in leadership can significantly contribute to the development of the theory of emotional intelligence and leadership theory. On a practical level, this study has several important implications for management companies and other organizations. First, it emphasizes the importance of leadership as an important source of competitive advantage of organizations. Second, it confirms some studies, significant and successful leaders and organizations, if the leaders have developed emotional intelligence. Finally, the paper shows to leaders that by self-directed learning, one can improve certain abilities or skills. So, if organizations want to be successful and competitive, they should be led by emotionally intelligent leaders. Further research in this area should further analyze all relevant and useful interaction between emotionally intelligent leaders and successful organizations.

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ANALYSIS OF STRESS IN THE HOTEL INDUSTRY DEPENDING ON THE WORK PLACE

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Abstract: Nowadays, stress at work has become a ubiquitous and a complex phenomenon, which has been studied intensively for over twenty years. Stress at the workplace can be a particular problem in intensive labour industries because employees often face conflicting demands of the company, their immediate supervisors and clients, all of them creating dissonance. Research on the effects of stress on hotel employees is a topic which has not been fully studied so far, although it is an industry where there is fierce competition, where guests' expectations are more sophisticated and job uncertainty has become a regular occurrence for most employees. In this paper, we dealt with the specifics of stress among workers in the hospitality industry at various positions, its causes and consequences, and possibilities of its management.

Key words: stress, sources of stress, stress management, preventive strategies.

1. INTRODUCTION

The pressure created by time limits in the hotel industry is increasing continually. At one point several time zones are operated simultaneously, and there are more and more restaurants that serve both breakfast and lunch at the same time. The United States National Association for Mental Health States estimates that between 50% and 75% of patients ask for medical help because of stress (Faulkner B, Patiar A. 1997). Hotel industry is an industry that is oriented to people, and the staff in hotels and restaurants are in contact with the guests seven days a week, and for twenty four hours. If we add to this that the companies are under the continuing pressure to improve their own performance and to continually adapt to unpredictable changes in the global market, we can conclude that there are a great number of situations that can be stressful for a hotel employee.

The word stress comes from the English word "stress" and literally means a blow. In its original meaning, ie. as it was first defined by the Austrian Hans Selye, stress is explained as individual response to stressors in the environment and plays a positive role in the mobilization of the whole organism for the reaction and adaptive response " (Faulkner B, Patiar A). However, the most commonly used definition says that stress is " psychophysical condition in which a man finds himself when in difficult circumstances and situations " (Mihailović D, Borovnjak V. 1997).

In the hotel industry, there are four major stressful situations that anyone who deals with hotel management should take into account. First, direct contact with clients as well as the simultaneity of production and consumption of services, not only creates obligations for employees to react quickly but make them the subject of contradictory and conflicting demands and expectations of different sources. Second, if an employee is under stress and thus in a bad mood, this will be reflected in the quality of the service provided and his relationship with the guest. Third, high levels of stress tend to result in high staff turnover, which results in high costs of training and the problem of maintaining the quality of provided services. Finally, one can reasonably argue that hotel managers as employers have a moral obligation to take care of the well-being of their staff by adopting certain measures to reduce employees exposure to stressful situations.

American Institute of Stress (AIS) states that the price of the problems caused by stress at work, amounts to around 300 billion dollars, and the stress is associated with traumatic injuries, absenteeism, job abandonment, reduced productivity, costs paid by health insurance. The same source claims that stress is responsible for 19% of absenteeism, 40% of cases of leaving the job, 10% of costs for drugs, and therefore 40% of the cost of sick-leaves (<http://americaninstituteofstress.org/>)

2. SOURCES OF STRESS IN THE HOTEL INDUSTRY

Sources of stress are usually classified into those arising from the character of an employee and his susceptibility to stress reactions, and sources originating from the environment. Stressors arising from the environment and their combinations often lead to the occurrence of stress at work. This includes work in shifts, work pace, job security and the number of clients or customers with whom the members of the staff interact. Even the noise, which may involve other people talking or the sound of the phone, contributes to stress with no less than 54% (Dessler G. 1997).

Stress has consequences both for the employees and the organization wherein they work. The most common effects include anxiety, stress, depression, anger and various physical effects, such as cardiovascular disease, headaches or injuries at work. In some cases it can lead to the use of drugs, overeating or starvation and the passivity or apathy. Stress also has serious consequences for the company, including reduced quality and quantity of business performance, increased absenteeism and complaints. However, it does not mean that stress is always dysfunctional. Some people are more productive if there is a small dose of stress or when they have very close deadlines to fulfil their tasks.

By analyzing the various causes of stress in the hotel industry, several authors have identified four major ones, such as: conflict of roles at work, role ambiguity, as well as over commitment and the need to make a decision as soon as possible (decision-latitude) (Dov Zohar 1994).

Role conflict at work and role ambiguity are the limiting factors that prevent the employee to fulfil his obligations, and lead to increasing stress and sanctions in the work place. In the event of a conflict of roles, the employee may be subject to conflicting requirements, when the fulfillment of one task hinders the realization of another duty. Conflicting expectations may originate from one person (for example in the case when both the quality and speed in performing the tasks are required at the same time), from various persons, or from someone else with whom he disagrees for any reason. On the other hand, role ambiguity occurs when employees are not sure about their work responsibilities, and when the information they need is not available or is delayed.

Unlike the previous two stressors arising from interpersonal dynamics of relationships of different work roles carriers, the two other stressors are associated with the organizational structure of hotel companies. Studies have shown that even hotel managers who are not in direct contact with guests respond to these four stressors.

3. ANALYSIS OF STRESSFUL SITUATIONS AND REDUCE OF STRESS AT WORK

Each person has his own individual measure of workload that he can overcome successfully without harmful consequences. Therefore it is necessary, to the extent possible, to avoid stressful situations, to recognize the symptoms of stress and when they occur to minimize the negative effects.

Some of the most common symptoms of stress are: (Mihailović D, Borovnjak V.2008).

- Physical. Fatigue, headache, insomnia, stiffness and muscle pain, heart palpitations, chest pain, nausea, trembling, cold hands and feet, redness, sweating
- Mental. Impaired concentration and memory, indecisiveness, hasty or difficult thinking, confusion, loss of sense of humor
- Emotional. Anxiety, depression, anger, frustration, worry, fear, hot temper, impatience
- Behavioral. Accelerated progression, anxiety, nail biting, excessive eating, smoking, drinking, crying, blaming someone else, violence

There are a number of individuals who make unrealistic picture of themselves, ie. overestimate or underestimate their abilities. Anyone who overestimates his intellectual and physical abilities can find himself in an unpleasant situation if the tasks overcome his capability, if he fails to find the adequate solution and if he does not adjust to changes.

Realistic perception of his intellectual and physical potential with the assistance of psychologists and valid tests enables the employee to accept as much responsibility as his powers allow him to. And this is one of the important factors of success at work. In fact, when one is physically and mentally tired it is more difficult for him to remember and carry out his tasks. If he is scared, depressed, ill-disposed or of poor general health, quality of his work will be poorer.

Optimal conditions at each workplace are determined by factors related to lighting, temperature, humidity, air movement, noise, shift work, vibration and the like. Not only will a sense of comfort and pleasure at the workplace depend on them, but health, productivity and safety as well.

Analysis of the stressful situation means that you yourself should have an insight into the basic elements of the new situation and face with the facts. In her book "Stress and manager, Dr. Karl Albrecht suggests the following ways to reduce stress: (Dessler G. 1997).

- Form pleasant cooperative relationships with as many colleagues as possible
- Do not take more tasks than you can fulfil
- Negotiate with the superiors about the realistic deadlines by which to get the job done and be ready to propose your own terms rather than waiting for them to be imposed on you
- Always take time to relax
- Make a constructive "problem list" - write down the problems that bother you and beside each of them write what you plan to do about it
- Learn as much as possible about upcoming events and prepare for them as well as you possibly can

In recent years, major medical centres have been developing the method of autogenic training as well. This method is based on the suggestive influences, more precisely, autosuggestion. Suggestions do not affect directly mental content, such as fear, but the physical manifestation of the psychological content in the form of muscle tension, palpitations, breathing difficulty, etc. By relaxation, through removal of these bodily manifestations, psychological balance is achieved.

Another old-new concept which emerged in the mid 80's is the development of life skills in a variety of stressful situations or life skill education concept. The essence of this concept is to learn some basic life skills. Life skills are defined as: "the ability of adaptive behavior, which helps individuals to deal effectively with the challenges of everyday life" (Hayes, D.M. & Eddy, J.M. 1985). Some of the key skills relevant to this concept are: analysis and problem solving, decision making, development of critical thinking, development of creative thinking, communication, empathy, overcoming stress, mastering emotions, interpersonal skills, etc.

As for the stressful situation itself, experts insist on education which aims to enable the person to establish more effective control of stress, as well as of one's own effective response and behaviour.

Very often companies, in cooperation with their departments of human resources, can play a key role in reducing stress at work. Supervisor who monitors the performance of subordinates is responsible for identifying symptoms of stress and then he is obliged to inform employees on organizational solutions that are available to him. The role of experts in human resources is to conduct a survey of employees periodically in order to repeat the selection process if necessary, determine the adequacy of the workplace for the employee and provide career development so that the employee should occupy the position that suits best his abilities.

Management of a catering company should be aware of the difference between the sexes when it comes to stress. It is believed that women are socially-oriented in their behavior, while men have a task-oriented behavior, which would mean that women are more satisfied with their jobs if they cooperate well with others in the company, while men are content if others value their work. This difference is also reflected in their responses to stress, therefore women are much more actively and more directly confronted with problems, mostly by working longer and harder than men (B. Cheol P. Kim, Suzanne K. Murrmann, Gyumin Lee 2009).

Many studies indicate that women who make their career in a predominantly male work environment are usually exposed to chronic stress., ie. they have more health problems caused by stress than men. The reasons for this are the stressors that are more specific for women than men, such as harassment, and sexual harassment in particular. By reducing these stressor women are allowed to advance their career and eliminate the effect of "glass ceiling" that often occurs in higher positions.

4. THE RESULTS OF STUDIES OF STRESS AT DIFFERENT POSITIONS IN THE CATERING AND HOTEL BUSINESS

Analysis of work as a professional technical method has showed that some jobs are more subject to stress than others. For example, professions such as a doctor in the emergency room, nurse in the emergency department, police officer, firefighter, pilot and the others expose people who perform them to a high level of stress. Quieter jobs such as professors, janitors, librarians and the like do not produce such a big risk. The fact that some jobs are more stressful than others is confirmed by the results of a survey which included more than 130 different jobs. They showed that several jobs such as a doctor, shift commander in the militia, foreman, waiter, include very high levels of stress. Much lower levels of stress are included in the jobs of maids, artisans, farmers (Mihailović D, Borovnjak V. 2008).

The typical organizational form of large international hotel includes division into the supporting sectors and operational sectors. Operational sectors include accommodation, food and drink, and they are directly responsible for meeting the needs of guests, while the supporting sectors encompass the commercial service, service marketing, financial and accounting service as well as the department of human resources and they have no direct contact with the guests, but provide an efficient and effective functioning of the hotel.

From this we can conclude that the different departments in hotels generate different levels of stress. The role of employees in the department of hotel housekeeping is fundamental in creating the hotel product

and if they do not meet certain standards that will affect the guests' perceptions of other services offered at the hotel. However, despite this, the department has less valued status in the eyes of managers and other employees. This may seem rather demoralizing, especially if we consider the unpleasant nature of this business. Although maids generally have little interaction with the guests and do their work in isolation, a stressful situation can easily occur: for example, in the midst of performing their tasks the receptionist could call them to clean another room urgently. Stressful and unpleasant moment could also be a guest entering the room, and the efforts to comply with the timetable despite the lack of cleaning agents and lack of equipment. Another potentially stressful situation is introducing new standards of quality control, which requires minimal administrative tasks to be performed by the staff, which could also be a huge burden for them.

As for the staff at the reception, not only do they represent their own department, but also a reflection of the quality and standards of the hotel as a whole. In the course of their working day their job is to check in and check out guests, solve a number of situations that require empathy, patience and discretion, and meet the demands of the guests of different cultures and linguistic backgrounds, all of which can be a potential source of stress. Besides the above mentioned, there are two situations that can be particularly frustrating and stressful, the first is completely beyond their control, and that is when the hotel policy does not allow them to respond because it is not in their jurisdiction, and the second situation requires communication with other departments that takes place under the pressure of rapid response, when the chances of conflict is very high. Because of this, management needs to act preventively and to provide ongoing training so as to reduce worker absenteeism and high employee turnover.

5. CONCLUSION

Surveys conducted in the hotel industry have shown stress has harmful effects not only on productivity at work, the performance of employees who provide services to guests in real time and requires them to reach decisions on the spot, but it also reflects the increased costs of training of new workers for leaving work, the problem of quality, and the cost of health insurance. Four major stressors that are commonly mentioned in the literature dealing with these issues are: conflict of roles at work, role ambiguity, as well as work overload and the need to make a decision as soon as possible (decision-latitude)

Message for this industry is that while working with guests can be a challenging and difficult job, tensions and conflicts with colleagues do much more severe damage to health. Managers are generally more vulnerable to stress because their positions include much more responsibility and they have more working hours than employees at other positions. Therefore, considering the above mentioned, the obligation of every hotel manager is to protect the welfare of their workers, and so he will find, evaluate and acquire managerial experience to reduce workers exposure to stressors that are difficult to control, while at the same time they must provide an adequate standard of quality and performance.

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MANAGERIAL STRESS IN AUDITING COMPANIES

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Abstract:

Stress management in auditing companies has become a primary strategic and operating concern for all big auditing houses because of the direct link between the very practice of auditing and the time auditors spend at work, as well as between good hiring practices and successful business. The term "stress" has been, in science and in everyday life, so widely used that it has acquired a great number of meanings and forms. The subject of our research was stress experienced by auditors working in big companies. The main goal of our research was to investigate whether and to what degree the auditors are exposed to stress and to what degree it influences their work and efficiency in business and control over financial reporting. In order to obtain more precise results in our research, we set up exact goals. We examined which period in the auditing year are the most stressful, whether specific positions in auditing influence the appearance and manifestation of stress, and whether it is possible to determine the influence of stress relief mechanisms on the frequency of stressful situations. Another goal of our research was to determine the interdependency between mechanisms that employees in auditing companies use to alleviate their own stress and the frequency of stressful periods over the years. In general, one half of the examinees alleviate stress at work through some sort of physical activity, whereas one quarter engages in different social activities. Based on the results obtained and processed, we came to the conclusion that stress greatly influences auditors and their work performance. We came to this conclusion since only 4 out of 50 auditors stated that stress has no influence on their work performance. As supposed, the most stressful period for the auditors is the process of control over financial reporting, and this stressful period equally affects male and female auditors.

Key words: Stress, auditing companies, stress causes, stress prevention, stress consequences

1. INTRODUCTION

Stress is a physical and psychological state that a person is in when confronted with difficult times and situations. It is problematic for experts to give the definition of stress since this phenomenon is highly subjective and difficult to measure and define. The notion of stress was introduced by Hans Selye in 1936, and he defined it as "the non-particular response of the human body to any need for alter"... Many scientific disciplines dealt with different aspects of stress, from biological sciences, such as physiology, biochemistry, and neurophysiology; through psychology and its disciplines: clinical psychology, mental hygiene, developmental psychology, social psychology, and other; to humanities such as anthropology and sociology. It is not surprising that the notion of stress was used with different meanings in these scientific disciplines, making thus its definition even more confusing. (Mihailović, D., (2009). *Psihologija u organizaciji*).

In the psychological literature, as well as in formal and informal communication between the experts, we can distinguish two approaches to understanding of stress, where in each of these two there are two versions of the definition. The first approach perceives stress as an external event, more precisely: (1) as an event that for most people represents a threat or a loss (or, rarely, a challenge); or (2) as an event that for the specific individual represents a threat or a loss (or a challenge). The second approach perceives stress as the reaction to the external event, more precisely: (1) as the activation of intense feelings (mostly unpleasant); and/or (2) as sum of the specific bodily reactions. (Macaulay D., (2010). *Successful Manager's Handbook*).

With the efficient stress management come direct obligations and responsibilities, with their own price. Auditing companies and their employees are much more required to invest their time, financial resources and skill in creating quality working time and environment and these requests can themselves be causes of stress. This makes recognizing the possibilities for the occurrence of physical and psychological stress absolutely necessary, as well as taking the necessary steps in the working place, occupation and business design towards the elimination of stress, or at least its minimization. If this is not possible, organizations and

their managers must be prepared to accept the fact that as the result they will have to face the problems of absenteeism, illness, injuries and job burnout.

The circumstances causing stress are also called stressors ("impactors"). The notion of stress in narrow sense signifies the physical reaction to the influence of the external stressor. When the "stress is loaded", man becomes ill: he/she can feel chronically tired or exhausted; may suffer from insomnia or increased need for sleep; may lose appetite and the ability to enjoy life; may feel depressed, anxious, experience crying and panic fits, obsessions and phobias. (Leplat, J. (2008). *The factors affecting workload*).

Starting from the developmental phase of stress and its consequences, as Selye did, we can distinguish three phases of stress. These phases are: the phase of alarming reaction (the beginning phase that doesn't last long and means preparing to face the stress), the phase of resistance (the organism enters the fight with stress and endeavors to cope with it), and the exhaustion phase (the organism subsides; its defensive strength is exhausted). According to Selye the development of stress is a long and exhausting fight of an organism and it can influence that through these three stages stress becomes illness. Stress illness is the consequence of the long term resistance to pressure.

Emotional reaction of a person in a stressful situation can be stretched between totally opposite meanings. These opposites are types of stress, eustress and distress. Eustress is a pleasant experience of self-fulfillment and joy, even though it is preceded by fight and exhaustion, whereas distress is an unpleasant emotional experience, negative and defeating, and a person wants to be relieved from it as soon as possible. A person going through distress is in agony and is suffering, feels great dissatisfaction and loss. In everyday speech the term stress is mostly used with the meaning of distress. (Leplat, J. (2008). *The factors affecting workload*)

2. CAUSES OF STRESS

2.1. WORKPLACE STRESS

Workplace stress creates possibilities for heart attacks and cerebral attacks, ruins mental health and shortens life. Ten years ago World Health Organization (WHO) pronounced workplace stress a global epidemic, and since then the workplace stress has increased even more because of the intensified global crisis and unemployment. Burnout syndrome denotes the state of complete emotional exhaustion due to excessive yet pointless putting of effort into work. Work burnout is similar to chronic fatigue syndrome, what makes them different is the changed attitude towards the work which is not characteristic for fatigue. Americans estimated that their companies lose around \$200 billion a year because of accidents caused by stress, decreased productivity, workplace absence (sick leaves) and medical insurance expenses. (Macaulay D, (2010). *Successful Manager's Handbook*).

Stress is a phenomenon that can be encountered wherever people live and work. Some professions are more exposed to stress, and some are less. The professions marked as highly stressful are: pilots, rescue service workers, journalists, actors, miners, construction workers, doctors and medical staff, especially those working in emergency room, flight controllers, prison officers, and other. Among the highly stressful professions managers and auditors in general are ranked pretty high. Stress and strain in these professions comes from almost every aspect of the job, especially from work operations: decision making, responsibility for the job completed, dealing with problematic situations, time pressures, striving to advance in business, to improve personal reputation, interpersonal relations, to find a new job, but social, economic and political environment also greatly influence the stressfulness of these professions. Managerial stress is the subcategory of stress that persons who are under great dose of responsibility, for companies as well as for its employees, are exposed to. Very often it is connected to deadlines, and making of difficult and responsible decisions under highly uncertain circumstances.

After all one of the main causes of workplace stress are interpersonal relations. Workplace stress that results from bad interpersonal relations is also described by the notion of mobbing, which denotes psychological terror that employees exert on their colleagues. Corner stone of this type of behavior is usually some disagreement, and then schemes, plots, humiliation and isolating ensue. For fear of loss of the workplace the "guilty party" can develop burnout syndrome and chronic health issues, and relief can be sought in leaving the workplace, or even suicide. And yet, every environment can cause stress, and some levels of stress are part of everyday life, and not just a consequence of workplace relations and circumstances. Interpersonal

relations of great quality, as well as those in the workplace, are never accidental; they are always the result of good interpersonal communication and appreciation. Good communication and work in a group give rise to new ideas and problem solutions due to sharing of experience and knowledge. It is of great importance that people learn to control their emotional reactions and avoid openly showing antipathy towards others. It is permanently employed that are most often exposed to stress – everyday or several times a week- whereas independent contractors and artists are least exposed to stress. As far as position is concerned, workers, experts and management are exposed to most intense stress, and they experience it every day, whereas apprentices and those at starting positions are under least stress.

Psychological symptoms also vary, and cover such states as anxiety, lack of concentration, frustration, agitation, aggression, insomnia, and in severe cases depression. Symptoms of the state of stress are not only unpleasant in their nature, but also restrain the person from his/her optimal performance at work causing thus more stress, and in that way the well-known enchanted circle is created.

2.2. PSYCHOLOGICAL REACTION AND CONSEQUENCES OF STRESS IN AUDIT COMPANIES

Audit is a systematic process of gathering and estimation of evidence that the management of a company provided about economic events and activities, in order to determine the degree of compatibility between those claims and determined criteria, and hand over the results to the customer. The goal of audit is handing over the results to the concerned customer (whether the financial reports paint “true and faithful” picture of the economic state). There are three basic types of audit: audit of financial reports that implies the examination of financial reports in order to determine whether they paint true and faithful picture or whether they present financial information truthfully according to the given criteria; operational audit that deals with the inspection of the operation of the specific organizational unit in order to evaluate its performance, and audit of compliance with rules and regulations whose goal is to check whether the organization follows certain procedures, rules and regulations prescribed by a higher instance.

Those working in audit have a lot of work and often work overtime. An auditor is responsible for forming and articulation of opinion about financial reports, whereas the management is responsible for its arrangement and presentation (audit does not diminish this responsibility of management). Main types of auditors are: independent auditors, who are usually authorized by some professional organization or by the government, internal auditors, who can be hired to do financial reports audit but the results of their work are then controlled by independent auditors, and governmental auditors, who can do the work of both independent and internal auditors. Although audit is mostly based on judgment, or in other words articulation of opinions (depending on the method used – statistic sample, audit risk, etc.) and that makes it faculty rather than science, the process of audit is still a systematic process. The audit process starts with the inquiry of a client, then an audit plan is made, the process of auditing takes place (examination of evidence) and finally an auditor forms his opinion. (Salas, E.M., Driskell, J.E., & Hughes, S. (2008). *Introduction: The study of stress and human performance*)

The four great audit companies influence the audit process in the world: Pricewaterhouse-Coopers (PWC), KPMG, Deloitte & Touche, Ernst & Young. Organizational form of these companies is partnership, and partners hire professional staff. Professional staff in these companies is comprised of: partners/executives (the owners of the company), managers (who follow and monitor audit), authorized auditors- supervisors (work on the field), younger auditors- auditor assistants (routine tasks). Each employee has his/her own tasks and stressful situations that follow them.

It seems that in many organizations there is a tendency to put people in the position that carries too much stress and is not appropriate. Many auditors make their problem even worse by their selection of delegated people for the creation of financial reports. These delegations are usually made in order to help the auditors that have too much work by sharing their responsibilities with their subordinates. However, delegating usually increases the auditor's stress. They usually delegate parts of their own work and more complex problems. The time that is in this way saved is later spent on worrying about problems that causes the most stress. By delegating, the personal stress portfolio of auditors is increased. In order to be more efficient it may happen that they delegate some of their most stressful tasks, such as audit of supply chain. Once the efficient delegation balanced the stress, next step to take is give priority to the tasks left to be done. By doing this auditors will in a more simple and easier way set up daily goals and set priorities. (Salas, E.M., Driskell, J.E., & Hughes, S. (2008). *Introduction: The study of stress and human performance*)

Examination and observation of psychological reactions of auditors working in great companies throughout one audit year made it possible to explain many questions related to stressful situations, psychological reactions and consequences. At the time of writing of financial reports, and when some important factor necessary for the completion of the report before deadline set by the client is missing, depression, general anxiety and post-traumatic stress disorder are observed. Relatively frequently observed symptoms are increased precaution, and fearful expectation of the next meeting with the client, hyperactivity, psychomotor restlessness and insomnia and nightmares. Since work in audit is very stressful and turbulent, terms of notice are quite common in all levels of management. Through examination and observation of the reactions of employees it was determined that it, almost infallibly, goes through the following stages:

1. Phase of impact (shock) - immediately after receiving terms of notice or unfavorable result of an auditor. It is characterized by the intense fear because of material endangerment and endangered reputation of the person in a company or society, and that is followed by corresponding problems (sweltering, breathing with difficulty, tachycardia...). Stupor and confusion, narrowed consciousness and attention, are also characteristic for this phase. These are all consequences of the strong effect of fear caused by the receiving terms of notice.
2. Consolidation phase: characterized by the mitigation of fear which makes it possible to more realistically look upon the situation and plan and execute organized activities in order to overcome the fact that one was fired and to concentrate on other open work positions in other competitive companies. This phase is characterized by great and devoted activity leading to irritability and exhaustion.
3. Phase of unjustified optimism: the phase in which after the abatement of the initial fear and tension, contentedness because of other possible positions in banking sectors and consulting becomes prominent. Auditors going into other branches have much more possibilities because of the comprehensiveness of their work. This leads to unjustified optimism in the consideration of possible future employments.
4. Phase of sobering down: characterized by the realistic perception of the present and future state of affairs, followed by depressive mood and anxiety, as well as with justified and unjustified disappointment in the new job, which never completely fulfills the expectations of an auditor. Hypersensitivity to actions of other employees, irritability, and envy for those who were luckier in the reorganization of work, are further characteristics of this phase.
5. Phase of reorganization: comes on scene when the hired auditors start anew to build their careers, and realize that their career depends solely on them. All the strength is used in that purpose. Possible mistakes and failures are followed by the bitter feelings, depression, anxiety, and loss of self-esteem, but the disposition to blame other colleagues, towards who negative feelings are developed, for one's own mistakes. (Lupien, S.J., Gillin, C.J., & Hauger, R.L. (2009). *Working memory is more sensitive than declarative memory to the acute effects of corticosteroids*)

3. STRESS AS AUDITORY ILLNESS

Despite the range of managerial occupations that exist, most auditors do some, or all, of the following activities: handling the financial reports, development and control of the subordinates, planning and organization, creation and maintenance of interpersonal relations in the team, communication with the clients, ensuring of joint and team efficacy, solving of problems and making decisions about the acceptance of audit. All these activities are highly quantitative and qualitative working norms for auditors, and they increase tension at work and decrease the very work on audit. Auditors have longer working hours than other workers. Also, a part of work, that is usually not paid, is done at home. That part makes about 40% of additional work. It is not surprising that working hours are source for conflicts on the work-home relation, especially for the executive auditors and partners. For most of the executive auditors it is a great problem to balance between work and life out of work. When faced with the problems on the relation work-home, they become more nervous, experience psychosomatic problems and suffer from depression on the workplace.

Roles of auditors are also characterized by high degree of responsibility and decision making. And, while certain degree of autonomy and freedom in making of the decisions has certain advantages, researches have shown that too much autonomy and freedom in decision making can be stressful and can endanger health. When certain level of autonomy is passed, work performance can deteriorate. (Wickens, C.D., Fadden, S., Merwin, D., & Ververs, P.M. (2008). *Cognitive factors in aviation displa design*)

As the consequence of all that we find the following consequences of stress in auditors. Psychological and emotional consequences, inability to concentrate during work on difficult tasks, loss of attention. Memory capacity decreases, both short-term and long-term, and they cannot perform their auditory duties devotedly. Problems that demand momentary and spontaneous reaction are solved in unpredictable ways. All the problems that demand mental activity are solved with many mistakes. Auditor is not able to estimate the momentary situation. The way of thinking does not follow logical and connected schemes, respects no order, and is unorganized. Difficulty with emotional and physical relaxation, tension. Increased impatience, intolerance, authoritativeness, lack of understanding for others. Moral and ethical principles that shape one's life are weakened. (Lupien, S.J., Gillin, C.J., & Hauger, R.L. (2009). *Working memory is more sensitive than declarative memory to the acute effects of corticosteroids*)

Managers are also faced with the unique causes of stress during maintenance of trust in the rightfulness of decisions on high levels. For example, employees usually feel betrayed in the cases of restructuring or decrease in the size of a company. Usually there is a long time span between the decision making of the managers and the results from the point of view of employees. An unfortunate side effect is that the influence of the decision made on the employees is of no interest to the managers. However, managers have already faced the weight of these decisions in past. Consequences for managers can be isolation and loneliness. Managerial isolation and loneliness may also be a consequence of the function they have in the hierarchy. Direct decisions can separate the managers and make them "different" from the rest of the employees and can be an obstacle for sincere and open communication.

Stress also has a great subjective element. What one perceives as advancement others may perceive as highly stressful. For some people some parts of work are more stressful than other. For example, some apprentice auditors see paperwork as a chance to be away from the pressures of audit department, while others are insulted by that work because it keeps them away from the audit department. (Wickens, C.D., Fadden, S., Merwin, D., & Ververs, P.M. (2008). *Cognitive factors in aviation displa design*)

3.1. STRESS PREVENTION IN AUDIT COMPANIES

There are a number of measures that a person or audit organization can use in order to diminish the causes and effects of stress. There are different guides that pay attention to good administration and management, to approaches to stress, training and resources for the completion of work and control of changes. Also, different techniques are suggested that should help one to control stress, such as: changing of the point of view, putting away problems in perspective, learning to feel joy of living, not worrying and working on the reduction of stress, thinking positively, and trying to slow down the pace of living. Stress control is the key to successful career. Some studies have shown that for success it is not enough to possess characteristics such as self-discipline and the ability for systematic work. Equally important is the ability to control negative feelings, such as fear and tension.

Many auditors are trying to diminish the effects of stress in a completely inappropriate and even harmful way. Nicotine, alcohol, caffeine, sedatives and narcotics are usually the means that auditors use to reduce the stress they feel. Substances that encourage action and increase performance at work or stimulants, work by encouraging excretion of neurotransmitters serotonin, noradrenalin and dopamine, but this causes great rises and falls in the energy and mood. In time, organism adjusts to them, and it is necessary to increase the dose of stimulant for the same result. Many take daily high doses of coffee, cigarettes, alcohol, chocolate, or all of them together. These do not reduce stress; they even create the addiction that breaks natural anti-stress mechanisms. (Diaz, D., Hancock, P.A., & Sims, V.K. (2011) *Ecological visual search under noise stress: Present & future research*)

Positive use of stress is important in prevention with auditors. Crises can influence everyone in an audit organization, or they can influence only certain individuals, however it is important for them not to allow desperation to overpower them. Actually, stress resulting from a crisis can be used in one's own advantage. Since stress increases their adrenaline level, they can use it for additional energy to solve the surprising

situation, if possible. (Williams, J.M., Tonymon, P., & Anderson, M.B. (2008) *Effects of life-event stress on anxiety a peripheral narrowing*)

Mental training has a great role in stress prevention with managers. Through methods of psychological or mental training, auditors can learn how to psychologically correctly overcome the stressful situation, and not how to avoid it, since in audit it is absolutely impossible to do that because of the very nature of the work. It is considered that all those who neglect the symptoms of stress, or, because of the nature of the work, expect the possibility of occurrence of stressful situations should in time go through professional treatment which would provide them with necessary knowledge and skills for the preservation of their psychological and physical health in the circumstances of everyday stress at workplace in audit companies.

Physical activity plays an important role in the prevention of stress. It encourages excretion of substances that act like natural antidepressants and anxiolytics – noradrenaline, endorphin and encephalin. Furthermore, regular exercise decreases level of estrogen and thus reduces the possibility of formation and growth of estrogen-induced tumors. Physical activity can greatly reduce stress and the intensity of reaction to stress. Particularly useful are aerobic exercises, such as hiking, running, swimming and riding a bike. Stretching is useful for muscle tension. Regular physical activity is a good strategy for coping with stress for auditors.

Communication between higher and lower auditors is of great importance. Through expressing and sharing of opinions with the members of the team auditors may come to better understanding of their own feelings; talk about what has been noticed in the reports, thinking and reaction on the stressors and deadline and client traumas is also very important.

Practicing of methods for stress control enables auditors to acquire mental, physical and emotional calmness on a wider plane. Knowing oneself increases the possibility for individual control, for the feeling that one has his/her life, problems, and difficulties in his/her hands.

4. RESEARCH (METHODOLOGICAL) APPROACH TO THE PROBLEM AND THE RESEARCH RESULTS

4.1. SUBJECT MATTER, AIMS, HYPOTHESIS AND DESCRIPTION OF THE RESEARCH

The subjects who work in the field of auditing participated in the research of the phenomenon of managerial stress. Sampling frame consisted of employees in the auditing companies operating in the international markets. Observation unit consisted of 49 participants from the auditing sector and consulting services of 75 employees in the sector. The sample comprised 36.7% of male population and 63.3% of female. The sample is representative for the reference sampling frame by sex ($X^2 = .225$, $p = .664$), because the difference between relation of male and female population was not determined.

Data obtained in this study were analyzed by using statistical software for data processing in the social sciences SPSS 17.0. Qualitative data were analyzed using descriptive statistics test for the analysis of variance (ANOVA) and Hi square test (Pearson Chi-Square) and determining the statistical significance of individual comparisons. Data collection was conducted through survey. Participants filled in electronically pre-prepared questionnaire, the survey was anonymous, i.e. the identification of respondents was not required. The survey consists of ten questions, claims related to auditors' perceptions of working conditions and control of financial reports. Encircling one of the answers, auditors participating in the survey marked to what extent they agree with the offered answers or to what extent these refer to them. The software package SPSS 11.5 was used for data processing. The responses were entered into SPSS spreadsheet program based on filled questionnaires. The frequency of responses expressed in percentages was calculated for each question in the questionnaire. Based on the results, which are presented in graphical and tabular form in order to be more clear, further analysis were carried out and conclusions were derived. The aims of the research and analysis are:

- The respondents' familiarity with the phenomenon and the influence of managerial stress in their daily business.
- Determining the period of most intense stress during an audit year
- Determining the impact of stress relief mechanisms on the frequency of stressful situations

4.2. RESULTS OF RESEARCHES

More than two-thirds of respondents (71%) believe that they know what stress is, while one-fifth does not think that they are completely familiar with the term. On the four-level scale for evaluating the effect of stress on business quality, medium grade is closer to the ultimate value and it is 2.71 (SD = .76376). The causes of stress in the form of hard and demanding work and causes that are not directly related to employment, i.e. that are concerned with personal ambitions, pressures of environment, etc. are found to be equally prevalent on the sample. Conflicts with colleagues and superiors are the causes that appear least in the respondents' choices. Increased nervousness with insomnia is the way in which stress is manifested in the cases of almost half respondents (38.8%) while the next most frequent case is lack of interest in 30.6% of cases. A fifth of respondents have health problems that include nausea, headache, stiffness, and other. What is specific for employees of audit companies is that more than half of respondents are under most intense stress before the deadlines for submission of final reports. At the level of the annual audit, the most stressful periods are almost equally present with the respondents. (Figure 1)

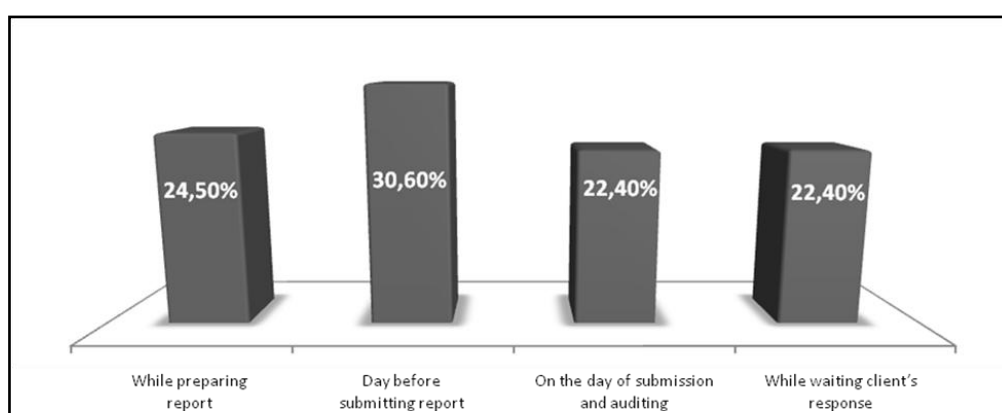


Figure 1. Most stressful periods during the annual audit work

One of the aims of the research is to determine the interdependence of the mechanisms employed in auditing firms use to reduce their own stress and frequency of stressful periods over the years. Generally, half of respondents reduce stress at work through some physical activity, while a quarter participates in various social activities. 18.4% of them have their own hobby as a mechanism for stress relief and 8% of respondents use the service of a professional psychologist. The assumption of the interdependence of ways of relieving stress and frequency of stressful situations during the business year is statistically proved. For this analysis we used analysis of variances (ANOVA) where the variable examining the mechanisms of stress relief was regarded as an independent variable and frequency of stressful situations was taken into account as a dependent variable. Table 1 shows the average frequencies and standard deviations of stressful situations during the business year for the group of respondents who use different ways to relieve stress.

Table 1. Average frequency of stress among the respondents

Mechanisms reducing stress	for	Average frequencies of stressful situations	N	Standard deviation
Hobby		2,11	9	1,054
Physical activity		2,54	24	,721
Social activities		2,75	12	,754
Psychological therapies		3,75	4	,500
Total		2,61	49	,862

Based on data obtained from the direct intergroup analysis of variance, it was determined that there was no violation of the assumption of homogeneity of variances. (Values of Levenov's test is 1167, $p = .333$). ANOVA test (Table 2) showed that there is a difference ($p = .011$) for the four groups of respondents

Table 2 Analysis of intergroup variance of the frequency of stressful situations for respondents

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7,785	3	2,595	4,194	,011
Within Groups	27,847	45	,619		
Total	35,633	48			

Adequate post hoc test (Tukey HSD) determined that there is statistically significant difference of frequencies of stress among those respondents who use physical activity and psychological therapies as a stress relief mechanism (the difference in average is -1208, $p = .033$) as well as one's own hobby and psychological therapies (the difference in average is -1639, $p = .006$). The magnitude of the differences is expressed through the test η^2 . In our case, the magnitude of the differences is large and it is 218. This measure represents the proportion of variance in the dependent variable (frequency of stressful situations), which is explained by the independent variable (mechanisms for stress relief) and it is 21.8%. Therefore, the alternative hypothesis can be confirmed: The frequency of stressful situations in the future is determined by the mechanisms for stress relief.

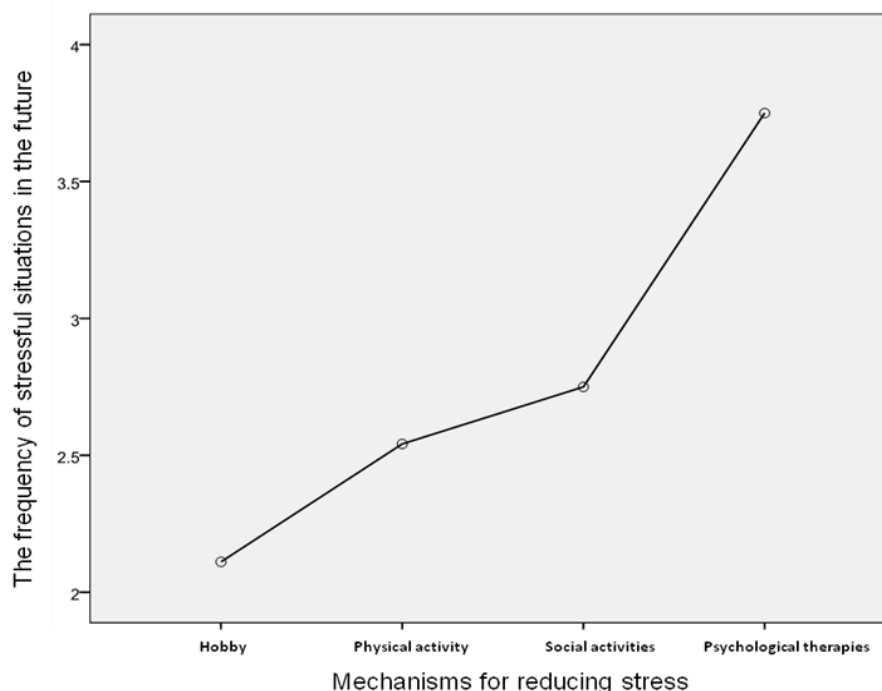


Figure 2. The effect of mechanisms for stress relief on the frequency of stressful situations

5. CONCLUSION

Organizational change in auditing companies, the return issue from the nineties, has left consequences on organizational and on the individual level which are reflected in stress and trauma. The costs of stress on the financial, organizational and individual levels are very high. There is a wide range of stress in every auditing company regardless of business and management. Every business has its own stress print. Surveys have shown that persons have an important role in the stress process. (Čizmić, S., Bojanović, R., Štajberger, I., Petrovic, I., (2010). Psychology and Management)

Based on the obtained and analyzed results, we concluded that the auditors and their activities are greatly affected by stress. We reached this conclusion because we got only 4 auditors out of 50 respondents who stated that stress does not affect their business. As we assumed the most stressful period for auditors is the process of preparing the report, and the stressful period occurs equally with both female and male auditors. The frequency of occurrence of stress is manifested in the following way: in the case of a difficult business task, 40% of them are under stress, and 36.7% if they did not prepared pre-auditing. Stress tends to occur more frequently with women, no matter what kind of job it is. We got equal results for the causes of stress. 14 auditors stated the reasons which were not related to auditing work, of which the most common reason is related to the pressures of the environment, while the other 14 considered overweight and requirement of the auditing job as the basic cause of occurrence of stress, which makes 64.3% of women and 35.7% of men. Stress can be manifested in different ways, and it is most frequently manifested in the form of increased anxiety/nervousness. (36.7%).

Stress is defined individually. It varies depending on personality. What someone considers being extremely stressful, someone else could regard as very exciting and interesting. Everyone has a range of comfort within which he/she feels safe and secure. Stress occurs when an individual feels to be working outside that range. Individual differences are very important in determining the level at which the limits of the range comfort are abandoned. Although stress could make people move (and may mobilize some of them) creating possible positive reactions in their behavior, we must not forget the psychological impact of stress on a person. Headaches, tension in muscles, fatigue and high blood pressure are given as instances of consequences of stress. Stress is a complex issue. It is essentially connected to the perceptual system of every man and thus could be understood as a subjective phenomenon. However, it could also be understood as an objective phenomenon, especially in the cases of psychological assessments. Also, the stress should be regarded within the social context, which largely determines and defines the causes of the stress.

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MOVING BEYOND MYTH OF CRITICAL SUCCESS FACTORS POWER OF ADVANCED SELF-MANAGEMENT SKILLS

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Abstract: *What distinguishes very successful companies like Apple and Google from other companies which are far less successful, if they all started with a very limited budget? This research is dedicated to finding and presenting those critical success factors. Methods we used in order to gather information and experience were: personal conversation, lectures, workshops, training programs, memoirs, autobiographies, biographies, web sites, blogs, magazines and conferences. During the research, we found that there was a key success thinking pattern very similar in the majority of successful company leaders. That thinking pattern provided them with a crucial competitive advantage and therefore made them very successful. Based on success experiences we have developed a method which is practically applicable. If applied correctly, the method could give individuals and teams a competitive advantage and increase their probability of success. This paper could be of value to professionals who are interested in increasing their probability of success in business.*

Keywords: *success, factors, business, advanced self-management, skills.*

1. INTRODUCTION

How do they make it? There was a company which started with budget less than \$10,000.00 in a family garage, like hundreds of thousands other companies started. Four years after, they reached \$1 billion in annual sales. Majority of companies didn't. The name of that company is Apple. But companies successful like that are found in very small percentages. So, we asked ourselves, how do they make it? If they all start with a small budget, what are they doing better than everybody else to achieve that amazing success? This work is dedicated to finding and presenting those critical success factors. For two years we have been following successful companies, reading books, blogs and magazines about them, talking with their leaders, studying their business activities and investments. After the research was done we examined data and find out that there is more than just sum of a critical success factors - there is a key success thinking pattern which is common for majority of successful leaders. In the essence lies advanced self management skills concept. Then we have done another research with companies and leaders who were far less successful and concluded that majority of leaders didn't use that thinking pattern. That confirmed idea of key success thinking pattern which we are presenting in this work. (fundinguniverse.com)

Advanced self management concept consists of principles, methods and success stories. We are going to start with principles. Principles are conclusions that we have made during analysis and their understanding is crucial.

Hypothesis 1: Applying this concept is dramatically increasing probability of success in business.

Hypothesis 2: Business leaders in Serbia are paying too little attention to this concept, but those who do, are very successful in their industry.

2. PRINCIPLES

2.1. Power of thoughts

Quality of our lives tomorrow is equal to quality of our thoughts today. In business, quality of our business performance tomorrow is equal to a quality of our thoughts in terms of business today. Quality thoughts supported with action plan create quality activities, quality activities are delivering quality results. Supported with determination, quality daily activities are becoming quality monthly, yearly activities which are delivering quality results. If we create great thoughts and support them with action plan and determination we will achieve great business results. So, it is very important to invest in process of creating great thoughts, constantly.

Few years ago there was a man who organized a free conference which was attended only by 23 people, from which 21 were members of his family. Now he is organizing one of the most wanted conferences which lasts for two days and has a \$5.000,00 price tag per person. That man is Mr. Sharma, one of the most successful motivational speakers in the world. He realized the power of thoughts, he invested in them and that great achievement is his reward. (Lime light group), (theremarkableentrepreneur.com)

2.2 Master your craft and perform on world class level

Today's dynamic market and intense competition are placing a client in a position in which he can choose between huge numbers of companies. Purchasing decision is based on value/money ratio (the value client is receiving for the money he is investing). That ratio is very similar for 95% of all companies, but other 5% have noticeably better ratio because they are delivering some form of additional value to their clients. And usually those 5% are gaining more profit than other 95% together. And it is all based on a principle: master your craft and deliver unique additional value to your clients.

Apple iPhone is a product which has a same basic function as hundreds of other phones (calling, texting) but it is much more profitable product than others. It is much more profitable because the Apple is delivering unique value to their customers and that unique value is great user's experience which is a key to iPhone's success. (Internetnews.com)

Top management of one club in Serbia realized that his additional value could be based on: very pleasant staff, always enough amount of ice (which was a problem in that area during that period) and free VIP party invitations for key clients. The first value factor was achieved by investing in team building activities and specialized staff training. The second value factor was achieved by organizing the delivery of ice more times a day than other clubs in that area did and third was managed by developing customer relationship program, which was based on informational technologies and could show how profitable was each customer. That information was key element for process of making a decision which clients should enjoy VIP experience. Other club's management teams thought those investments were just a way to waste money but management of this club realized the power of world class service and master your craft principle. These three initiatives created a great client experience which no other club could achieve. The profit increased for 200% in the next five months was a result of that. (Vasic, 2012)

2.3. Disrupt the psychological boundaries

There are some boundaries that we have to overcome in order to set a good foundation for a future business results. The interesting thing is that majority of people is ignoring these principles and that is creating a huge obstacle for them. Those principles could be shown this way:

Face the fear. Fear is excellence killer. The comfort zone is the zone where people are comfortable with every aspect of activity they are doing (such as: type of activity, working time, team, space and dynamics). Read magazines you don't usually read. Talk to people who you don't usually speak to. Go to places you don't commonly visit. Disrupt your thinking. Great business results are available only to those brave individuals and teams who are getting out of their comfort zone, regularly. They are doing things others are afraid to and that is differentiating them from others, giving them a great competitive advantage. (Sharma, robinsharma.com)

"Eike Batista", Brazil's richest man faced a fear of failure and went into gold business. He raised US \$500.000,00 from investors and took a chance. After 15 months he gained a profit of \$6 million. (Addicder2success.com, 2012)

True form of leadership. The business life is advancing fast and it has created a need for a different type of leadership. The leader needs to be:

Charismatic in order to be able to inspire people to perform on the highest level. High performance is necessary since the competition is growing stronger and the client has much more power so companies need to deliver much higher level of value than ever before.

Liberal, because team of minds is much more powerful than one mind. So, participation is critical for good ideas on one hand and form strong motivation on the other. Job of the leader is to create more leaders, to delegate authority, to share information, experience and contacts in order to maintain team development which is crucial for success.

Authoritative, because he needs to set the frame of the business strategy, timeline and terms of participating. Sometimes, he needs that power to influence people even when others don't agree with him, in case he is the only one knowing all relevant information, which could be a business secret, for example.

Sir Richard Branson is the great example of a true form of leadership. He started as rabbit hunter, now he is a billionaire (Branson, Screw it, let's do it, 2010)

Power of idea. Don't doubt that small team of individuals with one strong idea can change the world, because it has been the only thing that was changing it during all this time. So, if you are going to dream, dream big! This is a great time for creative thinking, in last 100 years we have concord more natural forces than ever before. We have concord the air, so birds cannot compete with us; we have concord mountain tops and depts. So, no other living creature could compete with us. This was not imaginable 200 years before, and now it is all possible because people are thinking big. The only limits we have are in our minds. This is very important to understand in order to destroy psychological limits and unleash full potential of our minds.

Henry Ford was not educated man, he was not the smartest one also, but he was not afraid to dream big and we all are witnesses of success he achieved thanks to that. (Ford, lifehack.com)

Research showed to us that 41% of students are using existing ideas when they are doing projects or case study. Those 41% will need to change their attitude if they want to become successful. Copy-paste principle isn't creating real value for client. (Vukobradovic, 2012)

Built great relationships. It's very important to know that people are paying a great attention to a relationship when they are making a purchasing decision. So it's acceptable to fly 500 miles to have a half an hour meeting. Great relationship is only possible with human to human contact.

Mr. Robin Sharma, one of the best motivational speakers in the world, understood this principle well and now he is enjoying the results. (Sharma, 2009)

Enriching life and patience. There are only two types of value in business world:

Making someone's life easier

Making someone's life more interesting

Employees need to understand that and to focus on improving their clients' lives without expecting immediate monetary compensation.

Google is helping people find what they are looking for without expecting any type of direct compensation. They are making people's lives easier and more interesting and they are patient. Because of that, they are one of the most profitable companies in the world. (forbes.com)

Failures are essential part of success. Because we cannot predict future with the 100% accuracy it is clear that we are going to make mistakes and face some failures, but that is not necessarily a bad thing. Failures are a great way to learn something and to make us stronger and more determinant. So, they are necessary ingredient of learning process and learning is success key. So, failures are critical for success.

If a sales person has 1 successful phone call on 99 unsuccessful and if that one successful phone call is providing him 100 euro of profit, he should conclude that every phone call he makes is worth one euro, and that there are no failures, just a challenging way to a prize.

Tomas A. Edison has met failure 10,000 times before he succeeded. (Hill, 2010)

Think unique. Regarding the fact that competition is growing stronger, companies need to differentiate them from the competition. As we have mentioned, the only way to do that is to create a new value which could be only a product of unique thinking.

People from Apple have some clue about this principle – "Think different" is their motto. Now Apple is worth about \$500 billion. (marketwatch.com)

The last atom of magic. Majority of leaders is keeping that last atom of energy in reserve because they are afraid of spending it. But the last atom of energy which successful leaders are ready to burn is providing them with another area of competitive advantage which could mean difference between success and failure.

Daymond John started with \$40.00 and a ton of determination and will power, he had a dream and he wasn't afraid of burning the last atom of his energy in order to achieve his dream. Every effort has its

reward. Multimillion business is reward for his willing to spend that last atom of energy that 99,99% of people are keeping in reserve.(Addicted2success.com)

3. METHODS

Every human activity has a number of factors influencing it, both controllable and uncontrollable. Factors that are outside of human control should be observed, estimated and incorporated in plans. But there are controllable factors like inspiration, state of mind, energy and time. These four factors are the key pillars of every business activity. If they are left to case they become limits, but if they are managed they are becoming very strong differentiation point which could be used for creating additional value for client. That added value could be very strong competitive advantage and since very few people are managing these factors their effect is very hard to copy. So, managing inspiration, state of mind, energy and time is dramatically increasing probability of success. Our research has confirmed this conclusion and then we went deeper into research looking for experiences which help us develop a model to be used for managing those four pillars.

This model has a set of methods which are essential for:

- Creating purpose and setting goals
- Developing and maintaining inspiration and energy
- Goal oriented decision making based on probability principle
- Ultra efficient time management

These methods are developing advanced self management skills which would provide a great competitive advantage to every individual who is applying them. Our research showed that 63% of people are investing their time and energy in physical exercise at least once a week, but less than 5% of respondents are investing in advanced self management skills. Analyzing our research group we found out that only 63% of respondents thought that motivation has stronger impact on success than talent. As a matter of fact, the motivation is creating exceptional skills that some people may even regard as a talent. So, we expected that this number would be much higher. That is even more increasing probability of success for those who accept this methodology. It is very important to apply these tools like they are described here because they have very strong synergy and psychology effect which could not be understood fully only by reading. (Vukobradovic, Online research, 2012), (Business schools students, 2012)

3.1. Dominant desire

In order to transform wish of great reality into a great reality we need to burn the bridges behind, create great state of mind, support it with strong emotional impulse, concrete action plan and unbelievable determination. Impulse will transform our wish into dominant desire with power and energy to achieve desired reality. Next seven steps will give a frame for that.

1. Define what you want to achieve. Be precise, it isn't good enough to say I want to be successful, define success.
2. Specify what are you going to do in order to achieve that goal, there isn't a free diner.
3. Set precise date. When are you going to achieve your goal.
4. Create accurate action strategy, define how exactly you are going to achieve desired reality with resources you have. Start realizing it now! The journey of one thousand miles starts with the single step. (Tzu, (604 BC - 531 BC))
5. Write down defined goals, specify what you are going to do in order to achieve them, write down the precise date, explain detailed strategy which would lead you to those goals.
6. Read your statement every morning after you get up and every night before you go to sleep. While reading, imagine, hear, feel and experience desired reality as it is already happening. By doing it regularly, experience will become stronger and stronger and it would develop a great state of mind which will trigger strong emotional impulse and drive necessary for achieving desired reality.
7. Invest 30 minutes every day in quiet thinking about previous achievements and future plans. See yourself as a successful and capable businessman who is enjoying desired reality. And you will become one.

Research data: About 15% of students are using techniques similar to this for goal oriented behaviour. But those 15%, who are using it, are far more successful than others in our research group. (Vukobradovic, Online research, 2012)

3. 2. Mastermind concept

With applying dominant desire method we are creating a vision and internal energy for realizing it, but we could also manage external sources of power and raise our competitiveness on entirely new level. Power is crucial in process of achieving our goals. We need power to transform our dominant desire into reality. Nowadays, more than ever, we could define power as an organized and intelligent knowledge focused on fulfilling precisely defined goals. Since we have described the tool for goal setting, we are going to present how we can acquire power-intelligent knowledge. Intelligent knowledge consists of:

- Imagination or fantasy which is the great source of new ideas
- Collected experience could be found in books, magazines, videos, online storage and so on
- Research and development for everything which could not be found in collected experience we should look in this field
- Capability of making intelligent conclusions is available only to a human brain which has enough information and experience about the entity and mixes that with the imagination and unique thinking

It is very difficult to acquire and apply enough intelligent knowledge to achieve success if individual is relying only on his capabilities. But there is a solution and it's called MASTERMIND concept. We can define mastermind team as coordination of intelligent knowledge and effort between two or more people in order to achieve ultimate goal. Concept has 2 key components:

1. Logical - Battery is providing us electrical power just like mind is providing us with thinking power. Like a group of batteries will provide us with more electrical power than just one battery, a group of minds will provide us with more thinking power than just one mind. So, we can do more complicated tasks which require more thinking power if we work in a group.
2. Synergetic - If group of people is coordinating their efforts they will become a team capable of producing synergy effect. Thinking energy produced by a coordinated team is much higher than energy produced by team members working separately.

We can conclude that power necessary for achieving goals produced by master mind team is much higher than power produced by any individual. That added power is a great source of competitive advantage which is crucial for success. So, get together a team of elite performers, brave dreamers and help each other achieve extraordinary results that wouldn't be possible to achieve alone.

This is great example of key competitive advantage created by mastermind concept. Ross Perot was the best salesman in IBM which he left because of his vision to start his own company. Few years after, IBM and EDS were competing for the best contracts in IT industry. IBM had much bigger budget and more experienced professionals and it seemed like they had the advantage but EDS had better coordination and managed to produce powerful synergy effect by using mastermind concept. Competitive advantage of EDS which was based on MASTERMMIND concept wasn't noticed by anyone outside of the company but it was powerful enough to win them a great contract and defeat more powerful IBM. (Hill, 2010)

3.3. Probability based decision making tool

Hypothetical situation:

You want to play game in which you have 1/10 chance win the price. Every time you play you are investing 1 euro. You can choose between options:

1. If you win, you'll get 9 euro
2. If you win, you'll get 10 euro
3. If you win, you'll get 11 euro
4. You can choose not to play

Notice: you can play as many times as you want.
What would you do and why? What would you expect in the end?

Probability based decision making tool explains: We should always chose option number three - which is offering us 11 euro if we win. We should choose that because we will almost certainly going to make profit if we play long enough (notice: you can play as many times as you want). That is principle of probability - on a huge number every tenth game will be our win. So, if we invest 1 euro per game and we win 11 euro every 10 games it means that there is a great probability that we would make 1 euro profit on every 10 games we play.

Option number one should not be selected because it is certain that we are going to make loss. Option number two should not be selected because we are not going to make any profit - just waste time. Even thou a lot of people would choose option number four because they think it is not calculated risk we should not choose this option because this game is calculated risk and the option number three has a great probability of providing us with profit.

This decision is based on relevant information and probability theory, so we know exactly what we are going to chose, why and what we could expect. It is called calculated risk planning and it is a key part in probability based decision making tool. This thinking pattern should always be used for decision making and all guess based on irrelevant information, fear or current state of mind should be eliminated. (Stankovic, 2012)

People usually don't analyze situation like this and they make decisions based on emotions, current temper or pure guess. This has inspired us to develop this tool which is going to exclude all obstructions and help us make decisions based on a relevant information and probability to achieve the ultimate goal. Sir Richard Branson, the owner of about 400 companies has a motto - "Always take risks, calculated ones". He says that this motto provided him opportunities that lead him to this position. (Branson, Screw it, let's do it, 2010)

3.4. Time management

Experiment:

If we take plastic jar and fill it up with bigger stones people would look it and say that it is full and that you cannot put anything more in it. Then we can insert small stones which would fill up the gaps between bigger stones. Then people would say "Now it's full, in the last iteration we were wrong". Then we could insert sand which would fill up even smaller gaps between small stones. Then people would say "In last two iterations we were wrong - now the jar is full". Then we could insert hot water which would saturate the sand. And then - people would be amazed. After fourth iteration jar is 3 times heavier than after first iteration when people were thinking it was full. (Vasic, Plastic jar experiment, 2012)

In this experiment plastic jar is representing one work shift of 8 hours. In jar we can place some stuff just like in 8 hour shift we can place some activities. Experiment has showed us that we could multiple the effects if we organize the space in optimal order. The same principle could be applied with activities in work shifts. If we analyze and plan our activities right we could dramatically increase efficiency. Usually, people are missing great results because they don't manage their time like they could. First we should accurately plan most important activities which acquire lot of time and energy and then we should fill the gap between these with less important activities which need less time and energy. After they have been planed, we should plan activities which are not critical for our business but could increase our competitive advantage and which could be started, stopped and continued in any time. Nowadays, managers could invest in tablet device and take their business wherever they go and use every free moment to do something useful (while they are in the train they could read emails, while they wait in the line they can analyze reports, while they are waiting for lunch in restaurant they could respond on emails) only this investment can increase their efficiency by 10% or more. Increasing efficiency by 10% is increasing competitiveness by 10%. Regarding the fact that the difference in competitiveness of 2% could mean difference between failure and success we can conclude that this is a great tool for maximizing efficiency and therefore probability of success.

Basic time management tool

This tool is providing basic time management frame which could be developed further and it is applicable to any type of business activity.

1. Apply Importance-urgency principle to your activities
2. Plan and create time management table

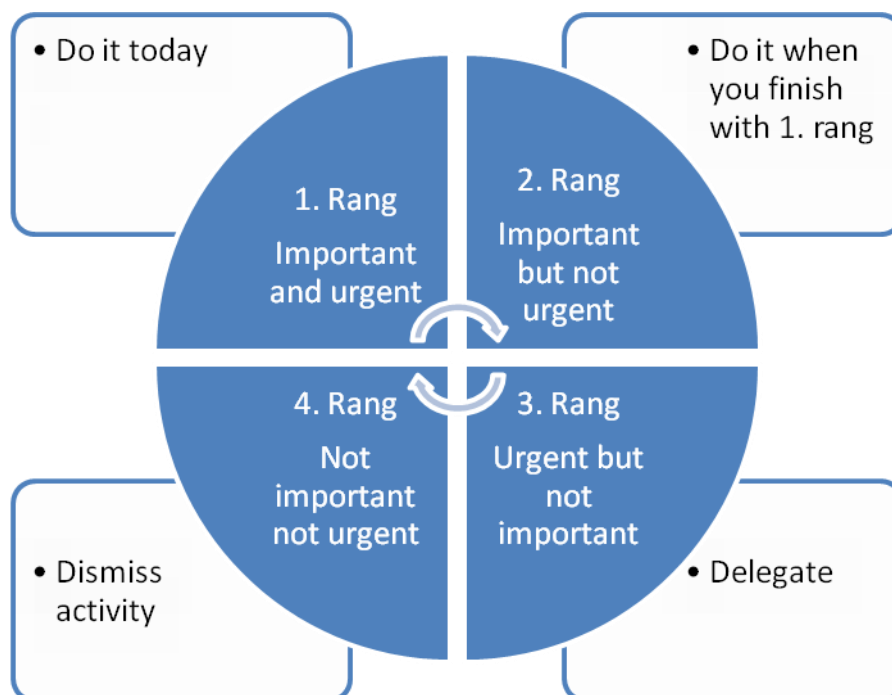


Figure 1: Importance-urgency matrix

Table 1: Time management table

No.	Activity name	Plan	Real	Initiative	Rang	%	Comment
1	Business meeting	20	20	Carlos Clooney	1	100	Successful
2	Activity no. 1	300	290	Eva Jolly	1	100	Successful
3	Activity no. 2	50	60	Everybody	2	90	Net enough time
4	Activity no. 3	50	0	Everybody	4	0	Dismiss activity

- No. Activity numeration
- Activity name Field for writing activity name
- Plan Planned time for activity
- Real Real (used) time for activity. This column is filled at the end of work shift
- Initiative- Name of the employee who is leading and who is responsible for the activity
- Rang From 1 to 4, using Importance-urgency matrix
- % Shows percentage of activity completeness
- Comment For the activity

Columns “Real”, “%” and “Comment” are filled in the end of the work shift. That information is necessary for effectiveness analysis. Looking at columns “%” and “Comment” we are briefly analyzing our effectiveness. If there is activity which wasn’t finished (less than 100 in column “%”) or if the comment isn’t “Successful” we should continue our analysis. If we compare columns “Plan” and “Real” we can control our time assessment. If the time we have estimated is too short or too long we will find a reason and solution for that and apply it to the time management table for the next iteration. Any activity which isn’t 100% done is moving to the table

for the next iteration in order to be finished. Using this principle we are eliminating the chance of forgetting some activities or letting them half done.

Research has shown us that constant rewriting the same activity is increasing the motivation for its realization. That is another psychological benefit. (Vasic, Concept tested in Auto Vasic d.o.o., 2012)

Future research directions: Research will be focused on startups in Serbian market and the concept will be developed further in order to increase probability of success in business.

4. CONCLUSION

Based on information and experiences that were collected in research we have developed a key success thinking pattern. Pattern consists of principles and tools. If applied correctly it will create room for competitive advantage based on advanced self management skills. Advanced self management skills are introducing us to unlimited potential which is waiting to be unleashed from our minds. Our thoughts are a trigger for that unlimited potential. Our thoughts are creating our daily plans which should be mixed with powerful desire and emotion for fulfilling the objectives. As the time passes daily activities are becoming monthly activities, monthly activities are becoming yearly activities and soon it's very clear that our thoughts today create our life tomorrow. Regarding that it's clear that best investment we could make is investing in positive state of mind, inspiration, energy and time management (Hypothesis 1: confirmed). By extending research in Republic of Serbia we have confirmed that understanding and applying described concept has a strong positive influence on success in business (Hypothesis 2: confirmed). The future of business belongs to brave dreamers who are stepping forward when everybody else is finding an excuse, to those who invest when everybody else is afraid to; to those who believe in ideas when everybody else thinks they are wasting time!

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HUMAN RELIABILITY ASSESSMENT APPROACHES AND THEIR USE IN MINING

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Abstract: *Statistics on and experience with accidents and failures of complex systems whose operations depend on human activities and behaviour show that human error is the most frequent and the most important cause. That is why reliability and risk analyses of complex systems need to include human reliability assessment. For that purpose, numerous models have been developed and used in practice and some of them are already established as recommendation or industry standards. This paper presents a review of human reliability approaches based on an insight into open literature. Emphasis is given to human reliability and risk in mining which is traditionally recognized as a very risky industry.*

Key words: *reliability, human error, risk, hazard, safety, mining*

1. INTRODUCTION

Human behaviour is considered to be one of the most important risk factors. Human reliability is not easily predictable since people perform several different functions in more different environments than any other component of a system. In addition, the possibility of a relationship between people and other elements of a system (including other people) is very vast. Therefore it is not possible to eliminate human errors; however, it is possible to evaluate to a certain degree the reliability of people involved in executing a task which they were appropriately trained for and propose change which could increase their reliability.

Human reliability is the probability of accomplishing a specified task successfully by humans at any required stage in system operation within a defined minimum time limit (if the time requirement is specified) (Dhillon, 2009). It is the probability that a person will accurately perform an activity required by the system within the demanded time (if time is a limiting factor) and will not perform unnecessary activities which could jeopardize the system (Swain&Guttman, 1983).

Human error is the failure to lead planned actions to desired events without the influence of unpredicted events (Reason, 1990). The same author uses the term "unsafe act" for describing errors and breaking rules by individuals which lead to hazardous events. Human error is the failure to perform a specified task (or the performance of a forbidden action) that could result in disruption of scheduled operations or damage to equipment and property (Dhillon, 2009).

Kletz (1976) points out that "To blame human error for accidents is as superficial and unhelpful as to blame gravity for falls". Therefore, the task is to identify the potentials for human error, and subsequently manage so as to prevent errors. In order to successfully manage errors, it is necessary to recognize and classify them.

2. HUMAN ERROR

Human errors can be viewed as a breakdown within an individual's mental activity and it can occur in attention, memory, retention, decision making, etc.

According to the level of cognition involved behaviour is divided into three categories (Rasmussen, 1982): skill-based, rule-based, and knowledge-based. Skill-based behaviours take place at an unconscious level and are often automated in nature. Rule-based behaviours deal with the application of learned rules, so errors occur when an individual uses the wrong rule or misapplies a good rule. Knowledge-based behaviours refer to novel instances where an individual must apply previous knowledge. These tasks require high mental activity which can cause problems in unusual emergency situations and errors occur due to a lack of training or information.

Human errors can be classified into two categories (*User's Manual*, 1983): situation-caused errors (SCEs) and human-caused errors (HCEs). SCEs are errors that are caused primarily by factors related to the design of the work situation. HCEs are errors with primary causes related to some human characteristic, such as sabotage or intentional errors.

Sater and Alexander (Sater&Alexander, 2000) categorized human error as errors of omission, commission, or substitution. Errors of omission occur when an individual fails to perform a required task. Errors of commission occur when the individual carries out an action in either the incorrect manner or at the incorrect time. Substitution errors arise when an individual carries out the incorrect actions.

One other classification is given in (McKenney&Roberts, 1997): omission - failure to perform an action, absence of response; wrong timing - action performed but not at, or within the proper time; extraneous act - unnecessary action not required by procedure or training; transposition - correct action but on wrong unit, system, or component; wrong selection - selecting the wrong item, control, action, etc; wrong sequence - performing the correct actions but in the wrong sequence; miscommunication - not communicating or receiving information correctly, or failing to communicate or receive at all; quantitative error - performing the task to excess, or insufficiently; qualitative errors - not performing the task to the quality required; other - anything else.

3. HUMAN ERROR TAXONOMIES

Human error models, taxonomies and classification systems have been developed in attempts to understand the causes of human error. These models include: the cognitive perspective, the ergonomic perspective, the behavioural perspective, the epidemiological perspective and the psychosocial perspective (Patterson, 2009). Newer models as *SHEL*, *ICAM*, *BeSafe*, *Wheel of Misfortune*, *SCM*, *HFACS*, tend to look at accidents as a result of a combination of causes that interact with each other, so they have moved from focusing on a single element of accident causation, to looking at the system as a whole and they represent a systems or organizational approach to accident investigation (Patterson, 2009).

Software Hardware Environment Liveware (SHEL) was developed to encompass human factors into system design (Patterson, 2009). The model describes human-machine interactions and identifies where areas of failure can occur. Failures are: software, hardware, environment conditions, and liveware. Software refers to the documents, policies, regulations, and standards; hardware is composed of the physical resources; environmental condition refers to the physical environment; liveware includes people who are involved with the system. Failures occur in the system when any one of the components or the connections between components fails.

Incident Cause Analysis Method (ICAM) is based on three main beliefs: 1) the root causes of all accidents can be linked to organizational deficiencies, 2) human error is inevitable and must be accepted, and 3) if an organization is serious about accident reduction then new approaches must be used, and one must learn from past mistakes (Patterson, 2009). ICAM includes establishing the facts, identifying contributing factors and latent conditions, reviewing the adequacies of existing controls and procedures, reporting the findings, recommending corrective actions, detecting organizational factors that can identify recurring problems, and establishing key learned facts that can be distributed across the company. It is very important to point out that the purpose of ICAM is not to measure the guilt and responsibility for errors, but to use errors to learn from them.

The Behavioural Safety (BeSafe) method is an example of an accident investigation technique that attempts to identify, through the use of ergonomics tools, the latent causes of accidents (Patterson, 2009). The goal is to identify areas where human error is possible before any errors occur.

Wheel of Misfortune is taxonomy with three concentric spheres representing the actions of the front line operators, local conditions, and organizational conditions (O'Hare, 2000). The central sphere represents local conditions and it is used to explain what happened. The next sphere shows organizational conditions, and the outer represents the interactions with the environment and these two spheres help define why an accident occurred.

In **Swiss-Cheese Model (SCM)** accidents result from a breakdown within the system which are a combination of active failures and latent conditions (Reason1990, 1997). Active failures are the unsafe acts of those directly in contact with the system and are most often associated with accidents. These failures can

be classified as errors or violations and intended or unintended actions. Unintended errors are classified as slips and lapses and they are associated with automatic actions and include result from memory or attention lapses. Intended errors are classified as mistakes which occur when an the individual fails to carry out the action as intended or carries the action out as intended, but the action was the incorrect response for the situation. Violations are intended actions that are carried out with wilful disregard to the established rules and regulations. Latent conditions of a system often go unnoticed until an adverse event occurs. These latent conditions take two forms, those that create error provoking conditions and those that create weaknesses in system defences. Reason reviewed this model several times, but each version defines the relation between active failures and latent conditions. The first version divides the system into five sections: the supreme decision makers, line management, preconditions for unsafe acts, production activities and defence. "Swiss cheese" occurs when "holes" appear in sections. The second version comprises three basic sections: organization, task/environment and individual, and the defence section expanded over these three basic sections. The third version of the section is presented by barriers, control, defence and protection of the system. An explanation of how "holes" occur is also added.

The Human Factors Analysis and Classification System (HFACS) was developed for use with the US Navy to define the latent and active failures that were identified in Reason's SCM (Patterson, 2009). Patterson was modified HFACS into Human Factors Analysis and Classification System - Mining Industry (*HFACS-MI*) with the input of end users to better correlate to the mining industry. *HFACS* classifications and *HFACS-MI* modification (in brackets) are given as follows:

1. unsafe acts
 - 1.1. error
 - 1.1.1.skill-based (routine disruption errors)
 - 1.1.2.decision
 - 1.1.3.perceptual
 - 1.2. violation
 - 1.2.1.routine
 - 1.2.2.exceptional
2. preconditions for unsafe acts
 - 2.1. environmental factors
 - 2.1.1.physical environment
 - 2.1.2.technological environment
 - 2.2. conditions of operator
 - 2.2.1.adverse mental state
 - 2.2.2.adverse physiological state
 - 2.2.3.physical/mental limitations
 - 2.3. personnel factors
 - 2.3.1.crew resource management (communication and coordination)
 - 2.3.2.personal readiness (fitness for duty)
3. unsafe supervision (unsafe leadership)
 - 3.1. inadequate supervision (inadequate leadership)
 - 3.2. planned inappropriate operations
 - 3.3. failed to correct problem
 - 3.4. supervisory violations (leadership violations)
4. organizational influences
 - 4.1. resource management
 - 4.2. organizational climate
 - 4.3. organizational process
5. (outside factors)
 - 5.1. (regulatory factors)
 - 5.2. (other factors)

4. HUMAN RELIABILITY ASSESSMENT

By analogy of general reliability calculation model, human reliability for simple tasks is calculated as (Dhillon, 2009):

$$P(Y) = \lim_{m \rightarrow \infty} \left(\frac{M}{m} \right) \quad (1)$$

where $P(Y)$ is the probability of occurrence of event Y , and M is the total number of times that Y occurs in the m repeated experiments.

When time to human error is described by statistical distributions such as normal, gamma, exponential, Weibull, and Rayleigh, for computing human reliability Dhillon (2009) suggests the use of the well-known general expression (2), irrespective of whether the human error rate is constant or not:

$$HR(t) = e^{-\int_0^t \lambda(t) dt} \quad (2)$$

where $HR(t)$ is the human reliability at time t and $\lambda(t)$ is the time-dependent error rate.

Human reliability assessment (HRA) deals with the impact of humans on system performance and can be used to evaluate human error influences on the system (ISO 31010, 2009). HRA can be used qualitatively to identify the potential for human error and its causes so the probability of error can be reduced, or quantitatively to provide data on human failures. Inputs to HRA include: information to define tasks that people should perform, experience of the types of error that occur in practice and potential for error, expertise on human error and its quantification. Outputs include: a list of errors that may occur and methods by which they can be reduced – preferably through redesign of the system, error modes, error types causes and consequences, a qualitative or quantitative assessment of the risk posed by the errors. The HRA process is as it is shown in the Figure 1:

Problem definition, what types of human involvements are to be investigated/assessed?

Task analysis, how will the task be performed and what type of aids will be needed to support performance?

Human error analysis, how can task performance fail: what errors can occur and how can they be recovered?

Representation, how can these errors or task performance failures be integrated with other hardware, software, and environmental events to enable overall system failure probabilities to be calculated?

Screening, are there any errors or tasks that do not require detailed quantification?

Quantification, how likely is individual errors and failures of tasks?

Impact assessment, which errors or tasks are most important, i.e. which ones have the highest contribution to reliability or risk?

Error reduction, how can higher human reliability be achieved?

Documentation, what details of the HRA need to be documented?

Health and Safety Executive in its research report for health and safety in laboratories gives the most detailed list of methods for human reliability assessment, followed by a brief overview of tools (methods) which are potentially useful. The majority of methods are developed to be applied in nuclear industry, and methods for general application are Human Error Assessment and Reduction Technique (HEART) and Absolute Probability Judgements (APJ) (Bell & Holroyd, 2009).

HEART is designed to be a quick and simple method for quantifying the risk of human error. It is a general method that is applicable to any situation or industry where human reliability is important. The method is based on premises (Bell & Holroyd, 2009):

- Basic human reliability is dependent upon the generic nature of the task to be performed
- In 'perfect' conditions, this level of reliability will tend to be achieved consistently with a given nominal likelihood within probabilistic limits

- Given that these perfect conditions do not exist in all circumstances, the human reliability predicted may degrade as a function of the extent to which identified Error Producing Conditions (EPCs) might apply.

There are nine Generic Task Types described in HEART, each with an associated nominal human error potential (HEP), and 38 Error Producing Conditions (EPCs) that may affect task reliability, each with a maximum amount by which the nominal HEP can be multiplied. The key elements of the HEART method are: classify the task for analysis into one of the nine Generic Task Types and assign the nominal HEP to the task, decide which EPCs may affect task reliability and then consider the assessed proportion of effect for each EPC, then calculate the task HEP.

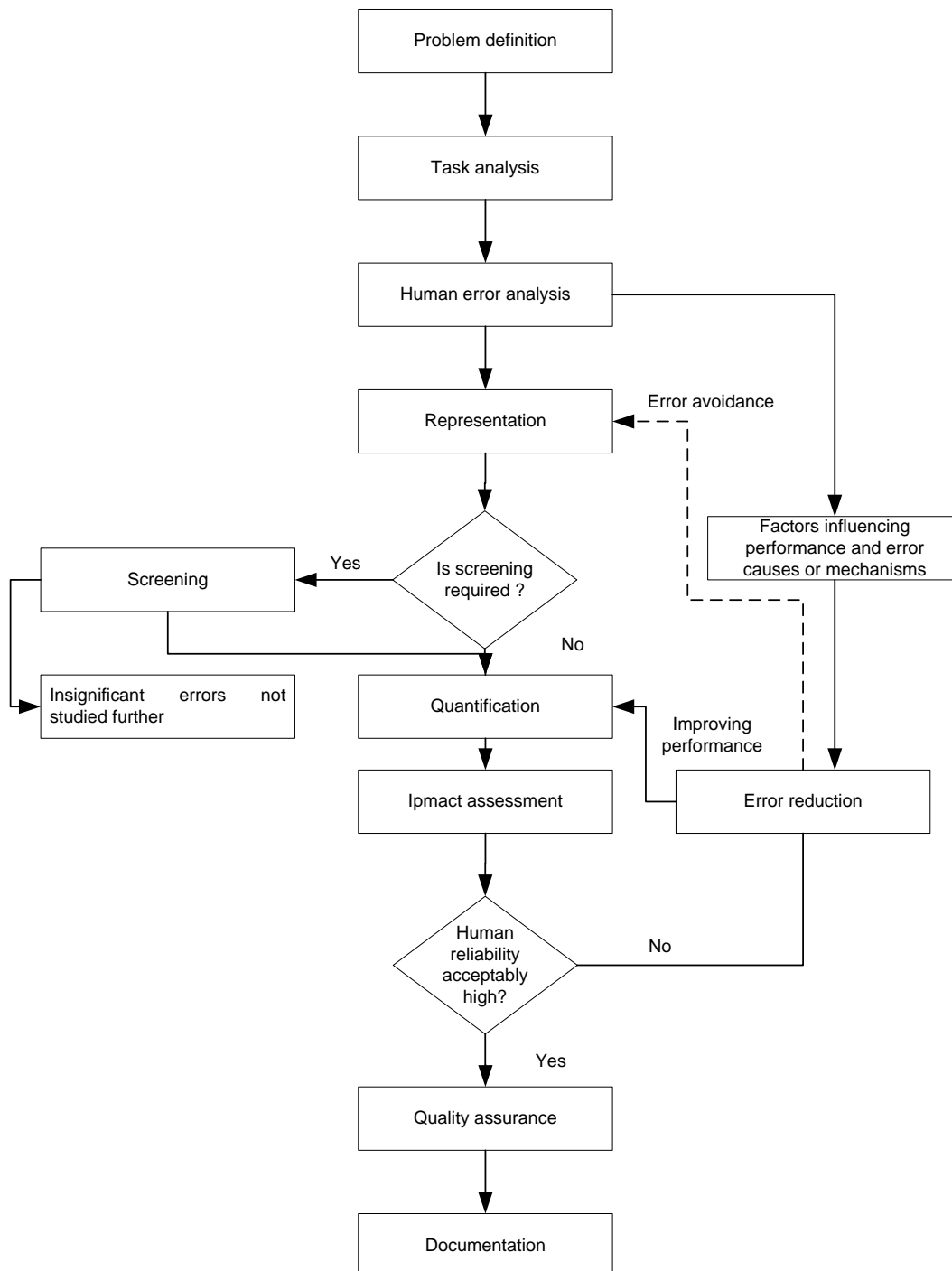


Figure 1 Human reliability assessment

APJ approach is conceptually the most straightforward human reliability quantification approach. It simply assumes that people can remember, or even, directly estimate the likelihood of an event, in this case, a human error (Bell & Holroyd, 2009). There are different APJ approaches that can be applied to determine human reliability: Aggregated individual method where individuals make their estimates individually and then a geometric mean of these estimates is calculated; Delphi method where individuals make their estimates independently of each other, but the assessments are then shared, allowing the experts to reassess their own estimates based on the new information; Nominal group technique where experts are given the opportunity to discuss their estimates and confidentially re-evaluate their assessment, Consensus-group method where experts meet and discuss their estimates, following which a consensus on an agreed estimate must be reached.

Steps to the APJ procedure are (Bell & Holroyd, 2009):

1. Select the subject-matter experts (SMEs). The SMEs should be familiar with the tasks being assessed and as many assessors as practically possible should be included. When discussions are required to reach a consensus the number of assessors would preferably be around 4-6 people.
2. Prepare the task statements. The clearer the task definitions the less they are open to individual interpretation.
3. Prepare the response booklets. The response booklets should include scale values that reflect the estimated range of the true probabilities of the tasks.
4. Develop instructions. The response booklet should include clear instructions for the SMEs.
5. Obtain judgements. SMEs are encouraged to work through the response booklets, starting with the tasks that they feel confident assessing.
6. Calculate inter-judge consistency. To determine the levels of consistency between SMEs an analysis of variance would be performed.
7. Aggregate the individual estimates. This is achieved by calculating the geometric mean.
8. Uncertainty-bound estimation. Uncertainty bounds may be calculated using a form of Seaver and Stillwell's (1983) formulae or alternatively SMEs can be asked to estimate the confidence intervals, the estimates being aggregated statistically.

5. HUMAN RELIABILITY ANALYSIS IN MINING

Safety issues in mining industry have been considered from ancient times. Henry Fayol, as a mine engineer, proposed safety function as an obligatory function within enterprise. For the purpose of providing high level of safety in mining industry there exist many standards and bills. Reliability issues have been considered more or less deeply. In manual (*User's Manual*, 1983) for human reliability analysis in mining, the following procedure was proposed:

1. Description of the system goals and functions in order to determine the position of humans in a system and their operational connections with other system elements, regardless of whether it is equipment or other people.
2. Description of the situational characteristics – comprises factors which influence the mode of executing a task. The factors can be categorized in three groups
 - 2.1. external factors - those outside the individual:
 - 2.1.1. situational characteristics – architectural features, quality of environment, working hours, availability/adequacy of special equipment, organizational structure, actions by supervisors, co-workers, union representatives and regulatory personnel, rewards, recognition, benefits
 - 2.1.2. Job and Task Instructions - procedures required, communication, cautions and warnings, work methods, plant policies
 - 2.1.3. Task and Equipment Characteristics, – perceptual requirements, motor requirements, control-display relationships, anticipatory requirements, Interpretation, decision making complexity, narrowness of task, frequency and repetitiveness, task criticality, long and short term memory, calculation requirements, feedback, continuity, team structure, man-machine Interface
 - 2.2. internal factors – certain skills, abilities, attitudes and other human attributes a person comes to the job with:
 - 2.2.1. physiological factors - previous training, state of current practice or skill, personality and intelligence variables, motivation and attitudes, knowledge of required performance, standards, physical condition, attitudes based on influence of family and other persons or agencies, group identification
 - 2.3. stressors:

- 2.3.1. psychological – suddenness of onset, duration of stress, task speed, task load, high jeopardy risk, threats, monotonous, degrading or meaningless work, conflicts of motives about job performance, reinforcement absent or negative sensory deprivation, distractions, inconsistent cueing
- 2.3.2. physiological – duration of stress, fatigue, pain or discomfort, hunger or thirst, temperature extremes, radiation, g-force extremes, atmospheric pressure extremes, oxygen insufficiency, vibration, movement constriction, lack of physical exercise
3. Description of the Characteristics of the Personnel comprises defining skills, fitness, experience and motivation of personnel, their abilities and limitations, which is compared with the requirements of the job position.
4. Description of the Jobs and Tasks that the Personnel Perform is a detailed analysis of tasks and jobs.
5. Analysis of the Jobs and Tasks to identify error likely situations and other problems
6. Suggesting of Changes to the System combines the results in order to analyze and give proposals for improvement.

McKensey and Roberts (McKensey&Roberts, 1997) suggested the method of Potential Human Error Identification as adaptation of *Hazardous Human Error Analysis*. This method is undertaken with a team, which should include people who can answer technical questions, who are familiar with the duties of people in relation to the machinery, and who are aware of the types of accident which people can have with plant and equipment. Typical applications include:

- identification of a single risky activity where there is potential for human error leading to serious consequences;
- identification of the potential for human error when studying the risks associated with mining equipment or machinery;
- identification of the potential for human error when studying the risks associated with a modification to a procedure or to equipment or machinery where there is potential for human error with serious consequences.

The study takes the following form:

1. The team is briefed on the equipment, and on the tasks undertaken by people around it.
2. A list is then compiled of the key tasks performed, each of which is then subdivided into sub-tasks and possibly into elements.
3. Each task element is then studied in turn by the team, using a checklist of possible types of human error, such as described in the previous chapter
4. Then the team discusses:
 - 4.1. *What are the possible root causes of such an error?*
 - 4.2. *What factors could increase or decrease the likelihood of the error occurring?*
 - 4.3. *What actions or factors could increase or decrease the consequences if the error occurs?*
 - 4.4. *What existing safeguards exist to prevent the error being made, or the adverse consequences resulting?*
 - 4.5. *What additional safeguards could be suggested to prevent the error being made, or the adverse consequences resulting?*
 - 4.6. *What actions are needed, in the light of the foregoing discussion?*

6. CONCLUDING REMARKS

The fact that inappropriate behaviour and errors of humans are the most important causes of system failures and accidents has influenced that great attention has been devoted to human reliability issues in research and practice work. As a result, numerous models and methods for human reliability analyses and assessment exist as well as manuals, recommendations and parts of reliability and risk standards. However, development of new models and methods remains a challenging theoretical task. An open issue is how organization and national culture influence human reliability models. Consequently, the issue is whether there is a general mathematical model for human behaviour which could be directly implemented in practice.

From the practical point of view, application and implementation of existing manuals and standards are of the most importance. In this context, the lack of a reliable statistical database of human errors and reliability is a very limiting factor.

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RESEARCH ON COMMUNICATION WITHIN THE SERBIAN DIASPORA

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Abstract: *Considering a large number of people of Serbian descent who live, work or study abroad, issues like their networking, institutional organization and joining forces and efforts in order to achieve mutual cooperation, the preservation of national identity and help in the economic and cultural development of the country of origin are very popular nowadays. The paper emphasizes the importance of formulating and implementing appropriate communication strategies within the diaspora, in order to improve internal connections and further strengthen the overall relations among the diaspora members.*

The main purpose of the research, which is an integral part of this paper, is to define the existing level of internal coherence and cooperation among members of the diaspora, through conducting an adequate kind of survey.

Key words: *internal communications, networking, diaspora*

1. INTRODUCTION

In the broadest sense diasporas are understood as self-identified cultural communities living outside the country of origin, but remains connected to their home countries (Fullilove, 2008). Simple and concise definition of diaspora would be: "The population scattered for any reason, in several places of residence" (Yossi, Aharon, 2003). According to Filipovic (2011) members of diaspora (diasporans) of a particular nation are "all those people of its descent and heritage living outside the country and territories where they are autochthonous population, irrespective of their citizenship, ability to speak the language, birthplace of their ancestors, the number of generations since emigration and who consider the state at issue as their Motherland, and remain committed to contribute to its prosperity through organized transnational endeavors". In recent literature, attention is especially paid on intellectual diasporas, defined as self-organized communities of expatriate scientists, engineers and professionals living in developed countries and working to impact development of their home country or region, mainly in science, technology and education (Barre et al., 2003). Features that distinguish diaspora are very strong connection among members of the same nationality outside the home country, a strong sense of nostalgia about the country, in pursuit, even irrational, to return to their country and desire to participate in the events which characterize the home country (Nielsen, Riddle, 2009).

From historical point of view, Serbia is one of the well known emigrational areas in the world, with one of the largest diasporas. As most of the diasporas of the world, the Serb diaspora was formed as a combination of voluntary and forced migrations, which occurred in several waves, four of them in the last hundred or so years. Serbian numerous communities of diasporans, dispersed around the world together with Serbs who live on territory of former Yugoslavia and countries in the region count almost four million people. Any individual who leaves the country of origin for it inevitably represent a loss, with the emphasis on experts in various fields, academics and many young people going to study or work abroad. There are more than six thousand and four hundred PhDs and doctorants among them, many of whom work at most famous research institutions (Filipovic, 2011), so it is certain that Serbia suffers from a chronic "brain drain". Although the state and its institutions work on development and implementation of strategies to motivate the return of expatriates in the country, it is evident that results do not meet the expectations. Taking into account poor economic situation in the country, high unemployment and low average wages, it is understandable why. The conversion of loss of the human capital into new possibilities and opportunities has become a topic of great interest in the world, including Serbia.

Diaspora can contribute to its motherland financially, socially and emotionally (Nielsen, Riddle, 2009). Kuznetsov (2008) states that: "Diaspora members can be useful to their home countries in two broadly defined modes of involvement: "discussions" and "transactions". "Discussions" include web sites, conferences, workshops, online communications and other activities helping diaspora members get to

know each other, connect with each other and define in which way they can contribute to the development of their home countries. "Transactions" involve actions usually requiring time commitment and sometimes, although not necessarily, or even desirably, monetary contributions" (p.275). Networking of members of the diaspora scattered around the world, their institutional organization and action towards realization of common goals is crucial for the matter. Only by increasing their internal connectivity, based on effective communication process, important goals can be reached, not only for individuals, organizations or associations in diaspora, but also for Republic of Serbia. Diaspora can be seen as the unrealized potential of the Serbian state and new, so far under-used channels of communication will help to mobilize this huge resource. Starting from publications and research papers conducted in recent years by state institutions, nongovernmental organizations and individuals in Serbia, this paper attempts to highlight the current situation in the area of internal connectivity among members of Serbian diaspora. Therefore, the overall objective of this study is finding adequate channels of communication with the target group of diaspora. Fazal and Tsagarousianou (2002) write: "With the spread of new technologies, diasporic communities have often developed virtual connections and a host of Information and Communication Technology - premised resources" (p.16). Internet and new technologies certainly help creation of new communication channels and improve relationships within the target group, enabling contacting and networking. Elaboration of strategies, activities and measures that will significantly contribute to the most optimal use of human resources in the diaspora should be directed in order to enhance and support development of Serbia. Diaspora networks are intended to improve and speed up communication and exchange of information and resources among members living dispersed from each other, as well as, among diasporans and their associates in the country of origin.

This so-called "network access", extensively used in the formation of diaspora networks in the past two decades, benefits the countries of origin, and brings many benefits for individuals in the diaspora. These networks are presented as a great help to migration process. Those who have already emigrated provide significant sources of data to those who intend to do the same. Those personal links can be used to avoid or reduce risks and costs of migration: legal and technical information on the procedures, financial aid, prospects for employment, administrative assistance, physical accompaniment, emotional solidarity and so on. The impact of these networks on migration flows is also one of their roles, as immigrants are a "bridge" for newly arrived immigrants - both in geographical terms (receiving country) - and in terms of fields of work (employment conditions) and housing (Grecic, 2010). Networks of this type around the world have arisen spontaneously and independently from each other, they are all different and heterogeneous. They differ in size, range, objectives, structure and activities.

2. CHANNELS OF COMMUNICATION

Internal communication has very important role in networking of diaspora community members around the world. These activities are usually carried out by the various organizations, whether at the level of individual countries, whether at the global level. In order to pursue planned strategies and activities of public relations it is necessary that, first of all, each of these organizations and associations determine target group of the public. Diaspora, by itself, covers a large human capital, so, every organizational subject must define the criteria to perform segmentation of target groups. For organizations that are limited exclusively to the territory of certain countries or continents, geographic segmentation is relevant, if their potential membership does not require certain profile and they want to address only to the target public on a particular territory. Demographic segmentation is the key determinant if the segmentation is based on age, gender, or, for example, the time of immigration. In addition, psychographic segmentation is also an essential element and shows common characteristics of groups based on education, membership of social class, occupation. The main task of any institutional form is to detect communication habits of its target group and reconsider the possibilities of restoration of communication link or improvement of existing relationships (Filipovic, Kostic-Stankovic, 2011).

Tsagarousianou (1999) states that medias in diaspora: "might be a valuable cultural and political resource available to minority groups, by instituting public spaces of representation and participation and creating an opportunity structure for cultural and political expression, dialogue and self-definition by members of ethnic communities"(p.57). Research about medias in diaspora, conducted in 2007 by Serbian Ministry of diaspora, shows that most respondent's access media content via the Internet. This category includes Internet radio and television, websites, blogs, magazines, newspapers that have on-line form, social networks. One-third of diaspora members cited that print media also have an important place. Furthermore, results show that younger members of the diaspora more often use the Internet for the purpose of informing than the elderly. This research has also shown that the most important mission of all

media in diaspora is "identity preservation". About 70 percent of media representatives marked this response. There are no differences depending on type of media: print, electronic and "new" media alike emphasize the mission of "preserving identity." In second place there is "information on events in the community" (50 percent of all media), and the third refers to "preserving and strengthening the Orthodox faith." The most frequent topics of Serbian diaspora newspapers are current happenings in Serbia, topics related to local Serbian community or country in which Serbian minority lives. In another study that was conducted same year by the "Strategic Marketing" agency, diaspora representatives cited: television, Internet and press as three most common source of information about political events, events in the economy, culture and sport.

Results of previous researches suggest that it is necessary that diaspora organizations form their own web sites, which will provide potential members and other parts of interest with accurate information about their own activities, goals and plans, and any other information of relevance. Sites must be regularly updated and there must be people in charge to communicate with all stakeholders. Communication with members must be regular, conducted by telephone, e-mail or personal contact, to ensure their commitment to joint tasks. In addition, by using modern technologies, organizations can create content of mass communication and reach a much wider audience with a significantly lower cost than by using of traditional media. Organizations can communicate with target audiences through email, online forums and other interactive media. Interaction, as the way of presenting information from various perspectives, builds a sense of community among users, in the same way people share their life stories and experiences. Opportunities that social media provide to an organization are: careful listening to their target group, objective insight into its reputation, understanding the target audience, identifying PR opportunities, direct communication with individuals, getting positive feedback and immediate identification of crisis situations, the use of e-learning activities. For all these reasons social media are very important communication tool among members of diaspora network who are spatially far apart. This method of disseminating information enables the influx of new ideas, dialogues and discussions among themselves and among them and their counterparts in the homeland.

Preferably, organizations should issue internal sheets, brochures or leaflets, available to all interested parties. Newspapers (newsgroup or newsletter) should be published in paper and / or electronic form, as tool of improvement of internal communication among network members and updating project plans and the latest developments in the country of origin, as well as publishing results of current researches.

Organizing special events, such as various conferences, seminars, workshops, celebrations and mass gatherings of the similar type is also a significant aspect of development and improvement of direct communication among members, sharing ideas, planning and finding ways to improve cooperation. These events are organized once or several times a year by the individual organizations and require preparation of several months, planning agenda, and all other elements (making a list of guests, making a call, informing the media, providing space, materials preparation, etc.). Many diaspora organizations choose to organize such events in Motherland, which allows gathering of diaspora members with relevant interlocutors in the country and their compatriots from other states. Events of this type bring together from 500 to 2000 people and usually take place during the period of summertime - June and July, when representatives of diaspora most often visit their home country, and during winter period around Christmas and New Year holidays. Organization of these special events is conducted by individuals within a specific network, in charge of these tasks, and rarely, by specialized agencies. Objectives of such special events are following: improvement of the image of exact network, getting in contact among certain groups of people, making the public familiar with activities of an organization, engaging participants in special in some projects, creating a positive echo in the media etc.

3.METHODOLOGY AND RESEARCH OBJECTIVES

The survey was conducted in attempt to determine the level of existing internal connection within Serbian diaspora, by polling a representative sample during the period June-September, year 2011. It was conducted in two stages. The first included personal contact with respondents at two special events of diaspora, Assembly of Serbs in diaspora and region and the Conference of Young Leaders in the Diaspora. 56 respondents were interviewed this way. The second stage included sending electronic versions of the questionnaire on e-mail addresses of respondents. 68 members of the diaspora were interviewed in this stage. The questionnaire contained questions relevant to the field of internal communication and the results of this study portray the current state of internal coherence and level of interaction from the perspective of respondents and correlation of key concepts and variables.

The main aim of the research was to examine the level of integration and communication methods of intellectual diaspora, while specific objectives of the research were to:

- Analyse demographic profile of the sample
- Determine the frequency and modes of communication of diaspora
- Establish a possible correlation among different variables
- Determine the percentage to which respondents belong to various organizations and associations
- Find out whether there is a developed cooperation with the home country and its institutions
- Show out the attitude of respondents regarding the future cooperation with the motherland

3.1. Sample description

The sample includes 124 participants - members of Serbian intellectual diaspora. The sample was gender-unequal: 37 respondents (29.8%) were female and 87 respondents (70.2%) were male. Subjects were classified into four categories according to age, as follows: 50 respondents (40.3%) were younger than 30; 40 respondents (32.3%) were aged 30 to 40; 18 respondents (14.5%) were aged 40 to 50 and 16 respondents (12.5%) had more than 50. The highest percentage of women in the sample (38%) is under the age of 30, while the majority of men (82.5%) aged between 30 and 40. Subjects were classified into four categories by level of education: students - 11 respondents (8.9%); with a university degree - 60 subjects (48.4%); with the title of Master - 36 respondents (29%); with the title of PhD - 17 respondents (13.7%).

For easier data processing, respondents were categorized by regions in the following way: European countries (36.3%); countries in the region (Slovenia and autochthonous population -13.7%); United States, (17.7%); Australia (21%); Canada (8.9%) ; Africa (1.6%); Asia (0.8% of the sample).

Based on the length of living abroad, most of respondents answered "more than 15 years" - 45, 2%, while the remaining three categories are relatively uniform: 21% answered "10 to 15 years"; 17.7% "from 5 to 10 years" and 16.1% "less than 5 years".

3.2. Results and discussion

Results of the survey showed that most women and men were connected with more than 50 people of Serbian descent who also live abroad. The results also show that the majority of respondents, regardless the age, were in contact with more than 50 people of Serbian origin in a country where they live and work. By comparing the education level of respondents and the number of people of Serbian origin with whom they were in regular contact following results were obtained: students were mostly in contact with 20 to 50 people (63.6%); respondents with a university degree were mostly in touch with more than 50 people (66.7%); the majority of respondents who have completed a master's degree (47.2%), and the vast majority of those with a doctorate (88.2%) maintained contact with more than 50 people. It can be concluded that people of Serbian origin who live somewhere abroad try to connect and make contact with as many Serbs as possible. It supports the idea of building large and solid diaspora networks.

Both, men and women, stated using all communication means offered in the questionnaire Internet, telephone and direct "face to face" communication. As an alternative means of communication and making connections respondents cited meetings, conferences, seminars and parties arranged by organizations and associations in diaspora. The combination of all these channels of communication is characteristic to respondents of all ages and levels of education.

As for the frequency of meeting the other Serbs in the countries they live, the majority of women, 40.5% quoted "once a month", while the largest number of men, 50.6%, rounded out the option "once a week" (Figure 1).

As for the relationship between age and frequency of meeting the other Serbs in the countries they live in, following results were obtained: half of those respondents who were younger than 30 rounded out "once a week"; the majority of respondents from the category between 30 to 40 (42.5% of them) also marked "once a week", as well as 56.25% of respondents older than 50. The majority of those who are between 40 and 50 (66.7%) reduced the frequency of seeing to once a month. Research had shown that the frequency of meeting with other people of the same origin differ by regions. The largest number of

respondents who live in European countries the frequency of seeing reduced to once a month (55.5%). Most Serbs living in the region rounded out "once a week" (59.2%). This applies also to the United States and Australia, despite the dispersion of those diaspora segments. In this way, answered 45.4% of respondents from the U.S. and up to 80% from Australia. Regarding Canada, the same number of respondents, 36.4% , voted for option seeing "once a week" and "once every few months". The respondents who come from Africa rarely arrange meetings with other Serbs, once every few months or even once a year. Respondent from Asia marked "once a week" (Figure 2).

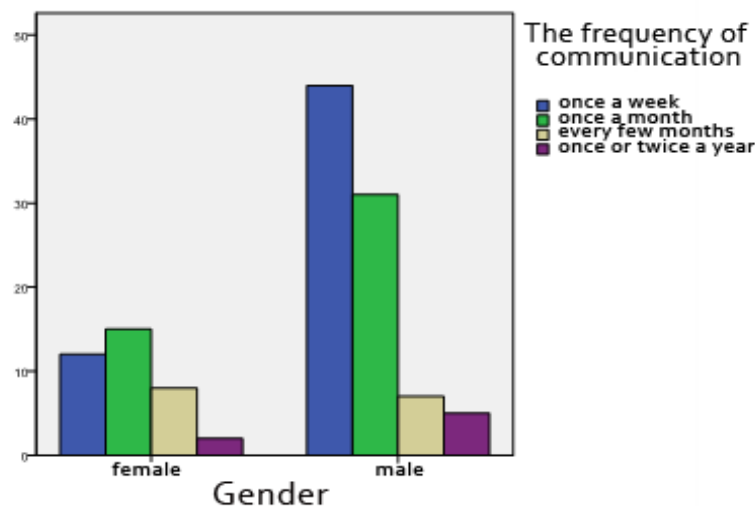


Figure 1: The frequency of communication by gender of respondents

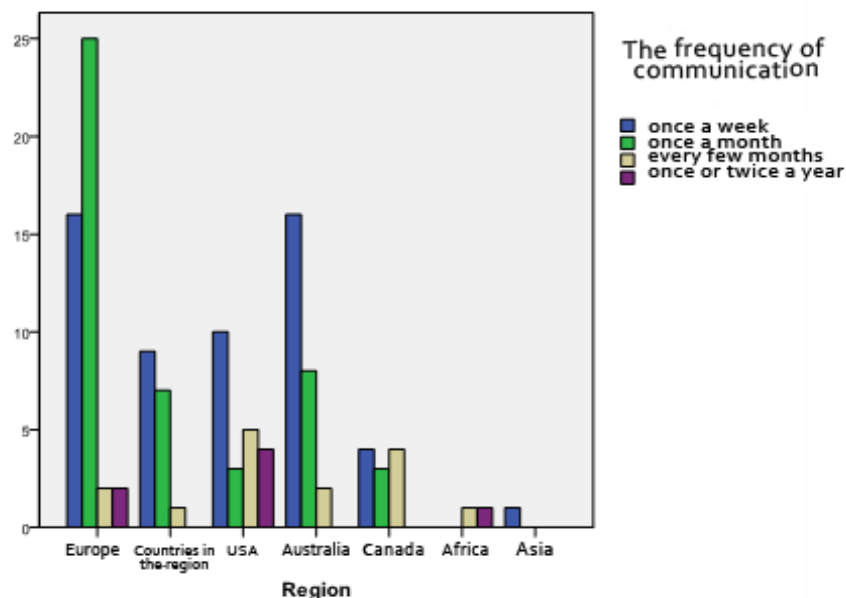


Figure 2: Frequency of communication by region

The survey results showed that male respondents in a much greater number joined up various organizations and associations of Serbs (77%) than female ones (23%). Most of respondents of all ages were members of at least one such organization or club - 64% younger than 30, 75% of respondents aged 30 to 40, 72.2% of respondents aged between 40 and 50, and 75% older than 50. Majority of respondents, regardless of the level of education, declared themselves as members of at least one Serbian diaspora association: 90.9% of students; 63.3% persons with a university degree, 61.1% with Master's degree, and all 100% of Ph.Ds. These findings are significant because previous researches of various authors had shown that only 12% of Serbs in diaspora were willing to join some expatriate network. 80% of

respondents living in one of the European countries were members of Serbian association or organization; and 64.7% of Serbs in the region; 54.5% in the U.S; 76.9% from Australia and 63.6% from Canada. None of the subjects from Africa were members of any organization. Respondent from Asia answered positively. As, all categories of respondents mostly identified themselves as network members, the results of this study clearly indicate high level of connectivity, networking and acting towards common goals.

Regarding business cooperation with other Serbs in diaspora as seen by education level, the results were following: 54.4% of those whose studying abroad was still in progress at the time of survey, so far had achieved business cooperation with fewer than 10 people; 56.7% of persons with university degrees cooperated with up to ten other Serbs, as well as 47.2% of those with MSc degrees. Finally, 64.7% of PhDs quoted business cooperation with more than 30 Serbs abroad. The fact that the respondents with the PhD were pointed out here could be explained by the fact they mutually associated and jointly engaged in the field of scientific and research work (Figure 3).

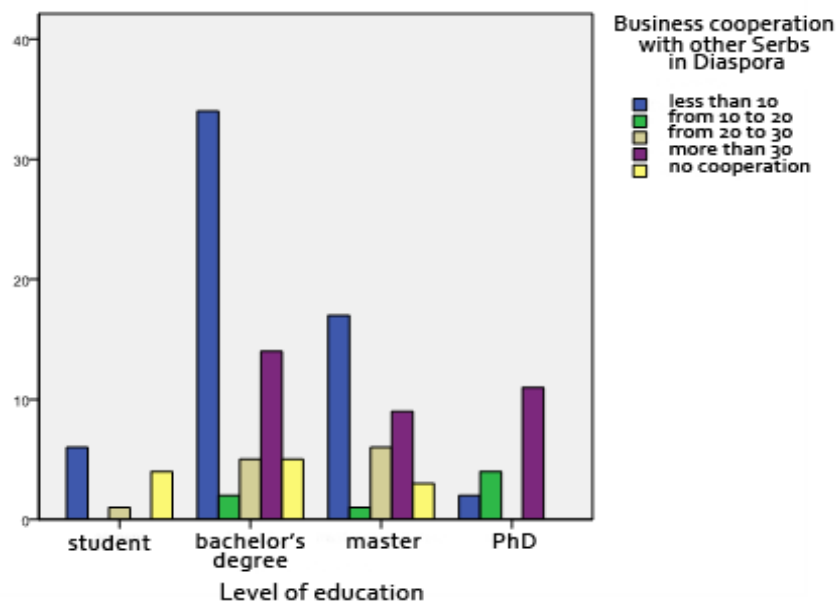


Figure 3: Relationship between education and business cooperation

The largest number, 72% of respondents younger than 30 years cooperate with fewer than 10 Serbs. No cooperation with any person of Serbian origin has 10% of this age group. 35% of respondents aged 30 to 40 do some business with more than 30 people of Serbian descent, while 10% do not cooperate at all. 59% of respondents aged 40 to 50, also do some business with more than 30 people of Serbian origin, while 16.6% do not cooperate at all. All respondents within age group over 50, pleaded business and cooperation with other Serbs, 56.25% of them even with more than 30 people of Serbian descent. It was shown that younger respondents, who were still students or just started their careers didn't have an extensive business network of cooperation with other Serbs, but the number of business contacts increases significantly with remaining three age groups. 64.5% of all subjects who participated in this survey work in an organization / institution that employed another Serbs (.Figure 4).

Regarding the collaboration with organisations and institutions in motherland, 56.5% of respondents answered positively, while the remaining 43.5% had not achieved that kind of cooperation. The fact that a large number of those who actively cooperate with the home country tells us that our expatriats are willing to help and contribute to its development. From the standpoint of educational level groups, 36.4% of students stated working with various organizations and institutions in home country, as well as 60% of university graduates, 44.4% of masters and 82.3% of doctors (Figure 5).

Looking from the perspective of years, 26% of those who are under 30 cooperate with organizations and institutions in the state. The percentage increases with remaining age groups from 30 to 40 (up to 77.5%), from 40 to 50 (77.7%) and over 50 (75%).

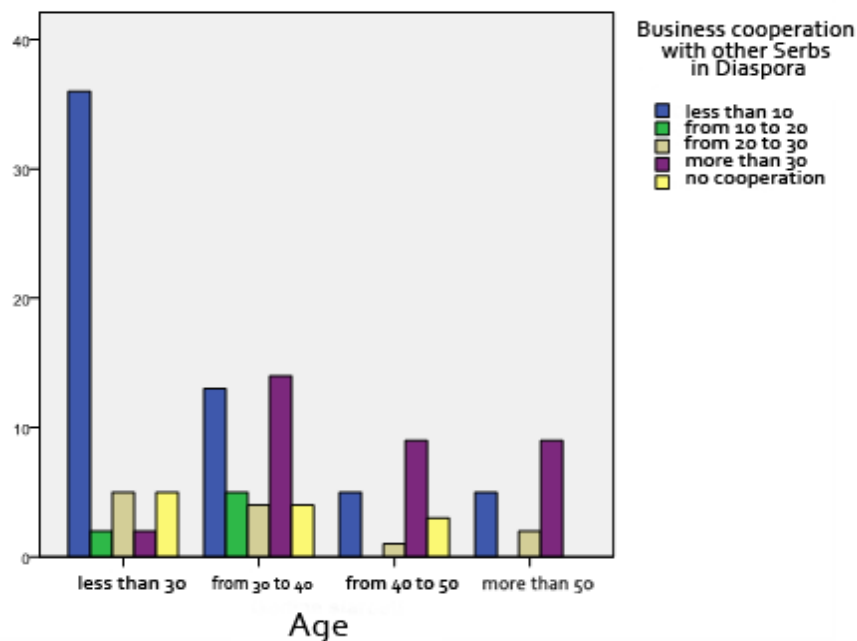


Figure 4: Relation between age groups and business cooperation

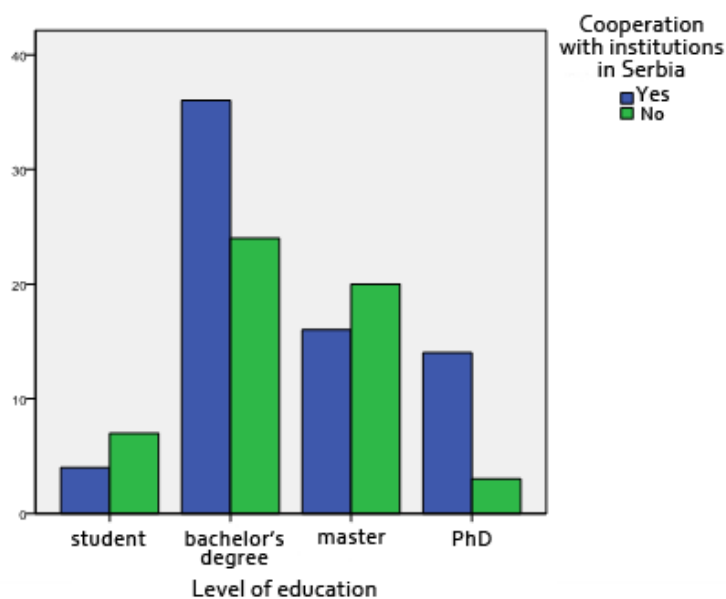


Figure 5: Relation between education and cooperation with institutions in Serbia

Respondents stated following institutions they most commonly cooperate with: Ministry of Religion and Diaspora, Ministry of Foreign Affairs, Ministry for Kosovo and Metohija, Serbian Chamber of Commerce, National Bank of Serbia, state agencies, local government authorities, youth and cultural organizations, Matica Srpska, the Serbian Orthodox Church, as well as different companies.

In terms of future cooperation with institutions and organizations in the Republic of Serbia, 71% responded positively, 27.9% negatively, and 1.6% did not declared. Even 90% of students from abroad intended to restore collaboration in the future with Serbian institutions, 65% of university-educated respondents, 69.4% of masters, and even 93.7% PhDs. The results are optimistic toward the possibilities of mobilisation of human resources from diaspora, which will certainly have a positive effect on the state of Serbia.

Types of cooperation which respondents pleaded to achieve with the motherland were following: economic cooperation (46.3%), cultural cooperation (54%), scientific collaboration (32.5%), investments (23%), humanitarian assistance and grants (6.4%), cooperation with educational institutions (21.6%), cooperation with political parties (16%), cooperation with sports clubs, youth associations and so.

4. CONCLUSION

Establishment and development of diaspora networks, as well as different types of organizations in all parts of the world where Serbian diaspora exists, should be strongly supported and helped. Understanding the basic forms, manners and processes of communication are keys to successful exchange of information among public in the internal diaspora organizations. Good internal communication is not just a reflection of successful policies and good interpersonal relationships, but is one of the conditions of well-functioning and on-going development of networks. Responsibility for establishing good communication flows lies on all members of diaspora organizations and associations, and therefore ability to act in the direction of defining the proper goals and improving internal relations.

The objectives of internal communication should be based on developing awareness of the importance of improving the effectiveness of communication for the overall business performance, precise and comprehensive definition of mission, vision and strategy of the network and continuous improvement incentives. The initial phase of this process is definition of the current state of the system, identifying obstacles, delays and strain point of the process of communication, combining existing or establishing new communication channels. It is vital that organizations regularly and promptly monitor and implement the latest technologies as important factor of efficiency and effectiveness of communication.

Results of the research work reflect the existence of a positive attitude among members of diaspora in terms of their networking, internal connecting and joining forces. Most of the respondents of both sexes, all ages and levels of education regularly contact and cooperate with their compatriots in diaspora, but also with many institutions and individuals in Serbia. It is necessary to use available resources in the best possible way, by uniting and gathering as many Serbs throughout the world, not only for financial aid programs, but also for establishing a wider range of cultural, educational and economic ties with the homeland.

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ROLE OF INTERNAL COMMUNICATION IN CORPORATE BRAND AND REPUTATION BUILDING

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Summary: *The role played by employees in corporate brand and reputation building is reflected in the delivery and increase of company values, and the creation of competitive advantage. This is why employees are one of the key stakeholders of each company and communication with them is a significant part of corporate communication activities and programs. This paper deals with internal communication, means and programs, which are the cornerstone for building and maintaining a corporate brand and reputation. By presenting the case of the Delta Holding company, the article shows the significance and scope of internal communication in good practices of corporate communication.*

Key words: *internal communication, corporate brand, corporate reputation*

1. INTRODUCTION

In the contemporary global competitive environment, corporate branding has become an important source of sustainable competitive advantage and a central element of corporate strategy (Balmer & Gray, 2003). It includes core values cherished by a company, its corporate culture, identity, business model, people (Cicvarić, 2006), and it can be described as “the visual, verbal and behavioral expression of corporate identity and business mode” (Balmer, 2001).

The corporate branding strategy determines the manner in which a company will fulfill its mission and vision, and realize value for its stakeholders (Järventie-Thesleff et al, 2011). It is most often expressed through the so-called “brand promise” which the company has to “live” and maintain in everyday business, to all stakeholders (Aaker, 2004). In delivering the value and brand promise, as well as in the application of each branding strategy, a strategic part is played by the company’s employees – from top management to those on lower-level positions, who cooperate daily with different stakeholders. The employees’ role becomes clear when considered in conjunction with the corporate branding strategy framework, which is not only the products and services it sells, but it also represents what the company does and actually is, i.e. a functionally and emotionally rounded unity. Due to intensive technological changes, the life cycle of products and services has a declining tendency, so corporate branding becomes the cornerstone for building and maintaining relations with stakeholders.

On the other hand, the corporate reputation definition, describing reputation “as a set of relatively long-term impressions, attitudes and emotions of individuals or groups in respect of an organization, established through experience or partially credible indirect information, in the context of personal and social expectations, which impacts intentions or behavior of individuals or groups in connection with that specific organization” (Vlastelica Bakić, 2012), helps to grasp the significance of employees in the establishment of beliefs and attitudes of the company’s other stakeholders.

The value of corporate branding and reputation yields benefits for the company which increase its financial performances and market value on the long run (Roberts & Dowling, 2002). They represent valuable resources which their competition cannot copy or imitate. Aside from reputation, being the organization’s intangible capital, another precious resource that is unique and attributable to one company only involves its employees, their knowledge, abilities and skills.

2. ROLE OF EMPLOYEES IN CORPORATE BRAND AND REPUTATION BUILDING

As corporate brand and reputation may be seen as a result of corporate governance and aggregate work of its employees (Cravens & Oliver, 2006), then their role in building reputation may be seen as having a decisive influence. The role is reflected in delivering and increasing the company's value and creation of a sustainable competitive advantage. Actually, employees are the starting point in reputation management, as it is impossible to create quality products and services without knowledge, abilities and efforts of employees. Furthermore, good reputation ensures good company performances. If employees work in a company that has good reputation, then their satisfaction is on a higher level and has positive effects on their attitudes and behavior which directly correlates with company performances (Riordan et al, 1997). As employees and reputation are the company's unique capital which no one can fully imitate, their synergy effect ensures a unique competitive advantage (Figure 1).

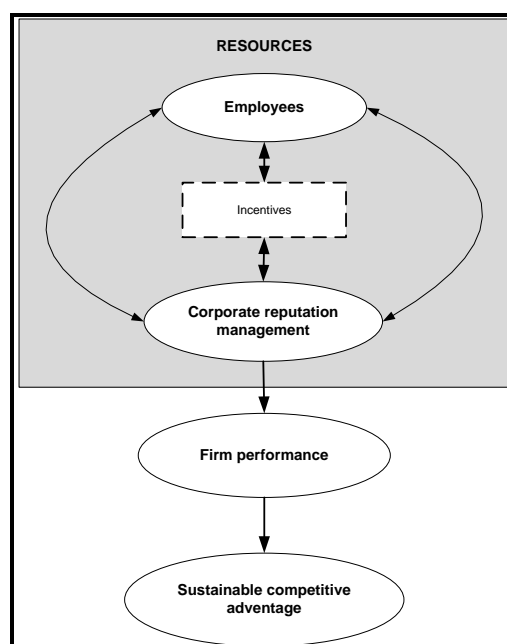


Figure 1. Synergy of employees and company reputation in the creation of competitive advantage (Cravens & Oliver, 2006)

The base for the image and corporate reputation building is the company's identity which is grounded in corporate culture and values. This is why reputation building requires that employees understand the core values of the company and its culture to be able to properly reflect the identity, positively impact image and, on the long run, the company's reputation. In understanding the corporate identity and its reflection in the desired image and reputation, the main part is played by corporate communications, i.e. internal communications inside them. The result of well designed and managed internal communications is the internal environment which understands the core values of the company and identifies with the company's vision which is stirred towards the creation and maintenance of the value of corporate brand and reputation.

The behavior of employees, especially in the sector of services, defines the manner in which customers, as well as other stakeholders, perceive the company. Employees are the company's interface with its stakeholders, so they are frequently called the "ambassadors" of the company. They deliver the company's value and its identity, and in that way they impact the formation of image and reputation. If employees identify with the values and aims of the company, they will behave accordingly and exert positive influence on other stakeholders. Otherwise, the correlation between employees' identification with the company and the company's reputation may be seen as mutually conditioned and symbiotic, since an employee working for the company with a strong reputation develops a sense of belonging to this company and emanates positive impression which further strengthens reputation (Morgan et al, 2004).

In bringing the culture, identity, brand and reputation of a company closer to its employees, an important role is played by managers on all company levels since their task is to communicate and work with

employees on a daily basis to build reputation. They observe, direct, estimate and reward employees contributing to the company's strength. And, in the final instance, top management and owners of the company must take reputation as one of priorities in business as that is the only way the reputation will integrate into corporate strategy. The strategy should include the activities of reputation management which should encourage, control and reward employees for their contribution in this respect. The major challenge here is how to measure individual contributions to reputation management. The part played by corporate communications in this field is implemented through internal communications which include communications between internal stakeholders. The goals of internal communications include (Welch & Jackson, 2007):

- Promoting employee commitment to the company;
- Creation of the sense of belonging to the company;
- Getting to know the environment and changes, as well as understanding corporate goals in the context of events taking place in the environment.

The final objective is to achieve employee satisfaction and enhance their business performances (White et al, 2010), which defines the role of internal communications in achieving business results.

Internal communications (Figure 2) encompass all formal and informal forms of communication which take place between the following parties (Welch, 2012):

- Between team peers and project peers;
- Between managers and employees.

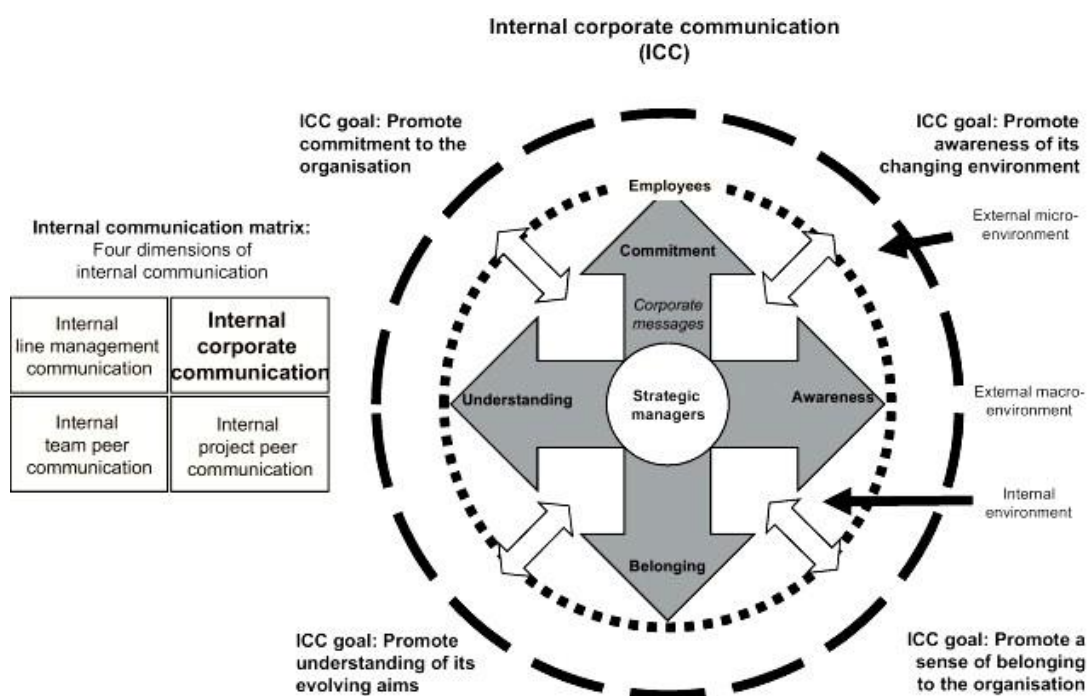


Figure 2. Internal corporate communications (Welch, 2012)

Therefore, by taking into account the organizational structure of the company, internal communications are performed: upwards, downwards and horizontally.

The task of internal communications is to achieve employee commitment and engagement reflected through positive work results, attitudes and behavior, motivation, ensuring productivity and better business performances (Gruman & Saks, 2011). Employee commitment represents the state determined by the dimensions such as levels of engagement, focus on work etc. and manifests in employee behavior, in being proactive, persistent, agile, adaptable etc. One of more famous models for analysis and tracking employee commitment is the JD-R (*Job Demands–Resources*) model which divides the work environment into demands and resources. Job demands relate to physical, psychological, social and organizational aspects of the job such as work conditions, microclimate, workload, clear work objectives, responsibilities,

reporting lines and the like. The resources of a job position include those physical, psychological, social, and organizational aspects of the job that are functional in achieving work objectives and stimulate personal growth, learning and development. Resources with positive influence on employee motivation may be:

- Organizational characteristics (wages, carrier development, work place safety), or
- Interpersonal relationships (support of superiors, team work),
- Work organization (clear role and level of participation in decision-making),
- Job description (skill diversity, autonomy).

The basic assumption of this model is that high demands adversely impact employee commitment, while resources are motivational drivers.

As all company employees participate in internal communications, the responsibility for its success falls on everybody. However, its initiation, steering and control are the responsibility of human resources and corporate communications departments. It is exactly the field of internal communications that represents the aggregation of impacts made by both sectors. Managing communications in a company requires, in the first place, determining employee satisfaction with their job, workload, deadlines, colleagues, their manager and other factors. This is mainly the responsibility of the human resource sector. The corporate communications sector should engage in the part related to planning communications with employees with a view to ensure effective and successful work performance, as well as the development of the employees sense of belonging towards the company and their commitment.

3. TOOLS OF INTERNAL COMMUNICATIONS

Internal communications are based on messages received by employees in the forms acceptable and understandable to them, as the manner in which they receive messages defines their evaluation of internal communications (White et al, 2010). The tools of internal communications may be observed through the forms or channels used to send a message, that can be print, electronic or direct, i.e. face-to-face communication.

Print tools include all forms of paper-based communication, enable making a large quantity of information available to employees over a longer period of time. These means may be distributed in visible places in the company so as to draw attention. The preparation of printed material for employees must take into account its profitability, time necessary for its preparation and effects it could have.

Print tools of internal communications encompass:

- Newsletter – intended for employees only and suitable for communicating topics such as the introduction of a new employee, changes in the company's policy and programs, presentation of activities and results achieved in the previous period and the like.
- Employee brochure – presenting to the employees company background information, its vision, mission, strategic goals, core values, rights and liabilities of employees and the like. An employee brochure may include ethical code, code of professional conduct and dress code, as well as other various manuals and guidelines.
- Collection of professional books and magazines – may help employees to familiarize themselves with some topics that are of consequence for the company's business.
- Notice boards – suitable for informing employees of significant events and their announcement, for communicating success achieved and the like. Boards are placed at busy places of a company.
- Suggestion box – a tool which enables employees to anonymously inform the company's management of their objections, suggestions and proposals connected to any segment of operations the adoption of which could help achieve higher satisfaction and enhance work. It often happens that ideas and suggestions are collected for some particular project, for instance "intranet portal improvement".
- Promotion material for employees – includes branded materials given to employees, such as mouse pads, personal organizers and the like. These items are used to communicate the visual identity of a company to employees.
- Congratulation letters for jubilees, promotions and the like – used to congratulate employees on their personal success.

Electronic tools relate to all forms of communication that rely on telephone, television, computer and internet, including, *inter alia*, the following:

- E-mail – a quick and cheap way of sending information. It is possible to group employees based on some criterion into certain mailing lists and send information as necessary.
- Intranet – entails a website allowing access to employees only (using a password), where folders with documents can be posted intended for all, news for employees, employee information etc.
- Share portals or folders – intended for e.g. sectors, enabling storage and using documents related to sector business, as well as exchange of materials, examples, business issues and the like.
- Video call and conference call – makes it possible for participants found on different geographical locations to meet. These require special equipment and are suitable for communication in small groups.
- Mobile telephone text messaging – suitable for rapid transfer of information and announcements.
- Social networking – if a company is connected to a social network, then it becomes a manner of communicating with employees who are also connected and follow network events.
- Plasma and LCD screens – as an up-to-date form of notice boards, enable the transfer of information, event announcement and the like. They are placed on visible and “busy” places in a company.
- Prize games and internal competitions – which are used to stimulate competitive spirit, motivate and reward employees for certain results achieved.
- Corporate video – presents core values of the company, its activity, mission and vision.

Direct communication or face-to-face communication is a form of two-way communication, which in addition to verbal elements, also includes transmission of messages and non-verbal communication. Among other things it also includes:

- Meetings – enables informing and active participation of employees in conversations and decision-making with regards to a certain matter. Meetings may also include employee training and advancement of their knowledge and competence, if organized as such.
- Individual meetings – represent a good way to make a conversation on delicate matters, especially when it is necessary to correct some mistake, conduct or problem of an employee.
- Conferences, forums, trainings – enable employee knowledge and experience on a certain topic, as well as advancement of knowledge and skills of participants.
- Conversations during breaks – lunch break can be used to have a conversation with an employee in a less formal atmosphere (popular term for this type of communication is a “brown bag lunch”).
- Employee recognition – represent an excellent tool for motivating employees. In respect of this tool it is necessary to determine causes for rewards, their frequency, content of such rewards and the like.
- Business trips – represent good framework for conversations among employees travelling together. These occasions usually give more time to talk and provide better atmosphere.
- Social events – represent a good way to develop and strengthen corporate culture and include various joint celebrations, lunches, visits to theatre, organized sports activities and the like.

Informal channels are not defined in the organizational structure, but they can be exceptionally strong as they are a result of a social network established by employees. These include rumors, hallway conversations, gratifies, funny materials and the like.

Many researchers have examined the forms of internal communications and tried to determine rules which channel is best applied on what occasion. Surely, it is impossible to determine universal rules given that the form of communication depends on the type of information conveyed, employee structure, positions among which communication is conducted and plenty other factors. The criteria applied to determine media to be used to send a message may include: availability of channels to a group of employees targeted by the message, characteristics of employee groups targeted by the message, message contents, speed at which the message should be sent to employees etc.

In one of most recent researches (Welch, 2012), it has been determined that employees prefer electronic media in internal communication, then combined electronic and print formats, and then only print formats. In choosing the channel of communication it may be dangerous to assume that all employees share the same preferences. Namely, it is necessary to identify internal stakeholders (important groups) and according to their preferences to select the channel of communication. For instance, internal stakeholders may be divided in the following way:

- Owner(s);
- Top management (executive manager and his board);
- Middle-level management (departmental directors);
- Work teams (departments);
- Project teams (of limited duration).

The tools or channels of internal communications are planned in reference to defined internal stakeholders and their preferences and expectations.

4. INTERNAL CAMPAIGNS AND PROGRAMS

Internal campaigns and programs are conducted for the purpose of keeping employees better informed, improvement of cooperation, gaining employees' support in the realization of short-term and long-term plans, projects and the like, strengthening the sense of belonging to the company etc.

The role of internal campaigns and programs is to present to employees projects of importance for business, to explain why they are important, as well as to describe the way in which projects will be realized, including the manner in which these will contribute to the realization of short-term and long-term goals. In addition, employees need to know the expectations from their engagement, within the meaning of tasks they need to perform, related deadlines, what are the expected results and the like. If the project and individual tasks are well understood and if objectives are clear, then employee commitment and support in the project realization can be achieved. Hence, if employees understand what they need to do and why, then the internal communication program is considered successful. Here again the significance of immediate superiors and managers is emphasized, as their commitment, involvement and attitude lead the attitudes and performances of team members and of all employees.

Internal campaign planning is a process comprised of stages specific for corporate communications campaigns:

- Company analysis and survey of employee opinions on and attitudes towards a certain matter.
- Defining the internal campaign goal.
- Identification and analysis of internal stakeholders to which the campaign relates.
- Formulation of key message(s).
- Choice and design of employee communication tools.
- Evaluation of internal campaign effects.

The starting point for internal campaign planning, regardless of its target, is to examine knowledge, opinions and attitudes of employees on the subject being the focus of campaign. A well defined starting situation sets the frame for further campaign planning and realization, and it may also prove instrumental as a starting value used to compare the campaign results. Some of the campaign and internal communications objectives are listed at the beginning. Depending on the campaign objective(s), the tools of internal communications are combines for each relevant group of employees.

The evaluation of certain campaigns, as well as internal communications in general, may be performed based on the following:

- Surveys of employees, their knowledge, opinions, attitudes.
- Analysis of proposals and suggestions received from employees.
- Level of employee intranet involvement.
- Level of participation in company events intended for employees, as well as many other criteria.

5. EXAMPLE OF GOOD PRACTICE: DELTA HOLDING INTERNAL COMMUNICATIONS

The company Delta Holding was established in 1991 in Belgrade. It was one of the first private companies started in Serbia, involved in agriculture, i.e. food production, distribution and real estate. The company Delta Holding aims towards continued development and enhancement of economic activities with a view to set new standards in the business practice of Serbia and of the region. By applying the principles of modern practice, it continuously works to establish a creative and innovative organization with an emphasis on the development of leadership, constant learning, motivation and team work for the purpose

of realizing quality company performances. This is why employees represent one of the most important stakeholders of the Company and internal communications are an essential part of activities and program of corporate communications.

Internal communications of Delta Holding are a shared responsibility of the Corporate Communications Department and Human Resources Department. The Company Code of Conduct delineates the rules of communications, graphic standards and codes in Delta Holding. The quality in all business domains is the main characteristic of all Holding members. Continuing progress and large investments, innovations and spreading and fortifying business activities are the capital tasks of all employees, as well as a significant motive for employees to prove themselves, improve and develop at work. The Company's summarized core values include quality, team work, respect and professionalism.

For the purpose of timely placement of information, there are various tools used to release information and most frequently used are:

- Mailing groups – for the needs of releasing information, different mailing groups are defined in line with the information being distributed. For the information that is of significance for the business system and for all employees, a mailed notice is sent to all employees. Special groups were formed for each separate member company.
- Internal portal – all information relevant to the system operation, rules, procedures, standards, new notices, contacts and the like is available to employees on the internal portal.
- Corporate communications SharePoint portal – in addition to standard portals, for all colleagues from communications department a portal was activated, covering all fields relative to marketing activities, public relations, corporate social responsibility and management of customer relationships. In addition to reporting on regular activities, creation of the calendar for all activities from the communications domain, the portal also encompasses the exchange of educational contents and examples of business practice, as well as idea exchange.

In addition to the abovementioned, the tools of internal communications used in Delta Holding also include:

- Internal newsletter – Delta Newsletter;
- Collection of professional books and journals – Library;
- Notice boards;
- Suggestion boxes;
- Prize games and internal competitions;
- Corporate video;
- Employee recognition.

All information concerning the system organization and work, as well as the promotions related to the Company's brands are regularly forwarded to employees.

In addition to informing and communicating to employees, internal programs and campaigns are also conducted in Delta Holding. Programs implemented for employees reflect through the organization of education, as well as team building for different employee levels. As an example of an internal campaign, the centralization of activities in the domain of marketing, public relations, corporate social responsibility and management of customer relationships realized in the course of 2011 can be mentioned. The centralization entails the preparation of complete necessary documentation, rules and procedures. The bylaws set out the rules and procedures in the segment of media relations, preparation and realization of marketing projects, media buying, event management, video production and corporate presentation, corporate social responsibility, customer relations management, relations with organizations with membership in the field of corporate communications, relations with educational institutions. To promote and realize the centralization, a joint SharePoint portal was established for all colleagues from the communications department. All colleagues have access to the portal and everybody enters data from his domain, so that now the Company has a calendar of all PR and marketing events, information on new products, companies and the like. In addition to Share Point portal of communications, joint e-mail addresses have been established to enable easier and speedier communication.

The communication with employees is achieved using the internal communication tools presented in the corporate communications theory. Internal communications are the responsibility of corporate communications and human resources departments. The example made by Delta Holding confirms the

applicability of instruments and significance of internal communications in the practice of corporate communications.

6. CONCLUSION

The grounds for corporate brand and reputation building are the company's identity which is based on corporate culture and values. The employees as the ambassadors of their company deliver the company's value and its identity thus impacting the creation of image and reputation. This is why reputation building requires that employees understand the core values of the company and its culture to be able to properly reflect the identity, positively impact image and, on the long run, the company's reputation. In understanding corporate identity and its reflection into wanted image and reputation, the main part is played by corporate communications, in particular the part relative to internal communications. The result of well designed and managed internal communications is the internal environment which understands the core values of the company and identifies with the company's vision which is stirred towards the creation and maintenance of the value of corporate brand and reputation. The task of internal communications is to achieve employee commitment and engagement reflected through positive work results, attitudes and behavior, motivation, and ensure productivity and better business performances.

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COMMUNICATION MANAGEMENT AND INFORMATION TECHNOLOGY – AN EXAMPLE ON THE USE OF SOCIAL NETWORKS IN THE DEFENCE STRUCTURE

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Abstract: *Communication management within the modern defence structure has been greatly influenced by the introduction of new information technologies in the last couple of decades. Interactive, informative communication within an organisation serves a purpose, but virtual communication has enabled direct feedback, i.e. two-way communication among an unlimited number of users. This is clearly a necessity for organizations such as ministries of defence and military organizations that affect the general public.*

The highest increase in use amongst social media has been recorded in social networking. This article has analysed reasons for and objectives of the participation of the Serbian Ministry of Defence in these networks. Qualitative analysis of the content of a social network page has proved that the involvement of the Ministry of Defence was justified. This study case has identified a method of communication that is acceptable to the younger population, which is one of the main stakeholders. The article gives a positive example of the use of new technologies in communication management within a specific social subsystem such as the defence structure, whose main goal is to adjust itself to community expectations and improve mutual understanding of the military and its stakeholders.

Key words: communication management, information technology, public relations in defence structure, social media, social network

1. INTRODUCTION

Social, economic and technological conditions of the modern world have influenced the attitude of managers and/or executive directors – they have become aware of the fact that the success or survival of their organizations depends on the image they have in public and the level of public trust they have created. Communication management, commonly referred to public relations in Europe (more Van Ruler, Verčič, 2008), has increasingly become an important function of governance. It is well known that set out policies may be implemented easier with public consensus and understanding rather than facing the public opposition. Good communication with the public creates a positive relationship that can have important economic, cultural and political effects.

At the same time, management goes through various forms of transformation in today's digital era. Life in the digital era enables faster, cheaper and more convenient ways of sending messages alongside simpler document processing. The importance given to information technology (IT) and especially a global network improves management communication and assist in important functions such as decision making, coordination and control.

Communication management is the type of management where the impact of IT and information and communication technology (ICT) may have been the most profound comparing to other managerial functions. New media have reformed the ways of communication as the foundation of communication management. The organizations that have not engaged with or have not implemented this in the right way have become unsuccessful or marginalised.

All throughout the twentieth century defence and security have been treated as the government sector with the least public influence. It was considered that only political elite and military personnel with the knowledge of secret data had enough information and skills to make decisions in this area. Yet, the area of defence and security has become more and more transparent in the last couple of decades. This government sector has gained political support using political representation and public opinion to create an efficient system capable of quick action. The military and other organizations within the security sector have been developing relations with different public groups on a regular basis. In this regard, their communication management involves various techniques and tactics.

2. MODERN COMMUNICATION MANAGEMENT

Nowadays communication management has substantially changed the content and form of communication with a domestic or foreign public. This has been strongly influenced by information technology.

The most noticeable change has been the increased complexity of communication with employees and other internal liaison groups, but also with various groups of external stakeholders. Communication has become faster and more encompassing while at the same time it has been conducted more frequently without face to face meeting of participants involved.

The use of IT has led to a revolution in the work practices in most of manufacturing and customer oriented businesses. Various kinds of software and networks provide opportunity for multiple users to work on the same project simultaneously from different geographical locations. They also provide for the use of graphics or hyperlinks, while the supervising manager is enabled to edit the content or the final format of the document. IT allows what was once unthinkable practice and that is to work out of your workplace; telecommuting or combining the efforts of separated co-workers enables forming of virtual teams communicating via web conferences.

Working relationships and communication among the employees, participants or members of an organisation may be more important than the external ones when the organisation is trying to fulfil its objectives in order to survive (Cutlip, S, Center, A Broom, G, 2006,p. 249). In internal public relations, direct interaction is more achievable. Managers can choose from different communication channels the one that is best suited to their needs. The choice is selected by, above all, the amount of information that can be transferred through the channel. Face-to-face, verbal communication enables direct communication, (almost) synchronised reply and the presence of non-verbal communication. Besides meetings and 'walk and talk's, other forms of direct verbal communication include a teleconference or web conference. The other ways of communication with the internal groups, such as verbal communication in the form of electronic communication such as phone calls, internet chats or voice mails or written communication either personalised or general – e-mails, web-portals, bulletins - have been also improved by the use of new media and new communication channels. (Jones and George, 2011)

The most common interpretation of communication management is that it is a development, realisation, and upkeep of communication with the external stakeholders on which the organisation depends.

Every organisation can establish connections with numerous segments of the public. Two ways, symmetrical communication with an emphasis on the complete interaction of an organisation and its target public recipients is widely accepted as a standard model nowadays. Despite this, in practice, a communication management of any organisation focuses primarily on its own objectives and use of various methods, techniques and tools to convey its message. Traditional techniques such as a direct relationship with public (organisation of various events), or indirect ones such as issuing press release to mass media in order to publish them, have been enriched with additional interactive methods enabled by the internet and other forms of new media.

The internet has created a way of communication the cost of which is rather negligible. Sending information from multiple sources to multiple recipients almost concurrently with an event happening is a process that is multidimensional. Two important internet characteristics related to communication are: accessibility around the world and the fact that web content is practically impossible to control.

One of the biggest advantages of the internet as a public relation medium is reality and the possibility of direct and simultaneous access to specific target audiences. This also lessens the dependence of communication managers to traditional mass media. New methods of communication based on the internet have changed the media environment. On one hand the internet sends messages to a specifically targeted audience but on the other it creates the possibility for an organisation to receive feedback, which makes it very important in public relations.

The presentation of an organisation on the global network or even the set up of chat forums with registered potential participants still could not completely achieve the main public relation objective which is maximum organizational exposure to the public and increased interaction. The establishment of social media has considerably alleviated this issue.

3. PUBLIC RELATION REQUIREMENTS IN DEFENCE STRUCTURE

The purpose of public relations in the defence structure is to improve mutual understanding between an army and its stakeholders. Public relations has become one of the key functions of command within most military organizations. This change has been brought up not only by the democratisation of society and the transformation of armies themselves, but also the growth of free press and increased market competition. The application of information and communication technologies in military organizations has become unavoidable. The result of which is an opportunity for increased transparency, interaction with major stakeholders and new channels of communication.

Those who are responsible for public relations in military organizations communicate with all relevant internal and external stakeholders in order to coordinate the set out goals of a military organisation with a community expectation. The expectation is related, above all, to socially responsible behaviour in carrying out missions, of which some are of a military nature, such as the defence of country's freedom and independence. The other expectation may be related to a traditional, non-military role of the defence structure such as armed forces protecting national unity or being an institution that influences the younger generation by promoting desired values and helping them integrate with society.

The communication management of a military organisation strive to develop a communication strategy, coordinate the military organisation with the surrounding social environment, create an identity and a desired public image of that identity as well as increase acceptance of the military organisation in public. In addition, it also provides for better informed military personnel, facilitates better team work, supports marketing projects and improves forms and techniques of internal and external communication.

The defence structure must define all communication elements of its communication strategy for different scenarios – in regular, peaceful conditions, but also in crises such as extraordinary situations, immediate threats of war or being in a state of war.

Interaction between an army and the public is conducted through the information department of the Ministry of Defence and General Headquarters, commands of strategic and operational troops, State institutions for information (especially in a case of liaison with foreign journalists), public relations and marketing agencies, military public relations representatives – spokespeople and various military mass media.

The principal aim of communication programs and plans in relation to the members and employees is to form a certain identity and positive relationship between army personnel; encouraging motivation for more efficient work and the upstaging of a positive image of military forces and its leadership. Communication with the internal groups has been increasingly conducted through new media and the internet.

Typical external stakeholders, related to the defence structure, are the general public, journalists, the qualified public (researchers dealing with security, defence and army), army journalists, public activists, young people, members of parliament, politicians, state institutions (government, ministries, department for information and propaganda), but also business people, citizens organizations, ex service military personnel, military emissaries and foreign correspondents.

Military organizations disseminate their messages through mass media, some direct contact such as visits to military troops, exhibitions and similar, but more often nowadays by new media.

4. USE OF SOCIAL NETWORKS

The development of the information and communication technologies enabled development of the new media and adjustment of the existing ones to the new working conditions and habits of the consumers of the media products. But new media have also produced, up to then, unknown ways of social communication.

The biggest rise and popularity in the field of digital communications have achieved the social networks: MySpace, Facebook, Twitter, LinkedIn, which have considerably changed the way, not only the mass, but also the interpersonal and group communication. The social networks may be defined as internet services

designed for social internetworking of people who are connected with each other by certain mutual interests or mutual life experiences.

The popularity and development of social networks was conditioned by technology development. With appearance of Web 2.0 technology there was enabled bigger interactivity of site users, such as opening user's account, installation of photographs and video clips on sites, making comments etc. The concept of interactivity is the basic concept of social networks. The purpose of existence is certainly bigger socialization of the internet users, finding mutual interests, old and new friends, personal affirmation, but also expressing of users through various social activities, such as games, quizzes, blogs, participation in discussions. It is characteristically that the social networks have got the role which overcome meetings and personal affirmation. Social networks had, for example, big political role in the „Arabian Spring“ because they encouraged and gathered the demonstrators. The social networks, unlikely of the forums, on which is regularly expressed intolerance towards different views, gather people who have same or similar opinion with the creators of the opinions. Such a model of the social network is very functional for outburst, i.e. identification or confirmation of the opinion, but too little for real political debate where confrontation has to be made vs. the argument quality, and not in relation to personalization or closeness.(Colombo, 2010, p.5)

Social networks are products of the new media which have noted the biggest growth of users since 2008. They created a totally different understanding of PR in companies, as well as different views on target groups and communication with them through new channels. Penetration of the new media in all segments of the society imposed a serious theme for consideration to the defence structure. The fact is that defence structure passes through all social subsystems and it is in connection to the state system. In that sense the use of social networks opens a space for direct communication of the defence structure with the target groups and for direct placing of the key messages.

5. SOCIAL NETWORKS IN FOREIGN DEFENCE STRUCTURES

The defence structures in the world have been adjusted to the social networks as a social phenomenon with variable speed and diversely understanding the role of the social networks in the life and the work of the military organizations. Today the use of social networks is present virtually in many armies. In the surrounding countries it is related to administration of the profile on the social networks Facebook and Tweeter, without adequate legal regulations and precisely defined jurisdiction. Out of the Balkan region, specific proactive access to the new media has the French Ministry of Defence – in its Department for Public Relations there is a person that deals only with social networks. The Facebook pages of the French Ministry of Defence has 4.438 fans, [19] and on this social network officially are present the French armed forces as well as the army branches: the navy, the air force and the army. The French Ministry of Defence is present on the other social networks as well (Twitter, Dailymotion, the French version of the Youtube), The presence of French defence structure on social networks has been defined in the Strategy of Use of New Medias in the French Armed Forces. The main objective is to improve the communication with the youth in the country. So, the content of all the profiles of the social networks is adapted to the youth population.

The most systematic and most open use of the social networks in foreign armed forces is in the Ministry of Defence in the USA where there is a department dealing with new media and social networks. The social networks used in the USA Armed Forces are Facebook, Tweeter, YouTube, Flickr, Vimeo, Slideshare, Army Live Blog. All professionals of the USA Armed Forces are allowed to open profiles on the social networks presenting themselves with the official duty they have in the Army Forces or as a official profile of the organizational unit but strictly respecting clearly defined directives which are regulated by the Ministry of Defence. In 2010, the USA Ministry of Defence made an incorporated page of use of the social networks in the defence structure of USA.[15] There are contents for education and training in the field of use of social networks, regulated procedures, register of all sites and links to the pages, which incorporate the presence of the army branches on the social networks (Army, Navy, Air Forces, Marines, National Guard, Coast Guard).

In the new handbook on public relations in the NATO new media are described as „web based technologies which are used for social interaction of the users and for a process of transformation and expansion of media monologues in interactive, social dialogue“. [1] Interaction of users and the process of socialization represent the basis for consideration of new media in NATO, wherefore are called social media.

6. COMMUNICATION THROUGH SOCIAL NETWORKS IN THE MINISTRY OF DEFENCE AND THE SERBIAN ARMED FORCES

The feasibility study of the eDepartment in Republic of Serbia which is in compliance with contemporary tendencies of organization management says that management in state institutions should be based on general (standard) processes which can be classified in several scenarios i.e. business processes with mutual characteristics. One of the mutual functions of the state administrations is public relations for which assumed the following processes: [15]

- Audio and video conferences
- News and events
- Publication of information
- Media promotion

The Ministry of Defence of the Republic of Serbia (Serbian MoD) as part of state administration, has developed function of public relations which, besides the classic communication channels, realizes based on ICT and new media. The system is user friendly and gives support to all actors in internal and external information in the defence system. According to the competence, they can distribute information of multimedia content quickly and efficiently and get back related information necessary for analytical studies

Rapid growth of number of young users of the social networks during 2008, initiated the participation of the Serbian Ministry of Defence in the social networks (YouTube 02.09.2008 and Facebook 22.12.2009.). The basic intention was to reach the youth by direct two way communication. Young population, that can be further classified per age and goals of concrete communication, is very important target group for the Ministry of Defence and the Armed Forces of Serbia [14].

YouTube channel of the Ministry of Defence, was opened within the campaign „Be a Professional“ with aim of publicizing promotional spots (acceptance in professional army service, acceptance in the Military Academy, Military Secondary School, promotion of lieutenants...) and during 2009. publishing video news of the defence structure. There have been published 747 pictures and examined 606 video shots [19].

The analysis of the visits and the review of the recordings show that this media is the most suitable for promotional campaigns in the defence system, because the most visited recordings are the ones used in the campaign – professional Vuk Kostić 34896 views, professional “2008” 20892 views, professional “Arm Forces of Serbia” 18980 views... In comparison to this, video news do not reach more than thousand views, regardless of their content and the time of release.

Facebook profile of Serbian MoD & Serbian Armed Forces (SAF) is opened with the aim to become a source of information adapted to the target group which is user of this type of new media. The other goal was to secure reversing of the members of the social networks to the official web presentations of the Serbian defence structure. Besides that, the aim of opening a profile on Facebook was the need of two way communication with the members of the social network and neutralizing others to open the profile on behalf of Serbian MoD and SAF.

As there were no regulations which would regulate the participation in social networks at the time of opening the profile, the MoD and SAF Facebook profile was edited in accordance to the Terms for Communication Strategy of MoD and SAF and the document – Directive on Information of the Public about the Work of MoD and the activities of SAF. The Handbook for Public Relations in the MoD and SAF was adopted two years ago. It has confirmed the preference of the relevant Department for Public Relations for common appearance of MoD and SAF through one profile. All the public relations in using new technologies, as well as with classic communication channels, are realized in coordination with the Department.

If one organizational unit from the defence system estimates that can participate in maintenance of the Facebook profile or certain themes it can also be realized with agreement of the Department. In the previous period there were no parts of the Ministry and the Army Forces interested for maintaining the Facebook profile by themselves. On the other side, members of the Serbian Armed Forces cannot open their own profiles on Facebook nor can they show contents which are related to their professional work or engagement.

7. Case Analysis of the Use of Social Network

Facebook page of MoD and SAF was marked by 2507 visitors as *like*, with tendency of constant growth. Taken into consideration the number of friends of those visitors, one can get the number of 878607 persons as potential users of MoD and SAF posts. The number of users of Facebook who have seen some of the content of the page of MoD and SAF weekly is 9310 with rising tendency [21].

The analyse the sex and age structure of the visitors of MoD and SAF Facebook page shows that 54% of the users are male persons, and the rest are female persons. This ratio is favourable in the process of profesionalization of the SAF and realization of the campagne „Women in the Armed Forces“. It is possible to note that the age structure of the users of MoD and SAF page in more than 96% cases is within the range from 13 to 44 years of age (Figure 1). This confirms the estimation of the Department of Public Relations that Facebook should be used in promotional purposes and adjust the content to youth, potential candidates for entry in professional army service.

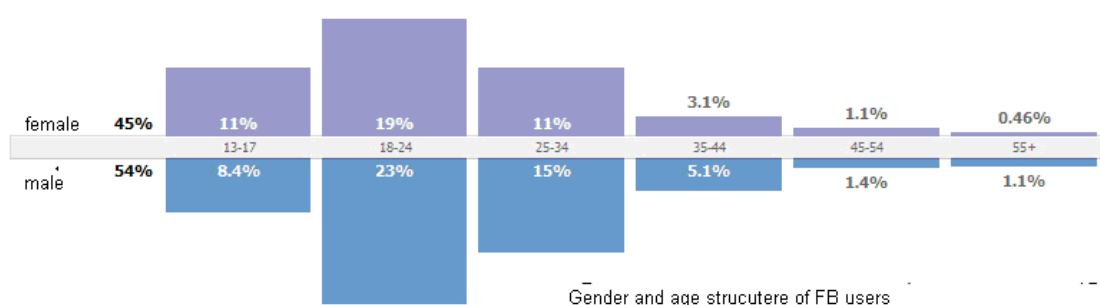


Figure 1. Age Distribution of the Users of Facebook of MO and VS

The qualitative analysis of the content of Facebook page of MoD and SAF shows that the decisive influence on the user is made by the type and choice of media where the information is published. Namely, the characteristics of the target group to which we address is that it expects a short, multimedia information. By analyzing the case of February 2012 one can realize the following

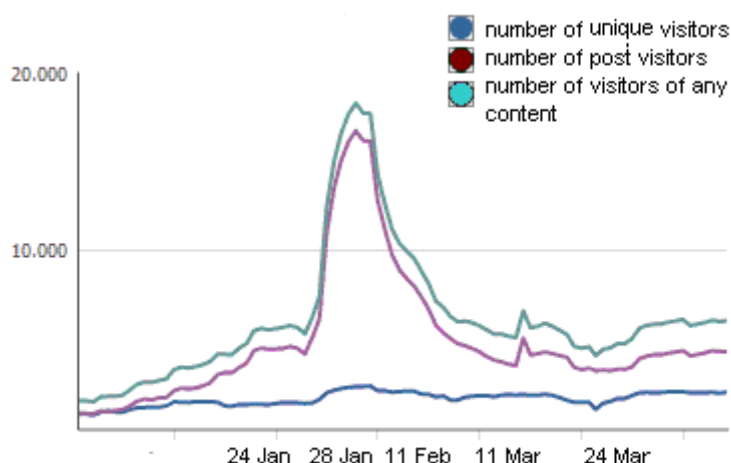


Figure 2. Number of Visitors and Users of the Bulletins on MoD and SAF page

From 02. to 08. February there were placed eleven bulletins of MoD and SAF, which arose interest of the users of the MoD and SAF page. The bulletins were observed by 18303 users, which represents distinct increase related to the average values of 5000 visits in 2012. (Figure 2). The type of bulletins indicates the fact that the visitors of Facebook page of MoD and SAF expect information on specific activities of the Armed Forces, followed by multimedia contents. In the observed period they are: Exercise “Meridien

2012", The Army helping the population in removal of snow, Serial "Military Academy" and Military Academy Cadets education in winter conditions.

8. CONCLUSION

Communication management in modern organizations has been influenced by new technologies in more than one way. Information and communication technologies have increased, enriched and speed up communication with the internal and external target groups. They enable direct and continuous interpersonal communication and in the case of liaisons with external stakeholders they increase interaction and improve the channels of communication.

Public relation has become one of the key functions of military organizations which need, as much as other social sub systems, improvement of mutual understanding with stakeholders. Military organizations provides for a continuous presence on the internet through web portals and organizational presentation, web services that is in the use of the defence system, electronic mail, blogs, forums and social networks.

The concept of interaction is the basis of social networks set up by military organizations. It is increasingly used for direct communication with stakeholders and immediate dissemination of key messages. Involvement of the Serbian Ministry of Defence in social networks has been conducted with the basic intention to reach the young population through direct, two-way communication. An analysis of web page use has shown that this medium is the most suitable for promotional campaigns in the defence structure and for short, multimedia information. More than 40% of web page visitors belong to the population group of 18 – 24 year olds. That demographic group is the one that has the most presence on the social networks, but they are also the key stakeholders group for the defence structure. The appeal and usefulness of information on the web page are two basic elements that promote users' involvement. These qualities also encourage the users to actively participate in creating a positive image related to social network announcements and to initiate feedback from them.

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COMMUNICATION OF POLITICAL PARTIES ON TWITTER: COMPARISON OF POLITICAL PARTIES IN SERBIA, CROATIA, SLOVENIA AND BIH

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Abstract: *In the past years, information and communication technologies have been affecting all aspects of our lives, including politics. Political parties use the Internet to communicate with their potential voters. This paper will give a short introduction to communication over Twitter, a description of the political parties in question, and the main part of the paper is the analysis and comparison of communication of Serbian, Croatian, Slovenian and BiH political parties on Twitter.*

Keywords: *Internet, communication, Twitter, Serbia, Croatia, Slovenia, BiH*

1. INTRODUCTION

A growing number of people use the Internet, thus it becomes a mass media whose advantages need to be used. For the past few years social networks, such as Twitter, Facebook or MySpace, have been recognized as a good medium for self promotion. Political parties have also discovered social networks and started using online campaigns to contact potential voters. One of the positive aspects is that potential voters can be informed and at the same time don't leave their homes. People can find information they are interested in with just a few clicks. It would be ideal that every political party publishes news about its work and program online, so people can now what is happening and be timely informed about newest developments.

Main advantage of using social networks for political parties is a great number of potential voters (mostly younger population) who use social networks. Political parties can in this way connect themselves better with younger population and present their programs. Also, promotion of political parties through social networks enables direct communication between voters and political parties, and thus makes a political party closer to its voters.

Some political parties have recognized advantages of social networks and see them as an excellent way of communication with potential voters. One of these social networks is Twitter which will be closely examined in this paper.

2. COMMUNICATION ON TWITTER

"Twitter is a very popular instant messaging system that lets a person send brief text messages up to 140 characters in length to a list of followers. Launched in 2006, Twitter was designed as a social network to keep friends and colleagues informed throughout the day. However, it became widely used for commercial and political purposes to keep customers, voters and fans up-to-date as well as to encourage feedback" (PC Magazine, 2012).

As in a lot of other things, Americans have first discovered social networks for communication with potential voters. Election of Barack Obama has been a milestone in effect of social networks on political campaigns. Twitter and other social networks have been used to collect funds, organize and implementation of campaign strategy, and most importantly, for gaining votes.

Twitter in numbers (Twitter blog, 2012):

- #tweets
 - 3 years, 2 months and 1 day. The time it took from the first Tweet to the billionth Tweet.
 - 1 week. The time it now takes for users to send a billion Tweets.
 - 50 million. The average number of Tweets people sent per day, one year ago.
 - 140 million. The average number of Tweets people sent per day, in the last month.
 - 177 million. Tweets sent on March 11, 2011.
 - 456. Tweets per second (TPS) when Michael Jackson died on June 25, 2009 (a record at that time).
 - 6,939. Current TPS record, set 4 seconds after midnight in Japan on New Year's Day.
- #accounts
 - 572,000. Number of new accounts created on March 12, 2011.

- 460,000. Average number of new accounts per day over the last month.
- 182%. Increase in number of mobile users over the past year.
- #employees
 - 8. 29. 130. 350. 400. Number of Twitter employees in Jan 2008, Jan 2009, Jan 2010, Jan 2011 and today.

3. POLITICAL PARTIES

First step in political party analysis is to define a political party. Downs (1964) says it is a coalition of men seeking to control the governing apparatus by legal means. Huckshorn (1984) defined political party as an autonomous group of citizens having the purpose of making nominations and contesting elections in hope of gaining control over governmental power through the capture of public offices and the organization of the government. Schlesinger (1991) defines a political party as a group organized to gain control of government in the name of the group by winning election to public office. Aldrich (1995) says that political parties can be seen as coalitions of elites to capture and use political office, but it is more than that. It is an institutionalized coalition, one that has adopted rules, norms and procedures.

3.1. Serbia

There is a great number of political parties in the Republic of Serbia (National Assembly of the Republic of Serbia, 2012): Serbian Radical Party (Srpska radikalna stranka), Democratic Party (Demokratska stranka), G17 PLUS (G17 PLUS), Democratic Party of Serbia (Demokratska stranka Srbije), Liberal Democratic Party (Liberalno demokratska partija), Socialist Party of Serbia (Socijalistička partija Srbije), New Serbia (Nova Srbija), League of Social Democrats of Vojvodina (Liga socijaldemokrata Vojvodine), Party of United Pensioners of Serbia (Partija ujedinjenih penzionera Srbije), Party of Democratic Action of Sanjak (Sandžačka demokratska partija), Alliance of Vojvodina Hungarians (Savez vojvođanskih Mađara), Serbian Renewal Movement (Srpski pokret obnove), United Serbia (Jedinstvena Srbija), Bosniac Democratic Party of Sanjak (Bošnjačka demokratska stranka Sandžaka), Democratic Left of the Roma (Demokratska levica Roma), Democratic League of Croats in Vojvodina (Demokratski savez Hrvata u Vojvodini), Party for Democratic Action (Partija za demokratsko delovanje) etc.

Political parties to be analysed are: Serbian Radical Party (Srpska radikalna stranka), Democratic Party (Demokratska stranka), G17 PLUS (G17 PLUS), Democratic Party of Serbia (Demokratska stranka Srbije), Liberal Democratic Party (Liberalno demokratska partija) as top five parties with the highest number of seats in National Assembly (National Assembly of the Republic of Serbia, 2012).

3.2. Croatia

In Croatia also, a great number of political parties exist: Croatian Democratic Union (Hrvatska demokratska zajednica), Social Democratic Party of Croatia (Socijaldemokratska partija Hrvatske), Croatian Peasant Party (Hrvatska seljačka stranka), Croatian People's Party-Liberal Democrats (Hrvatska narodna stranka – Liberalni Demokrati), Istrian Democratic Assembly (Istarski demokratski sabor), Croatian Democratic Alliance of Slavonia and Baranja (Hrvatski demokratski savez Slavonije i Baranje), Croatian Party of Pensioners (Hrvatska stranka umirovljenika), Croatian Party of Right (Hrvatska stranka prava), Croatian Labourists - Labour Party (Hrvatski laburisti - Stranka rada), Croatian Social Democrats (Hrvatski Socijaldemokrati), Croatian Demochristian Party (Hrvatska demokršćanska stranka), Croatian Labour Party (Hrvatska radnička stranka), Croatian Party of Rights 1861 (Hrvatska stranka prava 1861), Croatian Pure Party of Rights (Hrvatska čista stranka prava) etc.

Parties to be analysed are: Croatian Democratic Union (Hrvatska demokratska zajednica), Social Democratic Party of Croatia (Socijaldemokratska partija Hrvatske), Croatian People's Party-Liberal Democrats (Hrvatska narodna stranka – Liberalni Demokrati), Croatian Labourists - Labour Party (Hrvatski laburisti - Stranka rada) and Croatian Democratic Alliance of Slavonia and Baranja (Hrvatski demokratski savez Slavonije i Baranje) as top five parties with the highest number of seats in Parliament (Hrvatski sabor, 2012).

3.3. Slovenia

There is a large number of political parties in Slovenia: Positive Slovenia (Pozitivna Slovenija), Slovenian Democratic Party (Slovenska demokratska stranka), Social Democrats (Socialni demokrati), Gregor Virant's Civic List (Državlјanska lista Gregorja Viranta), Slovenian People's Party (Slovenska ljudska

stranka), Democratic Party of Pensioners of Slovenia (Demokratska stranka upokojencev Slovenije), New Slovenia – Christian People's Party (Nova Slovenija – kršćanska ljudska stranka), Slovenian National Party (Slovenska nacionalna stranka), Liberal Democracy of Slovenia (Liberalna demokracija Slovenije), Party for Sustainable Development of Slovenia (Stranka za trajnostni razvoj Slovenije), Youth Party - European Greens (Stranka mladih - Zeleni Evrope), Democratic Labour Party (Slovenia) (Demokratska stranka dela), Zares, Greens of Slovenia (Zeleni Slovenije), Movement for Slovenia (Gibanje za Slovenijo), Slovenian Party of Equal Opportunities (Stranka enakih možnosti Slovenije), Forward Slovenia (Naprej Slovenija, NPS) etc.

Parties to be analysed are: Positive Slovenia (Pozitivna Slovenija), Slovenian Democratic Party (Slovenska demokratska stranka), Social Democrats (Socialni demokrati), Gregor Virant's Civic List (Državlјanska lista Gregorja Viranta), Slovenian People's Party (Slovenska ljudska stranka), Democratic Party of Pensioners of Slovenia (Demokratska stranka upokojencev Slovenije) as top six (fifth and sixth party have the same number of seats) parties with the highest number of seats in Parliament (Republika Slovenija državni zbor, 2012).

3.4. BiH

Some of the political parties in Bosnia and Herzegovina are: Greens of Bosnia and Herzegovina (Zeleni Bosne i Hercegovine), Bosnian Party (Bosanska stranka), Citizens' Democratic Party (Građanska demokratska stranka), Liberal Democratic Party (Liberalna demokratska stranka), Pensioners' Party of Bosnia and Herzegovina (Stranka penzionera/umirovljenika BiH), Workers' Communist Party of Bosnia and Herzegovina (Radničko-komunistička partija Bosne i Hercegovine), Democratic youth movement (Demokratski omladinski pokret), Democratic Party of Bosnia and Herzegovina (Socijaldemokratska partija Bosne i Hercegovine), Our Party (Naša stranka), Union for a Better Future of BiH (Savez za bolju budućnost Bosne i Hercegovine), Party for Bosnia and Herzegovina (Stranka za Bosnu i Hercegovinu), Bosnian-Herzegovinian Patriotic Party-Sefer Halilović (Bosanskohercegovačka Patriotska Stranka-Sefer Halilović), Party of Democratic Action (Stranka Demokratske Akcije), Democratic People's Community (Demokratska Narodna Zajednica), Democratic Party of the Republika Srpska (Demokratska stranka Republike Srpske), Party of Democratic Progress (Partija demokratskog progresa RS), Democratic People's Alliance (Demokratski Narodni Savez), Serbian Democratic Party (Srpska demokratska stranka), Serbian People's Alliance of the Republika Srpska (Srpski narodni savez RS), Serbian Radical Party of the Republika Srpska (Srpska radikalna stranka RS), Socialist Party of the Republika Srpska (Socijalistička partija Republike Srpske), League of People's Rebirth (Savez narodnog preporoda), Christian Democrats (Demokršćani), Croatian Christian Democratic Union (Hrvatska kršćanska demokratska unija), Croatian Democratic Union of Bosnia and Herzegovina (Hrvatska demokratska zajednica), Croatian Democratic Union 1990 (Hrvatska demokratska zajednica 1990), Croatian Party of Rights (Hrvatska stranka prava), Croatian Peasant Party (Hrvatska seljačka stranka), Croatian Right Bloc (Hrvatski pravaški blok).

Parties to be analysed are: Social Democratic Party BiH (Socijaldemokratska partija BiH), Alliance of Independent Social Democrats (Savez nezavisnih socijaldemokrata), Party of Democratic Action (Stranka demokratske akcije), Serbian Democratic Party (Srpska demokratska stranka) and Croatian Democratic Union of Bosnia and Herzegovina (Hrvatska demokratska zajednica Bosne i Hercegovine) as top five parties with the highest number of seats in Parliament (Parliament assembly of Bosnia and Herzegovina, 2012).

4. ANALYSIS OF COMMUNICATION

Twitter, with its 190 million users, is the second largest social network in the world. Last couple of years number of twitter users is constantly increasing, and is expanding to former Yugoslavian countries. This chapter will give an overview of communication of the largest political parties in Serbia, Croatia, Slovenia and Bosnia and Herzegovina.

Twitter Grader tool has been used for analysis (Twitter Grader, 2012). Profiles are compared according to:

- Number of followers
- Number of updates
- Number of following profiles
- Rank
- Grade

Number of updates, followers and following profiles can be seen on every twitter profile. Rank and grade are calculated according to algorithm presented by Twitter grader. Following factors influence this algorithm (Grader blog, 2012):

- Number of Followers: More followers leads to a higher Twitter Grade
- Power of Followers: People with a high Twitter Grade following a profile, count more than those with a low Twitter Grade following a profile
- Updates: More updates generally lead to a higher grade
- Update Recency: Users that are more current generally get higher grades
- Follower/Following Ratio: The higher the ratio, the better
- Engagement: The more a given user's tweets are being retweeted, the more times the user is being referenced or cited, the higher the twitter grade

Those are the factors that go into the calculation of a score. The grade is calculated as the approximate percentage of other users that have an equal or lower score. Twitter Grade of 80 means that about 80% of the other users got a lower score. The absolute ranking says, based on all other users scored, what's the profiles "position" in that list. A ranking of 5,000 means that only 4,999 other people had a higher score than profile in question (Grader blog, 2012).

4.1. Serbia

Analysed political parties are: Serbian Radical Party (Srpska radikalna stranka), Democratic Party (Demokratska stranka), G17 PLUS (G17 PLUS), Democratic Party of Serbia (Demokratska stranka Srbije), Liberal Democratic Party (Liberalno demokratska partija). Those are top five parties with the highest number of seats in National Assembly.

All of the five mentioned parties have Twitter profiles (Table 1):

- Serbian Radical Party - @srpski_radikali
- Democratic Party - @demokrate
- G17 PLUS - @G17PLUSOfficial
- Democratic Party of Serbia - @DSSvesti
- Liberal Democratic Party - @LDP

Table 1: Twitter profiles and characteristics of Serbian political parties

Twitter account	Rank	Followers	Following	Updates	Account opened	Grade
srpski_radikali	972800	763	1208	837	28.3.2009	91
demokrate	139643	4988	1135	5336	31.7.2009	100
G17PLUSOfficial	506601	1361	604	719	16.12.2009	95,5
DSSvesti	1517903	297	4	230	15.3.2011	86
LDP	195464	3836	2078	1682	26.1.2009	100

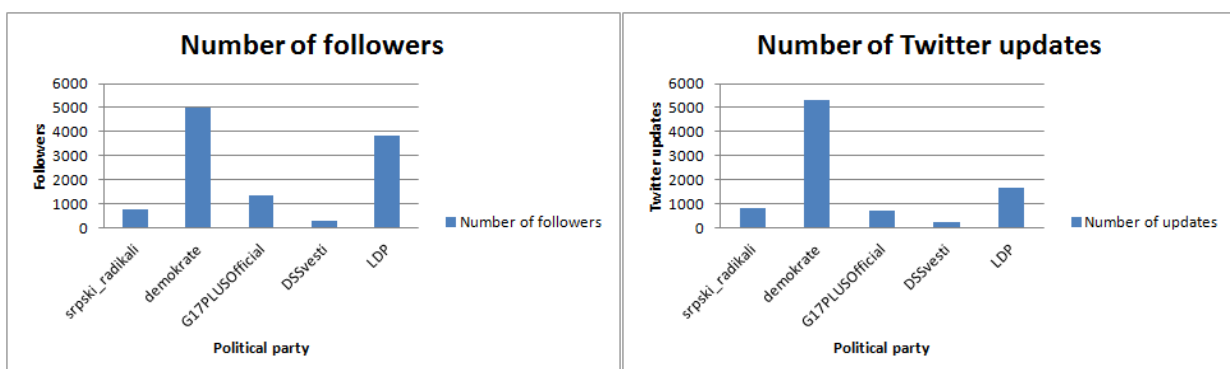
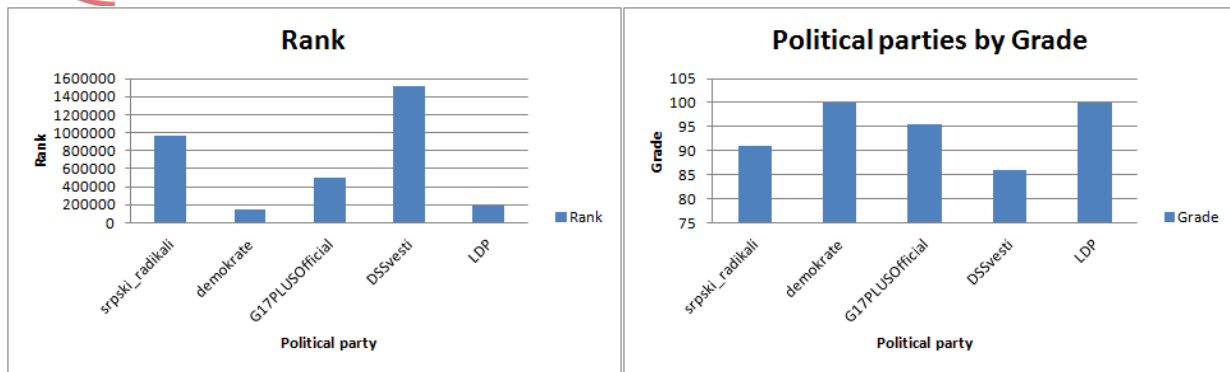


Figure 1: Twitter profiles by number of (a) followers and number of (b) updates

It can be seen (Fig. 1a) that Democratic party has the largest number of updates, and the largest number of followers (Fig. 1b). Through number of updates, number of followers and number of following profiles, twitter rank (Fig. 2a) and twitter grade (Fig. 2b) are calculated.



(a) (b)
Figure 2: Twitter profiles by (a) rank and (b) grade

4.2. Croatia

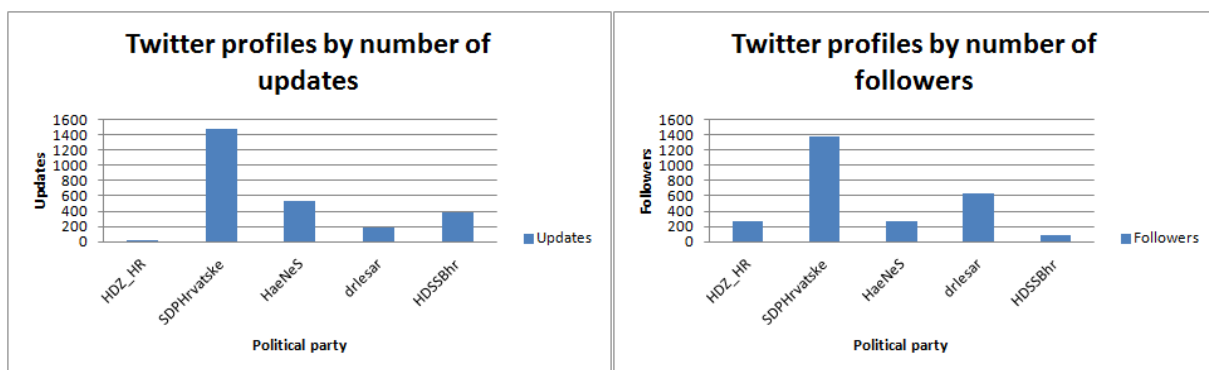
Analysed political parties are: Croatian Democratic Union (Hrvatska demokratska zajednica), Social Democratic Party of Croatia (Socijaldemokratska partija Hrvatske), Croatian People's Party-Liberal Democrats (Hrvatska narodna stranka – Liberalni Demokrati), Croatian Labourists - Labour Party (Hrvatski laburisti - Stranka rada) and Croatian Democratic Alliance of Slavonia and Baranja (Hrvatski demokratski savez Slavonije i Baranje).

All of the five mentioned parties have Twitter profiles (Table 2):

- Croatian Democratic Union - @HDZ_HR
- Social Democratic Party of Croatia - @SDPHrvatske
- Croatian People's Party-Liberal Democrats - @HaeNeS
- Croatian Labourists - Labour Party - @drlesar
- Croatian Democratic Alliance of Slavonia and Baranja - @HDSSBhr

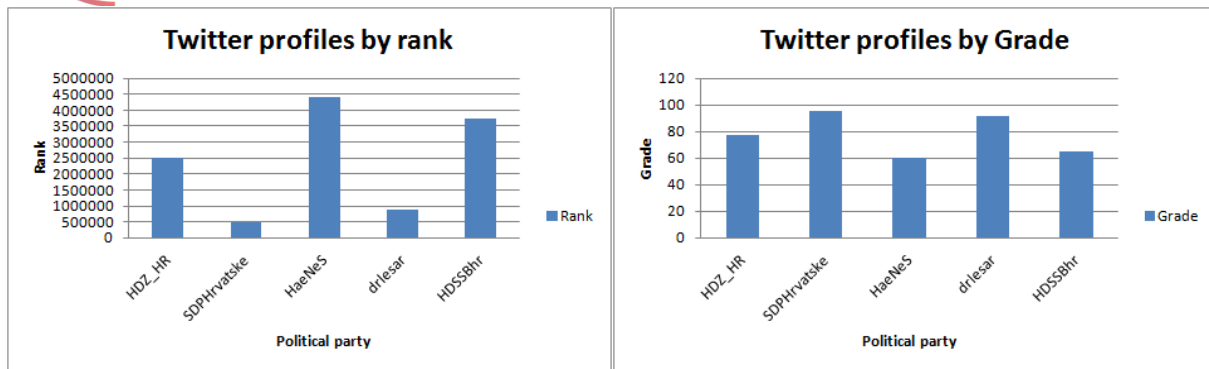
Table 2: Twitter profiles and characteristics of Croatian political parties

Twitter account	Rank	Followers	Following	Updates	Account opened	Grade
HDZ_HR	2521914	263	0	5	27.2.2009	77
SDPHrvatske	506601	1375	946	1470	15.9.2009	95,5
HaeNeS	4393131	272	136	532	23.5.2010	60
drlesar	901676	639	55	183	27.7.2011	92
HDSSBhr	3748941	89	142	384	21.3.2011	65



(a) (b)
Figure 3: Twitter profiles by number of (a) followers and number of (b) updates

It can be seen (Fig. 3a) that Social Democratic Party of Croatia has the largest number of updates, and the largest number of followers (Fig. 3b). Through number of updates, number of followers and number of following profiles, twitter rank (Fig. 4a) and twitter grade (Fig. 4b) are calculated.



(a) (b)
Figure 4: Twitter profiles by (a) rank and (b) grade

4.3. Slovenia

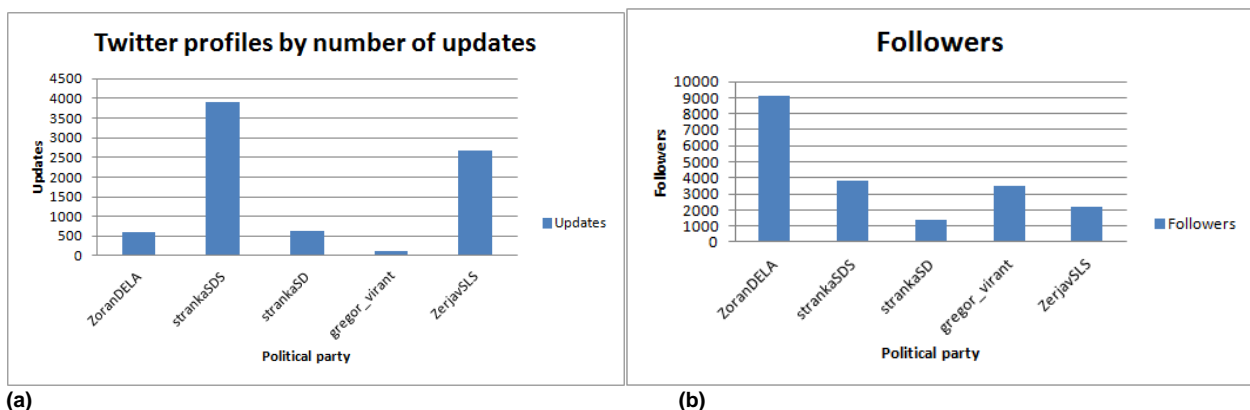
Analysis has been done on the following political parties: Positive Slovenia (Pozitivna Slovenija), Slovenian Democratic Party (Slovenska demokratska stranka), Social Democrats (Socialni demokrati), Gregor Virant's Civic List (Državljanska lista Gregorja Viranta), Slovenian People's Party (Slovenska ljudska stranka), Democratic Party of Pensioners of Slovenia (Demokratska stranka upokojencev Slovenije). Out of this six political parties, only one of them does not have a twitter profile - Democratic Party of Pensioners of Slovenia.

Other five mentioned parties have Twitter profiles (Table 3):

- Positive Slovenia - @ZoranDELA
- Slovenian Democratic Party - @strankaSDS
- Social Democrats - @strankaSD
- Gregor Virant's Civic List - @gregor_virant
- Slovenian People's Party - @ZerjavSLS

Table 3: Twitter profiles and characteristics of Croatian political parties

Twitter account	Rank	Followers	Following	Updates	Account opened	Grade
ZoranDELA	140885	9092	669	610	27.8.2010	100
strankaSDS	180203	3822	427	3891	25.2.2009	100
strankaSD	420557	1342	271	635	26.10.2011	96,4
gregor_virant	270132	3536	144	122	18.10.2011	97,3
ZerjavSLS	297809	2232	562	2670	21.4.2010	97,3



(a) (b)
Figure 5: Twitter profiles by number of (a) followers and number of (b) updates

It can be seen (Fig. 5a) that Slovenian Democratic Party has the largest number of updates, but Positive Slovenia has the largest number of followers (Fig. 5b). Through number of updates, number of followers and number of following profiles, twitter rank (Fig. 6a) and twitter grade (Fig. 6b) are calculated.

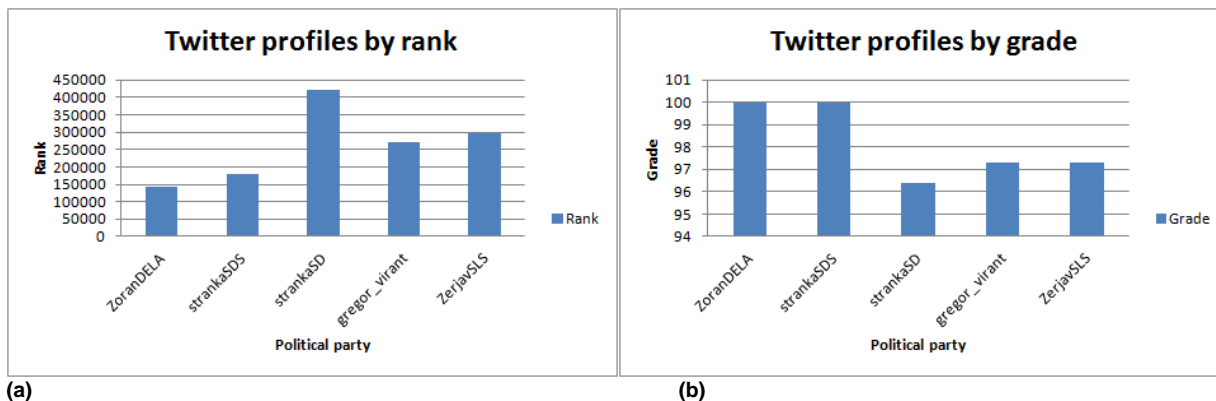


Figure 6: Twitter profiles by (a) rank and (b) grade

4.4. BiH

Analysed parties are: Social Democratic Party BiH (Socijaldemokratska partija BiH), Alliance of Independent Social Democrats (Savez nezavisnih socijaldemokrata), Party of Democratic Action (Stranka demokratske akcije), Serbian Democratic Party (Srpska demokratska stranka) and Croatian Democratic Union of Bosnia and Herzegovina (Hrvatska demokratska zajednica Bosne i Hercegovine). Out of this five political parties, only one of them does not have a twitter profile - Croatian Democratic Union of Bosnia and Herzegovina.

Other four mentioned parties have Twitter profiles (Table 4):

- Social Democratic Party BiH - @sdpbih
- Alliance of Independent Social Democrats - @srpskazauvijek
- Party of Democratic Action - @ASDAba
- Serbian Democratic Party - @sdrscom

Table 4: Twitter profiles and characteristics of Croatian political parties

Twitter account	Rank	Followers	Following	Updates	Account opened	Grade
sdpbih	2051739	171	23	937	10.9.2010	81
srpskazauvijek	1536590	257	22	1708	4.9.2010	86
ASDAba	9743944	1	0	2	13.4.2010	9
sdrscom	5421542	38	58	240	4.8.2011	50

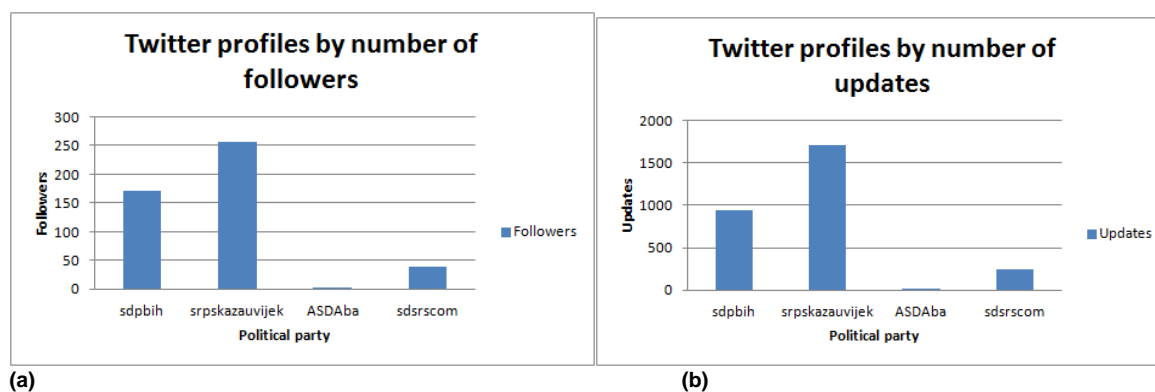


Figure 7: Twitter profiles by number of (a) followers and number of (b) updates

It can be seen (Fig. 7a) that Alliance of Independent Social Democrats has the largest number of updates, and the largest number of followers (Fig. 7b). Through number of updates, number of followers and number of following profiles, twitter rank (Fig. 8a) and twitter grade (Fig. 8b) are calculated.

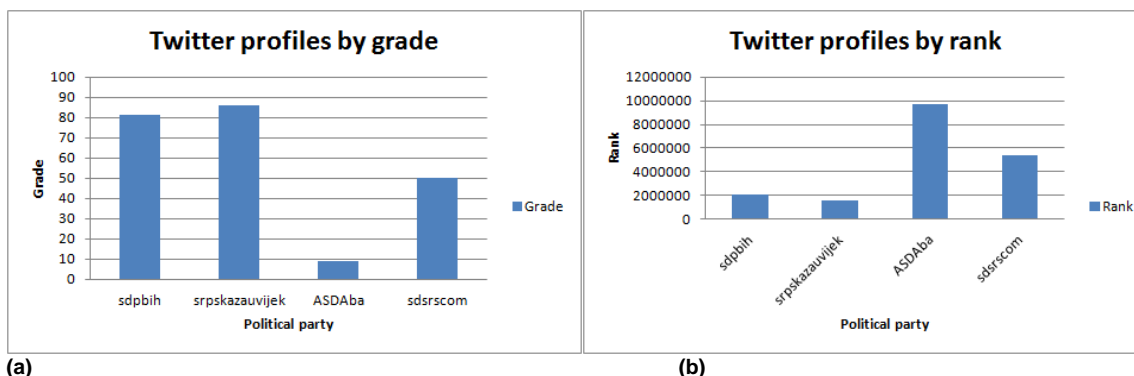


Figure 8: Twitter profiles by (a) rank and (b) grade

6. CONCLUSION

By this analysis of statistical information, and by reading numerous articles, it is concluded that Internet is used in politics in all analysed countries. Twitter social network is far from general popularity of Facebook, but its popularity is increasing every day. Twitter has great potential. This potential has been discovered by political parties but is yet to be exploited. Communication over Twitter unfortunately has many minuses. The main problem is unidirectional communication. There are no answers to users questions. There is also the problem of popularity of Twitter, inactive profiles etc. In most cases, politicians and political parties are active during election campaigns for state, local or presidential elections to win more votes. With election ending, Internet activity also mostly ends.

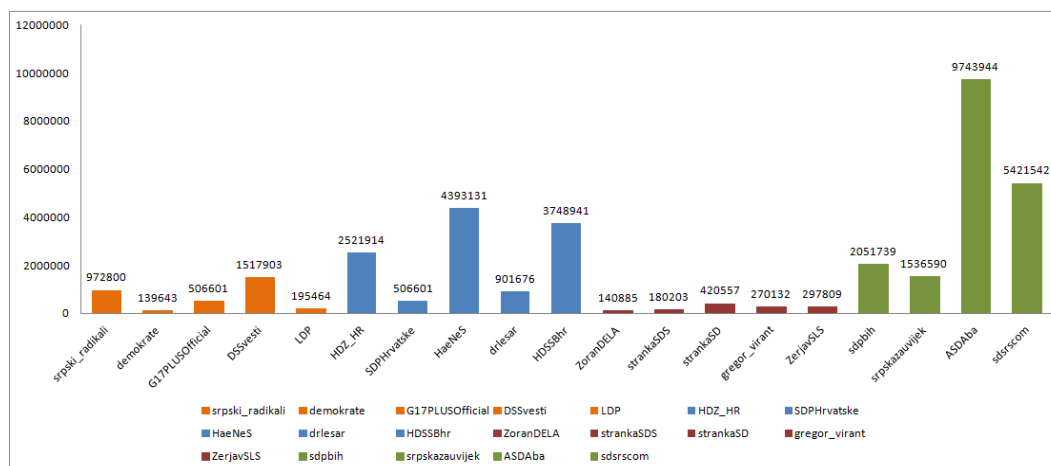


Figure 9: Twitter profiles of all political parties analysed by rank

According to ranking of profiles of all political parties analysed, Slovenian political parties have the highest ranking, Serbian political parties follow them, then Croatian, and Bosnia and Herzegovina at the end (Fig. 9). Future work will analyze political communication over Facebook in neighbour countries.

ACKNOWLEDGMENTS

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INVASION OF PRIVACY IN THE TIME OF ONLINE SOCIAL NETWORKING

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Abstract: *This paper is based on the comparison between the 2008 research and the official data about social networks in 2011. The main topic is the relation between privacy and sharing information on social networks. The reason why this research was conducted is that the concept of privacy, which has existed for a very long time and is considered a fundamental human right, is slowly disappearing because of massive sharing of personal information via a wide range of Internet media. The research was conducted in 2008 on a group of students at all universities of Serbia using an electronic questionnaire. The data from 2011 was the official data on a particular social network. After comparisons, it is clear that privacy as we know it no longer exists and social networks are no more about fun and entertainment but much more about business.*

Keywords: *Privacy, policy, social, networks, research, comparison*

1. INTRODUCTION

Probably one of these days you got a call from at least one acquaintance to become his Facebook friend. Nothing unusual, considering that every day more and more Internet visitors uses currently the most up to date social networking application that crashes all previous boundaries. If you have already used one of similar communication applications, and if you have realized that you were tired of many self-imposed roles, you can relax and finally decide to present yourself to the virtual world exactly as you are, and accept with relief an invitation to join in the Facebook network. With unconcealed cinder you've started to compare your knowledge and taste in movies, music and pets with your new cyber friends, to selflessly send them hugs, kisses or your photos. You have discovered that you could easily reach long lost friends, colleagues and business partners. And you realized that, if you wanted them to find you, you must be open and leave as much information about yourself. In this way, you end a many years long tradition of concealment of identity and maintaining the confidentiality of various of information about yourself and about others.

What started to develop an interest for studying new patterns of behaviour on the Internet is a completely new phenomenon created by it. No communication media, until the Internet, did not manage to create a new, virtual space that has enabled its users to meet, learn and communicate between themselves. All previous methods of intermediary communications (letters, telegraph, telephone) were of transmission character, i.e. their role was to enable targeted remote communication. Introducing electronic mail service, the Internet joined to intermediary-targeted ways of communication, suppressing classic mail and, beside mobile phones, has become the dominant aspect of this type of communication. However, the particularity of the Internet is reflected in the fact that it has enabled a new type of mass social interaction. Whether it is the word of synchronized or unsynchronized communication¹, specificity is that its condition is no longer aimed at targeted or communication only with the ones we know, but it is getting closer, especially with synchronized communication, to face-to-face communication which takes place in a public place. However, chat-rooms and social networks on the Internet, do not only represent public places where many meet and pass by, but they may be more coherent occurrences that are thematically specific, with less and less limited number of integrated members. They start to regularly communicate, to develop their rules of communication² and build specific subculture through social patterns called virtual communities.

¹ Communication that is realized through the Internet (computer mediated communication) can be divided on synchronized (the one that takes place directly and in real time) and non-synchronized (indirect, the one that is not taking place in real time).

² One of the specifics of communication on the Internet is the language which is used. The adjustments or modifications of standard linguistic forms and rules, and on the other side is being enriched with the so-called emoticons (symbols that represent different moods) that have the function to imitate non-verbal aspects of communication in the real world. (Crystal, 2001.) represent different moods that have the function to imitate non-verbal aspects of communication in the real world. (Crystal, 2001.)

The Internet returned the topic of community in the centre of interest, through discussions on *cyber* space. Some recognized the possibility of returning to traditional strongly integrated community (Rheingold, 1993), other opted for possibility to create community free from nationalism, racial and gender prejudices, while the third rejected real possibility of forming community outside the physical space of the real world.

Leaving early Internet studies behind, it is essential to interpret new forms of social connectivity in a wider social context. If city represents projection of society in physical space, then virtual place is projection of society in *cyber* space. Only if we connect virtual society forms with the overall climate of individualization and network structures of macro and micro social relations, we can correctly interpret their manifestations and characteristics. But that does not mean that all social patterns on the Internet represent manifestations of networked individualism, but that they also represent projections of traditional patterns that may be based on religious, racial and other principles.

Starting from understanding that the Internet as a communications medium has dual nature, meaning that he is a intermediation channel for remote communication, but also virtual space for the establishment and maintenance of new social relations, we can extract two basic functions of the Internet: transmission and procreative (Carey, 1989). Transmission function indicates the Internet as a channel for technological intermediation of targeted communication between remote specific subjects of interaction. Through procreative function the Internet transcends the role of the mediation channel and converts into a social interaction space. This feature not only allows the individuals to develop through the existing remote connections, but also, in accordance with their needs, to build entirely new relations. Internet in this aspect became a social reservoir, and his virtual seats are just one click of the mouse away from us, wherever located.

2. RESEARCH IN 2008

2.1 Defining the sample

Because of this emerging phenomenon, during the month of February 2008 the research was conducted on use of social networks such as Facebook and MySpace among university students in Serbia. The sample included 1664 respondents, which makes about 1% of all students, proportionately taken in relation to the number of students per each university. All state universities in the Republic of Serbia were included (Belgrade, Novi Sad, Nis, Kragujevac, Novi Pazar, with the exception of Pristina University in Kosovska Mitrovica for objective reasons). The educational profiles structure of the respondents was as following: Natural-Mathematics 11.8%, Social-humanistic 47.3%, Medical 12.7%, Technical-Technological 24.3 and Artistic 3.9%. Males (49%) and females (51%) were almost equally represented. Considering the fact that they are all students, it is not surprising that 88.1% of respondents was at the age between 20 and 25. Half of the surveyed students are currently living with parents in the family homes, 8.2% lives in the student home, 11.3% of them live alone, and 30.5% live with someone.

In March and April this research was conducted on the Internet. A form of electronic questionnaire was posted on the Cyber Academic Forum site, belonging to student organization on Faculty of Organisational Sciences, and filled by 1022 visitors during these two months. Link to this questionnaire was forwarded to many groups in Facebook and MySpace community, as well as to individual student forums. The sample, therefore, becomes somewhat different. It included 86.5% of student population in Serbia, but also 9.8% of high school students and 3.7% of graduated students. The gender balance was preserved - 44% of female and 56% of male respondents. A large number of respondents fit in the age structure of offline sample - 82% are between 20 and 25 years, 10.4% are between 15 and 20 years, the rest consists of people from 25 years of age and not older than 35 years. Of course, those are the people who use the Internet intensively, and they are not accounted for in the results of this research, and will be subject to some special studies.

2.2 Formulating the questionnaire

The questionnaire consisted of 33 questions in three parts. The first set (7 questions) consisted of socio-demographic questions, as explained in the sample section. The second set of questions related to the availability of PC (where and when respondents use PC) and the degree of Internet using (whether and to which extent they are using it, to which purpose and in what way). Issues related to ways of communication on the Internet were featured, particularly for the use of certain chat-rooms, and for the

use of social networks. The third part (17 issues) was directed to users of Facebook and MySpace as the most frequently used social networks in these regions. Five grade Likert type scale was created for the purposes of this research, which goes from 1 for response *always* to 5 for *never*.

2.3 Analysis of collected data

The development of informational society in Serbia is notable in the past few years, as confirmed by the fact that 92.4% of students owns personal computer (compared to 55.1% according to research from 2003³). Of this number, 94.1% uses the Internet, which indicates its inevitable influence on the life of the young people. 50.4% of them uses Internet every day, half of which for more than 2 hours per day. Educational web sites are always visited by 30.3% of them, sometimes by 40.3%, but 19.4% of students never visits this type of sites. The percentage is higher when we talk about the news sites, always visited by 66.2% of them, sometimes by 25.3% and never by 8.5% of students. Leisure services are always visited by 34.4% of them, sometimes by 38%, and 27.6% of them never visits these sites.

Yet, one of the key reasons for the use of the Internet, as identified by students, is online communication, mostly by e-mail, then through various chat applications and finally through social networking. Numerous social researchers in the past decade tried to discover the causes of the ever more intensive need for communication in virtual space. When emerged, this type of communication took place behind the hidden identity of its participants. Until the phenomenon of social networking, users did not feel the need for disclosing of their identity, and used various pseudonyms. Easy way of involvement and disconnection, as well as possibility of identity changing, allowed for certain degree of relaxation and safety of individuals. The need to remain anonymous in this infinite world has widened the gap between online and offline personal life of ever increasing number of the Internet users. Short messages, introduction of new symbols such as a smile, allowed for arbitrary interpretation of the content and the opportunity to keep the distance. The introduction of visual identification with web cameras gradually changed the flow of communication and improved the individual's need to connect with others and to be recognized in the cyber world, even if only with the ones he knows.

Whether it was necessary for a certain period of time to pass in order to overcome the fear of the unknown, or for that generation of cyber kids to grow up with the Internet, it is still somewhat unclear. In any case, it becomes unsustainable, still somewhere present, this misapprehension that virtual groups consists solely of idle and lonely computer maniacs who want to escape from reality. Besides clearly measurable evolution of the Internet as well as social maturation of its users, explosive development of social networks becomes understandable. Final liberation and discovery that there are countless ways to connect with similar people if you leave enough data about yourself introduces us into a new era. Privacy loses its significance when compared with inevitable human need for socialization. In addition to that, the research results show that 45.1% of students uses some kind of existing social networks, mainly social networking application Facebook.

In 91.3% of the cases they communicate with closest friends. As for the communication with unknown people - in 25% of the cases this type of communication is rare, but 5.6% of respondents always communicate with strangers. This statistics is confirmed by the fact that 81.2% of students usually uses these applications for convergence with friends, 19.3% for finding "lost" friends, and for linking to people with similar interests in 15.1% of cases. For the purpose of achieving emotional connection 4.89% of students opted for the option - always, 23.51% - occasionally, 71.6% - never. It is interesting that, in all levels, more than twice higher number of male participants identified this option. Half of social networks users (50.6%), however, use this kind of communication for "killing time".

Maintaining contact with friends from the social network is being held, except through the Internet in 35.5% of cases, with mobile phone / sms 33.4% of them, through prone and personal contact in 28.5% of cases, while only 2.6% of students used exclusively personal contact for the development of communication, which indicates a very satisfactory role of the Internet in the social life of young people.

³ Research of Academic Cyber Forum "Using of personal computers by students", 2003.

Half of the respondents got to know personally at least one friend gained in the cyber community, but only 1.02% online relationships converts into deeper emotional contact, which indicates a certain degree of reservation and caution among members of virtual communities. The gap between online and offline gets relieved with mobile phone communication, especially through SMS contact, which in 13% of the cases serves as an additional form of communication. For those who dare to cross the line of real contact, in only 7.42% of the cases they continue to see each other intensively, 10.68% of them rarely, 16% continue to communicate by telephone, 6.25% through the Internet, while 4.45% of them cease all kind of communication. The number of „friends“ in these networks is mainly up to 80 (44.3% of users has up to 20 friends, 30.3% from 20 to 80).

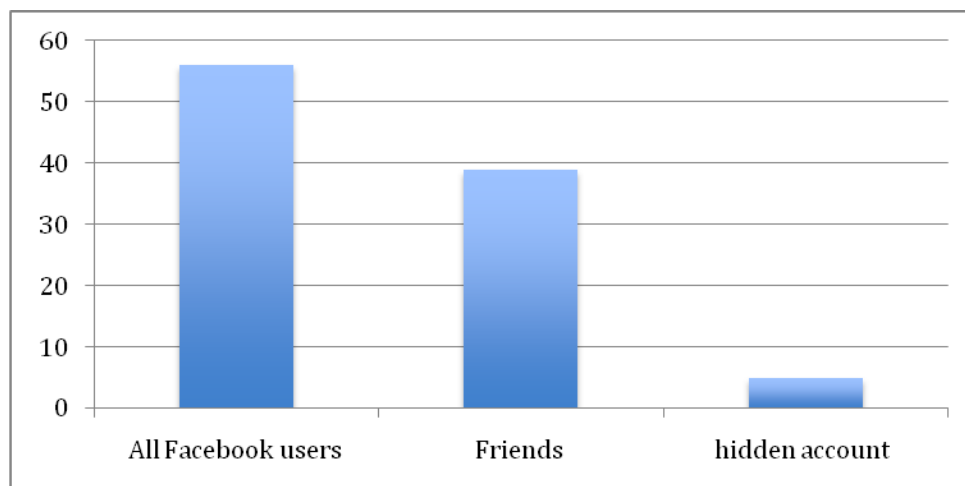


Figure 2: Facebook account visibility in percentage

As a confirmation that this is real social network, transferred to the cyber space, indicates the fact that 56% of participants allows them to be "seen" by all users, 39% - just by friends. Only 5% of students hide their identity in this virtual community. Confirmation that the secrecy in the cyber space was exceeded gave 68.5% of students who, on the question what information about yourself you leave specified the name, surname and date of birth, while 57% leaves the photo on their profile. However, only 15.7% are ready to leave mail or contact phone number, and marital status (whether in relationship, married or single) 37% of them. Others identify themselves through different interests, education, academic community (Faculty) to which they belong, and through many other groups of all profiles.

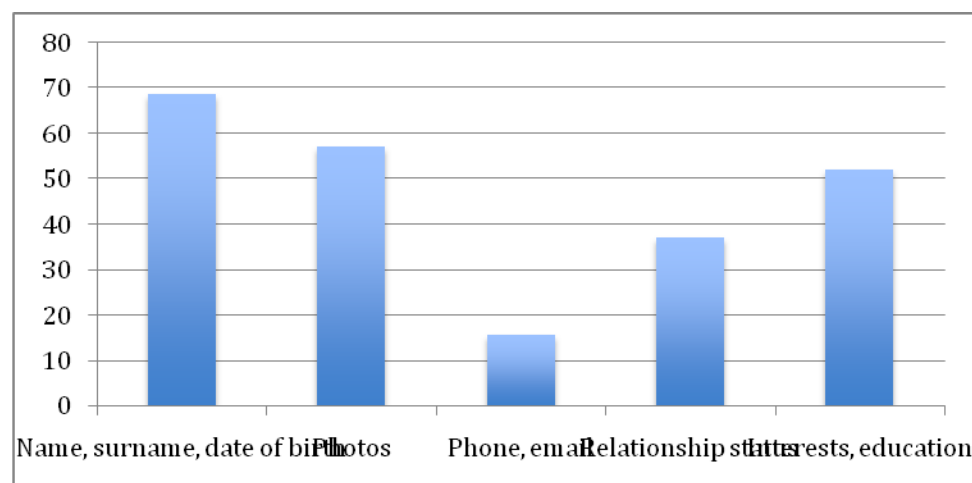


Figure 2: Type of information shared on Facebook in percentage

It is interesting that 91% of respondents think that there is no possibility of abuse in these networks and that they are not interested in who can use their personal data. The only thing that bothered them, in 35%

of cases, was receipt of unwanted messages, which are, primarily, related to many applications uploaded by their friends. Identity theft was emphasized only by 4% of users.

2.4 Focus groups

Discussion in the focus group, consisting of 10 students from University of Belgrade, with different educational profiles and of both sexes, explained some of these results. All members of the group intensively used various means of communication on the Internet. For the exchange of important information, materials for learning, business communication, they use e-mail. Seven of them consider forums as major form of online communications. The amount of information, access speed, unlimited time of use, the possibility of active participation, these are characteristics and advantages that they delegate primarily to forums but, increasingly, also to social networks. For them, this new virtual communities are just another option and chance for something more. Internet, according to them, is not a window into the world, it *is the world*, the world in which there are no visas, where everyone who is in is just a single mouse click away from any point inside of this world. This is a network through which countless information flow, equally available to all, to students who seek scholarship to continue studies at a foreign university, to passengers who seek inexpensive transportation and lodging, to researchers seeking new scientific achievements, conferences, or even current literature. But it is also a place where you can establish contacts between those who otherwise would never have met.

2.5 Conclusion of research

The question is whether the development of the Internet and many social networking systems, which have confirmed people's striving desire toward more intensive communication and connectivity through different socialization processes, led to overcoming of our need for privacy. Whether we became so sure of our own choices and the possibility to even promote them online, or are we, in fact, so distant from each other that it became immaterial what do other people think and how do they represent themselves. Only time will give an answer to this question, and we will, in the meantime, find each other on one of the social networks.

3. COMPARISON OF YEAR 2008 AND 2011

It is 2012th year and concept of social networking on the Internet has drastically changed since the last research conducted in 2008th. You have all probably forgot the time when you were leaving only your name and surname, or even just a nickname in aim to make an account on the social network website. By introducing new features social networks initiated new demands for sharing more personal data in order to connect with others similar to you. In the very beginning people used to connect mostly with their everyday friends. As networks were getting bigger, users needs were growing, too. For an instance, if you would like to get in touch with some from your primary school, you must provide some more specific information such as name of the school, year you participated in etc. Also, emergence of companies on social networks has led to users leaving details of their employment, experience and interests.

Secondly, development in IT industry has established the new way people communicate among each other. Nowadays, users are spending more time using social networks not only for entertainment, but also for other activities such as business and education.

Those new trends in online social media communication has led us to this new research on privacy of users on Internet by comparing it to one from 2008th year.

3.1 Data in 2011

Internet users growth in past three years has led us to social network diversification. Therefore, today we have new networks specialized for certain type of communication among users.

For an instance, Twitter is social network based on short status updates with over 140 million users. LinkedIn is a network oriented to professional business people where they can communicate, make contacts and seek for new jobs by updating their working experience and expertise online. FourSquare is location-based service which provides users to notify location to others and also see other friends locations and recommendations for certain places. In the end, there are Facebook and Google who are trying to merge multiple services into one integrated platform.

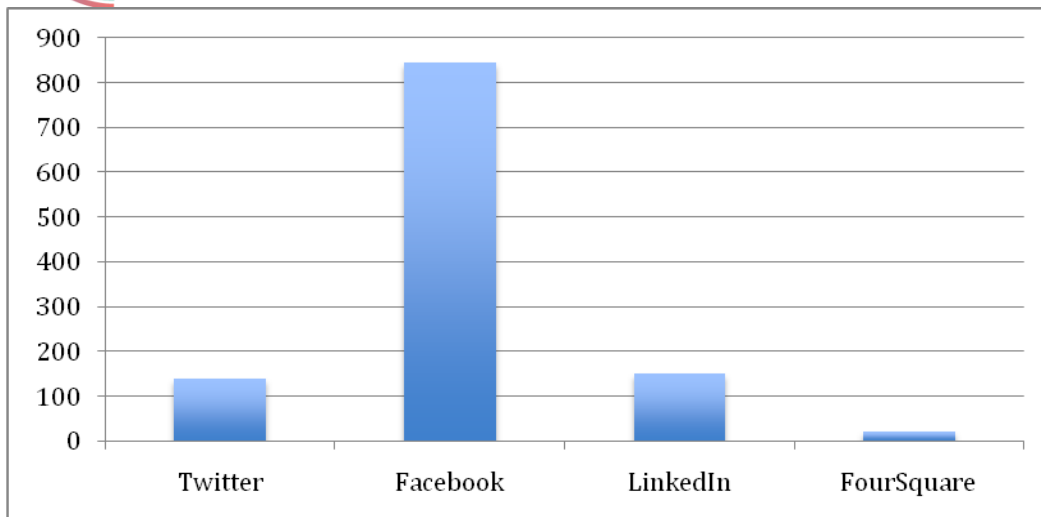


Figure 3: Number of users (in millions)

Popularity growth⁴ of these social networks has resulted in fact that users are present on more than one network, which invokes sharing different types of content, which often includes personal data of the user.

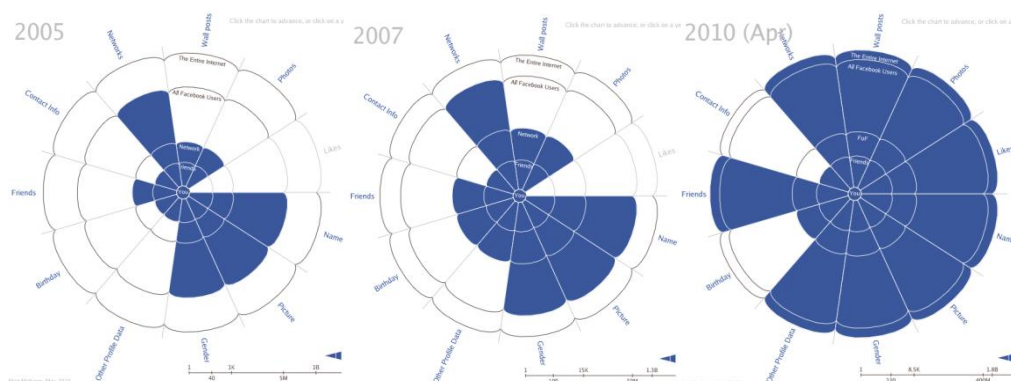


Figure 4: Level of protection and types of information sharing

Figure above⁵ represents types of information, which are published, and level of privacy regarding to that can access them. Comparison is conducted through years from 2005 to 2010. Inner circle shows information that are visible by friends of certain user who published them. In second circle information are visible to user's friends of friends, while outer circle shows that published information are visible to all Facebook users. Each piece of circle indicates certain category of information, which is provided.

Figure clearly shows that from year to year users are providing bigger amount of information about themselves to wider audience on Facebook.

4. PRIVACY POLICY AND DATA COLLECTING

Even though social networks are diversified, Big Internet companies such as Google and Facebook are doing all they can to try and connect all those different services under their roof. There are numerous examples of new social networks and/or Internet services which got purchased by Google or Facebook (YouTube – Google, Instagram – Facebook). This is done because it is easier to create somebody's full profile if data about that person is gathered on a few platforms.

⁴<http://newsroom.fb.com/content/default.aspx?NewsAreaId=22> data about Facebook, 20 of April 2012

<http://newsroom.fb.com/content/default.aspx?NewsAreaId=22> data about FourSquare, 20 of April 2012

<http://blog.twitter.com/2012/03/twitter-turns-six.html> data about Twitter, 20 of April 2012

http://en.wikipedia.org/wiki/LinkedIn#cite_note-linkedin2-2 data about LinkedIn, 20 of April 2012

⁵<http://www.socialbakers.com/> Facebook statistics, 20 of April 2012

4.1 Google policy change

Example and a proof of this strategy is Google's latest policy change⁶. Before 1st of March, Google had 60 different policies for numerous of services that they offered (Google+, Gmail, YouTube, Calendar, etc.). Then, they packed all of those into one general Google policy. What does this new policy changes?

Google spokesperson - Alma Whitten, summarized the firm's new move with next words: *"Our new privacy policy makes it clear that if you're signed in, we may combine information you've provided from one service with information from other services. In short, we will treat you like a single user across all products, which will mean a simple, more intuitive Google experience."*

The point of this change, however, is that Google, in addition to merging their many privacy policies, is also merging their entire platform⁷. Meaning, all data collected on Gmail, You Tube and Google+ will be intertwined – thereby allowing for more targeted advertising. And yes, part of that data being collected is of the tracking variety – in other words, once you're logged-in to Google, they have the right to track your online activity within their network. And you can't opt-out.

This change is about the whole Internet basically becoming personalized. By tracking down all of users activities online, Google will be able to make a profile of the user and to be more intuitive about that users needs and interests. For example, if you search the Internet using Google, and type „Jaguar“, Google will know if you are looking for an animal or a car. If you use features such as Google calendar and Google maps, Google will be able to tell you if you're going to be late for a meeting, based on your calendar activities, your location and a local traffic conditions. It also allows Google to place better-targeted ads. By combining its data, Google will have much more precise data on its users. So for example if a user is searching Google for a holiday in Ibiza for June, they could be served advertisements from travel agents with an offer for Ibiza while they're watching videos on YouTube.

What does that mean practically? The more they know about you, the better they'll be able [to serve up targeted ads; and targeted ads lead to better sales.](#)

New Google policy explains what type of information they will collect. There are two collecting strategies.

- 1) *Information that user gives them.* Many of theirs services require from user to sign up for a Google Account. When they do, they will be asked for a personal information, such as name, Email address, telephone number, credit card. If a user wants to take a full advantage of the features that Google offers, he will be asked to create a publicly visible Google profile.
- 2) *Information they collect from use of their services.* In the policy itself says: *"We may collect information about the services that you use and how you use them, like when you visit a website that uses our advertising services or you view and interact with our ads and content."* This includes device information (such as hardware model, operating system, etc.), Log information (IP address, cookies, telephony log – duration o calls, SMS routing information, etc), Location information, Local storage.

4.2 Facebook Data mining

There is a great question about what Facebook does with all the information it collects from its users⁸. Most of us, who have a Facebook account, have noticed that there are more and more ads that are somehow related to us. That's because none of the data which users post on Facebook doesn't go unnoticed. The companies pay a great deal of money to get their hands on that data, so they can learn about those customers and what they do online so they can target them better.

Entities such as airlines, politicians, and even non-profits can use this data for finding new customers or targeting products to existing ones. Financial services companies such as banks and lenders are also

⁶<http://googleblog.blogspot.com/2012/01/updating-our-privacy-policies-and-terms.html> Google official blog. Updating privacy, 21 of April 2012

⁷<http://www.aaronkellylaw.com/internet-law/googles-new-online-privacy-policy-internet-lawyer-explains-in-plain-english/> Kelly / Warner internet lawyers. Google policy change explanation. 21 of April 2012

⁸<https://www.facebook.com/about/privacy/> Facebook privacy policy, 21 of April 2012

using the same data mining services for marketing purposes and to make lending decisions. For instance, certain types of credit products, which fit your personality, could be marketed specifically to you.

The Facebook policy says, „*We do not share any of your information with advertisers (unless, of course, you give us permission)*“. Over 40 million websites have installed the 'Like' button across the internet, so the infrastructure and technology is already there for Facebook to start capitalizing on its users' data away from the social networking site. When an advertiser creates an advert on Facebook, they are given the opportunity to choose their audience by location, demographics, likes, keywords and any other [information we receive](#) or can tell about you and other users. For example, an advertiser can choose to target 18 to 35 year-old women who live in Serbia and like basketball.

4.3 Conclusion

As a technology is constantly upgrading, so is our presence on the web. Internet giants are doing all they can to change the way we represent ourselves on-line. We watched the Internet users, starting the on-line road as an anonymous user, hidden behind some alias name, to become a full personality, like in the offline world.

Companies are doing everything they can to create a full individual, from all the information they can gather via social media. Somewhere in some database, there are folders with our names on them, describing our on-line habits. They tell who we are, what we like, which languages we speak, what food we eat, which books we read, which places we have been to.

If you ask yourself „Who gave those companies the right to know so many information about us, about who we really are?“, maybe you should also ask yourself – are WE the ones who gave them that power ?

The research shows that we shared so many information about ourselves, so that we could connect to the like-minded. Things drastically change from year 2008. to 2011. We, the users, care less and less about our privacy. The privacy policies are in most cases not even ridden. And even if every user does read them, what can we do about it as individuals?

The social networks are no more about fun, sharing photos and connecting with people. It became serious business with serious money involved and serious personal information data flowing around.

As the days go by, everyone is feeling like „The Big Brother“ is watching more intensively than the day before.

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ENGAGING CUSTOMERS THROUGH SOCIAL MEDIA TOOLS

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Abstract:

The time that people devote to all forms of media consumption is higher nowadays, and so is the impact of media on society and the public. Specificity of social media requires a completely new way of thinking and engagement of experts in order to use them efficiently and achieve goals. This paper will research the possibilities that social media provide to organizations as well as ways to connect customers via social media tools. It examines the concept, features and advantages over traditional social media. Social media, satisfying the expectations of the new generation of consumers, fill gaps by creating new opportunities and establish themselves as an inevitable instrument of marketers in connecting with customers and market products. In accordance with that, the rules of marketing have also changed. While a number of marketers are still trying to achieve the desired results the old way, others explore and take advantage of social media, which bring new opportunities to connect with customers, but require a completely different way of thinking and acting. If used in a proper way, social media and networks can trigger a change of the entire marketing mix. The era of monomedia, where nations are bombarded daily with television commercials with the aim of building great brands is coming to an end. Marketing will be characterized by a radical new way to communicate with customers, where a digitally networked society has crucial influence on purchase intent and brand building.

Key words: Social media, social networks, communication, engaging customers, organizations, web tools

1. INTRODUCTION

Social media represents set of different new sources on web, that users, run, distribute and use in order to educate other customers about products, services, brands, individuals and challenges (Mangold & Faulds, 2009). Also, social media could be defined as a group of web applications based on ideological and technical basis Veba 2.0 that provides creation and exchange of content generated by users (Kaplan & Haenlein, 2010). It includes various media, such as blogs, chat rooms, e-mail, websites and consumer forums for ranking products and services, internet sites, discussion forums and social network websites.

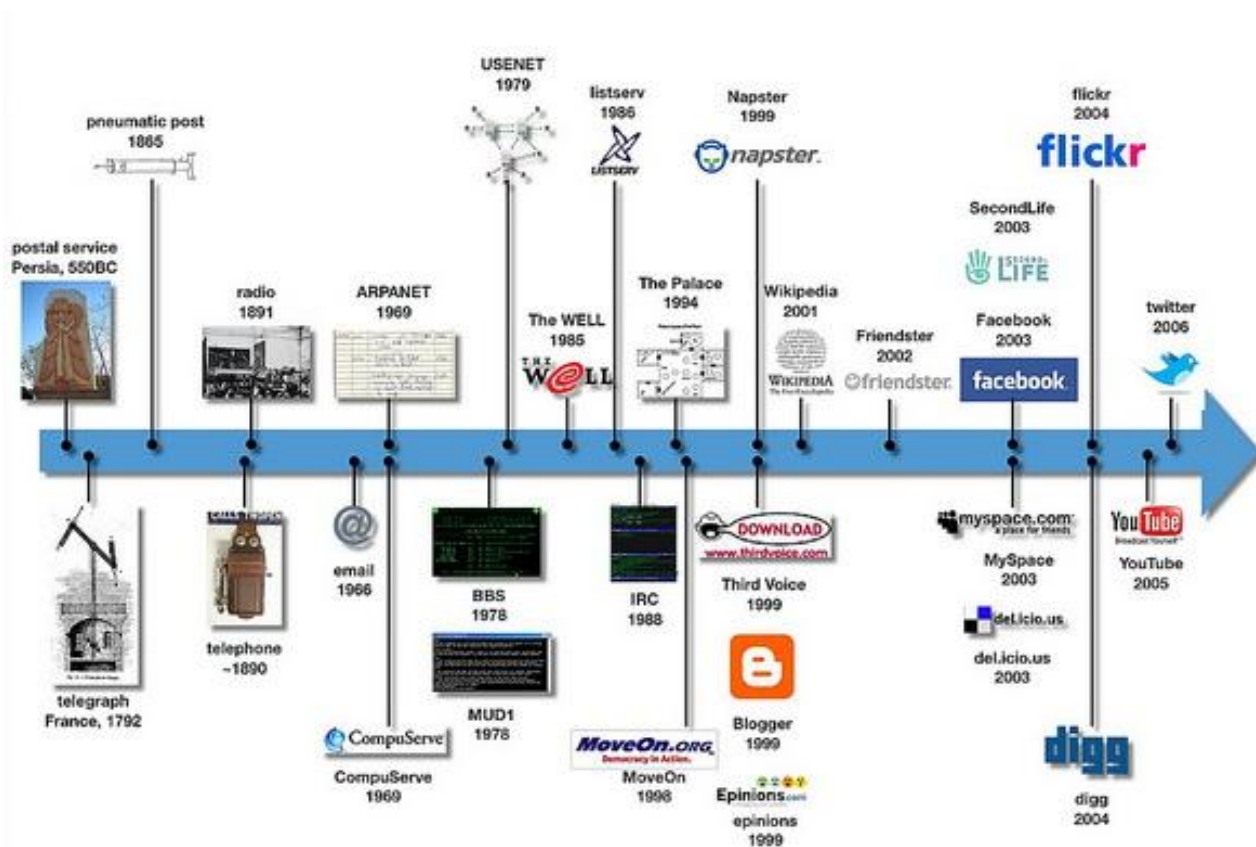
Social media is a gathering place of people with similar concerns and interests. In this way virtual communities of people, gathered around specific issues and informations on a particular website, of academic to the groups that are intended for leisure and various activities. Exchanging ideas and meeting people in such conceptualized space, beyond the limitations that exist in everyday human communication, such as ethnic, religious, gender and age restrictions.

By forming their own discussion groups and topics of the companies and monitoring of existing, effective way to market research is rapid translation of customers through the stages of the purchase process, strengthening the company's image and online business. Taking out your own and researching views and experiences, help in finding solutions to specific situations in the purchase and consumption. The concept of social media is nowadays top subjects of many business managers. Decision-makers, as well as advisors, trying to identify ways in which companies can make profitable use of applications such as Wikipedia, YouTube, Facebook, Second Life, and Twitter.

Today, social media is a new revolutionary trend and should be of interest to companies doing business online, but also for those companies that still do not. Companies are able to control the information available about them through strategically placed and through the publication of good governance and public relations. Because of its very wide distribution and expansion, social media are used for various purposes.

2. HISTORY OF SOCIAL MEDIA

Precursor of internet was the ARPANET, which was created in order to facilitate networking of universities. Some of the first applications Usenet, LISTSERV and BBS's had several characteristics in common with the current social networks. One of the first tools that appeared on web was service for sending and receiving e-mail. The development of the Internet environment was followed by real expansion of the various services that now make the history of the Internet. These services are shown in the middle of the line, and they are Napster, Usenet, The Well, BBC, IRC, until the advent of Wikipedia and the appearance of the first blog services in the late nineties. At the beginning of century, Internet environment is turning exclusively to users, and it is the users who have the opportunity to create content. There are new services that are very simple for use, and the emphasis is on multimedia and interactivity. More frequent user access to the Internet has led to the creation of social networking like MySpace, Facebook, Twitter, You Tube, Flickr, Delicious ... This contributed to the importance of social media that we now have. The latest glamorous groupings are called "virtual worlds" which are computer-based and simulated environments in which they live as three-dimensional avatars. The best-known virtual world is Linden Lab's Second Life. Proper use of a combination of these services and targeting the appropriate market can obtain effective marketing results.



Picture 1: The historical development of social media (Pajić B., 2010.)

Graphic representation shows the rise and progress of the media through the history of the period BC to the present. It starts with the appearance of postal in ancient Persia 550 BC, continues with the invention of the telegraph in France, and then the emergence of radio and television in 1890. created a real revolution in informing. Until the advent of the Internet in the seventies, there was no real media interactivity that connects a large number of users (Pajić, 2010).

3. DIFFERENCES BETWEEN TRADITIONAL AND NEW MEDIA

Unlike traditional media, which through unilateral, one-to-many communication, places informations in public, whose contents are created by professionals, more or less dependent on large and powerful stakeholders, the new concept of media offers bi-directional, many-to-many communication and public interactivity, which itself creates and fully independently selects and takes the necessary

information that are considered as relevant. While in era of monomedia others decided what information is important, in which moment will be placed, unlimited space of multimedia, besides the possibility for the public to choose which information, when and where will be assumed, offers the possibility of further research and finding new information (Fancher, 2009). While traditional media, perhaps too late, trying to adapt to the changes that have led them at a disadvantage (Gillmor, 2009) (introducing the online editions of daily newspapers and magazines; combining television, Internet and mobile communications into a single package, by creating blogs on the web pages of TV, radio stations and newspapers...) social media, meeting the expectations of new generations of consumers, fills gaps, create new opportunities and establish themselves as an indispensable instrument for marketers to connect with customers and product placement.

Accordingly, the rules of marketing have changed. While a certain number of marketers are still trying to come to the old way to the desired results, others explore and take advantage of social media, which bring new opportunities to connect with customers, but require a completely different way of thinking and acting. Used in proper way, social media and networks can trigger a change of the entire marketing mix. Era of monomedia, where nations are bombed by daily television commercials in order to build great brands, is coming to an end. Marketing will mark a radical new way to communicate with customers, where a crucial influence on purchase intent and brand building will have a digitally networked society (Meadows-Klue, 2008).

4. ANALYSIS AND CHARACTERISTICS OF SOCIAL MEDIA

Social media is a new world of free online media created by individuals and organizations. Various theoreticians emphasize different types of social media, and one of the main divisions are: (Zarrella, 2009)

- Social networks on web (Social networking services) - Internet communities that connect people around the world who share similar interests or activities. The most popular social networks are Facebook, LinkedIn, Myspace, Hi5, Friendster, Orkut, ResearchGate and Foursquare.
- Blogs – A blog represents a type of site that allows one or more authors to publish content (text, images, audio and video) in the form of articles (blog post) that are available to other users and are usually displayed in reverse chronological order.
- Microblogs - They allow users to exchange small elements of content, such as short sentences (up to 140 characters), hyperlinks, or individual images. The most popular services for microblogging are: Twitter, Tumblr, Plurk, and Jaiku.
- Media sharing sites - Allow users to create and place documents, images, presentations and audio and video recordings. The most popular sites of this type are: YouTube, Flickr, Scribd, SlideShare, Photobucket, Vimeo, Dailymotion, Livestream, Ustream, Pandora Radio, Spotify and Last.fm.
- Social bookmarking and voting sites - Enable users to tag websites which they find to contain useful or interesting content, and thus to create a list of useful resources. The most popular sites of this type are Delicious and Stumbleupon. A similar system for organization news use websites Digg and Reddit.
- Internet forums – Forum is a hierarchical structure that contains the topics that can be discussed, and each topic can have subtopics.
- Review sites - Sites where users or editors of the site can post their impressions of the products, services, companies and people. The most used sites of this type include Yelp and Epinions.com.
- Virtual worlds - Internet community, which is usually in the form of a computer simulation environment in which users choose a graphic look that will represent them (avatar) and where they can get in touch with each other and create and use objects. The most popular sites of this type are Second Life and SmallWorlds.
- Reputation aggregators - Provide services for ranking sites, usually the reputation of the site's content, which facilitates the customer to select the best products and services. The most popular search engines are Google, Yahoo and Bing. (Weber 2009)

5. CHARACTERISTICS OF SOCIAL MEDIA

The features of social media include participation, transparency, focus on communities, global connections, conversations and user capabilities. (Pajić, 2010)

- Participation: involvement and access to social media is widespread and broad. These media are, from the technological aspect, are complex, while from user's are very simple and designed to be

universally applicable. Using social media is free, registration and accessing accounts are very simple via e-mail address and password. Social media services are also designed to be very easy to use, and provide a full user comfort.

- **Transparency:** Social media are very transparent, as their entire content is public and accessible to all users. One can communicate with individuals and companies and monitor their performance and flows. An important advantage is free access to content, which is now available and transparent, while previously you had to pay for content that has often been filtered.
- **Focus on communities:** The primary focus is based on the creation of certain groups, targets specific groups of people with common interest with the ease of creating such communities. Very simple communication between group members allows free interaction.
- **User features:** User features are reflected in the fact that users can respond to content, or to express opinions and give feedback. It is a large number of portals where users have the option to vote, response and evaluate specific content whether it is video, image, text or other format.
- **Conversation:** In addition to good communication, it is possible to easily share content among users, so that some content can be easily spread and passed on to other users. The conversation is enabled through the messages in a large number of social media. These messages may be public so the other users and friends can see them and can be private, enclosed in a private conversation. The possibility of commenting is another important feature that encourages high-quality conversation. It is very useful to hear, and follow the comments of other users. Constructive criticism is good because they make us correct a mistake and encourage us to be even better. It is especially important not to filter the comments, unless they are spam.
- **Global connections:** The advantage of social media is that many people could see one's content in a short time. Connection can be carried out in two ways, by simply linking to other sites and shared among other sites. This creates a global connection among users around the world in a very quick and efficient manner.
- **Interoperability of social media:** Connectivity of social media allows information sharing through various platforms within social communities. Advertising in this environment is a good choice because it exceeds the limits of a social network. Connectivity of platforms allows users visibility of certain topics, products and services that can be found and connect to any social network.

Measuring the effects and costs of marketing activities using social media is a critical component of success, which causes a lot of interest. Although it seems tempting to measure the effects of social media, according to Chris Murdough, it's not impossible (Murdough, 2009). In this case, measurement would be a set of controlling experiences of customers and setting up checkpoints during activities to understand the reactions and predict future customer behavior. Social media are unique because they can be measured both qualitatively (through the topics under discussion, sentiment) and quantitatively (by measuring the range of reach, mentioning in chats). Three basic elements in measuring the effects of the reach of social media (which monitors the number of references and quality of author as some authors have more power than others on the basis of frequency of visits and comments, activities), discussions (need to understand the themes and sentiment of content) and outcomes (outcome monitoring behavior to assess the direct and indirect economic value as a result of engaging in social media).

6. DIVISION OF SOCIAL MEDIA TOOLS

The term social media refers to online tools and platforms that enable Internet users to collaborate, share experiences and make connections based on business arrangements or pleasure. Internet supports, and includes various methods such as social networking, user-sponsored blogs, multimedia sites, company-sponsored web sites, sites on based on cooperation, podcasts, etc. (Chung, 2010), or blogs, message boards, online video, social networking, podcasting and encyclopedias (Ganim, Mattson, Marušić, 2008).

According to (Lincoln, Rice 2009) the most important applications of the key social media are:

- | | |
|-------------------|-----------------------|
| ▪ Blogs | Chat rooms |
| ▪ Microblogs | Message boards |
| ▪ RSS | Podcasts |
| ▪ Vlogs | Sharing video content |
| ▪ Social networks | Sharing photos |

The division of social media tools (Pajić, 2010)

- | | |
|-------------------------|----------------------------------|
| ▪ Status | Sharing photos |
| ▪ Profile | Sharing documents |
| ▪ Group | Group of links |
| ▪ Fan page | Social bookmarking |
| ▪ Paid ad | Online journals - blog platforms |
| ▪ Event | Wiki platforms |
| ▪ Chat | RSS readers |
| ▪ Sharing video content | Promoting through forums |
| ▪ Sharing audio content | |

7. CHARACTERISTICS OF SOCIAL MEDIA TOOLS

Social media and networks tools are multifunctional and can contribute to:

- Join community
- Increase impact by presentation
- Assist the product development
- Receiving feedback
- Content creation
- Increase sales
- To create equal relationships among producers, consumers and clients
- Improve communication
- Increase confidence

Statuses on social networking sites can attract the attention of users, followers and potential customers. Regular update of pages on profile has a positive impact on increased traffic and increase the number of followers.

Subscribing to RSS using this tool, it is possible to monitor the content of popular sites, news, blogs by registered users. Sharing video and audio content is a useful audiovisual tool that can bring outstanding results combined with a well-defined strategy.

Online journals and forums with its open contents attract users with similar interests who can find in them useful information such as the experience of other users of a product, make comments, but can also actively participate in the creation of specific content.

8. WAYS OF INVOLVING CUSTOMERS THROUGH SOCIAL MEDIA

The amount of time that people devote to media consumption is increasing, and therefore the impact of media on society and the audience. The trend is particularly noticeable in countries with emerging economies, which are still evolving media market. The media, in fact, affect the simulation of reality and adoption of various forms - social, cultural, consumer, etc. (N. Perić, 2011).

Blogs can play a significant role in engaging customers through on going communication, which, in return, can help to greater brand loyalty.

Blogs tend to be time sensitive and driven by user-defined interactions, messages include customers and they are relevant through the customers. Customers use blogs to reflect their experience of the brand, both good and bad. Companies can offer customers the ability to get a role and be involved with a product or brand. This in return can contribute to build loyalty, giving them feeling of ownership of the brand (Nardini, 2005; Woffington, 2006).

Chart 1: Plan of social media

Listening	Planning	Strategy	Tools
Locate consumers Track consumers activities Focus on target audience	Set business objectives Consider how to increase the power of brand online	- How and where we can achieve increase the power of brand online - How can we change customer relations - Who will be responsible for action implementation	- Decision of what tools will be used - How will we follow activities and measure success

Source: Pajić B., 2010.

By listening, it is necessary to locate consumers, evaluate their social activities and focus on selected target group. When planning to determine the business tasks and assess how the strength of the brand could be extended to the Internet. Strategy defines how and where we act, how to change our relationship with customers and who will lead these efforts. Finally, to determine which tools will be used and how our activities will be monitored and how we will determine our success.

Chart 2: ACES Planning (A-audiences, C-capabilities, E-enablement, S-sustainability)

TARGET GROUP	POSSIBILITIES	ENABLED BY	SUSTAINABILITY
- Clients - Employees - Workers - Pensioners - Investors - Community - Government - NGO	- Vision - Trends - Chances and risk - Current/future state - Case study - Options - Surveying	- Government - Customer experience - Community building - Development models - Models of connectivity - Informational models - Organizational factors	- Monitoring the value of assets - Identification of new or changed group - Adjustment on based opportunities and business organizational needs - The possibility of new and improved ideas

Source: Pajić B., 2010.

Good practice of maintaining the presence in social media

- Monitoring discussions on forums, discussions and comments on blogs and in general all references to brands on the web.
- Creation of communication tools on its website, encouraging conversation and support of all related companies.
- Monitoring and participating in any discussion on the web that talks about a product, even thanking customers for using their products. Through this creates a dose of personalization between consumers and products.
- Monitoring the popularity of products and overseeing the competition automatically over the Internet.
- Active monitoring and measurement of product sales with social media monitoring range.
- Updating the blog on a daily basis with the inclusion in discussions on other blogs.
- Demonstration of proficiency on own blog. This means that most of the articles are not only about their own product, but these articles give the value of the product later on.
- Building product ranges using interactive tools, affiliate program, where business partners are linking certain content (phrases) to our site.
- Rewarding good behavior in online communities on the web. Writing letters in person to the biggest fans. Calling those people who have relevant knowledge to write the blog VQS and thus are involved in creating content.

Using the system of social media, companies are involved in participation of a large online community. Companies need to be good community members to take advantage. The trend of consumers using social media is increasing. Consumers rely on various social media sites as much as the company's sites on a particular product or brand. As a result, companies that use social media and directly engage consumers are more likely not only to reach more customers, but also to increase the likelihood of making purchasing decision.

Ideas to attract customers attention through social media

- Competition for the best idea (slogan, music ...) and online voting .
- Survey on the particular product or service.
- Creating a database where the most frequent customers are noted and which will be displayed on the website as winners for loyalty.
- Updating profile page on regular basis and setting up of multimedia content, for example. wallpapers that will be implicitly inspired by product or service. This content can be published weekly or monthly.
- The possibility of a free download of this content is the main idea of linking our brand.

Therefore we influence the promotion and presence in your customer's mind.

According to studies on the involvement of customers, Engaging customers online worldwide Dei (2008) on attitudes towards the information they get from online brand representative, the likelihood that users will transfer the information to others, share their opinions and take buying action is of 57 to 67%. 62% more price information than ads. To obtain information about the company, brand or product, 70% of respondents visit social media sites, 68% of company Web sites, 57% of online news, Review of page 49% and 44% Wiki. Social media play an increasingly important role in marketing strategies of companies. One of the biggest benefits that social media sites have compared to company sites or news is that there is a greater probability that consumers who visit social networking sites will make purchases. Therefore, companies that integrate the elements of social media into their marketing mix will have a greater ability to influence the consumers for the purpose of buying as a final goal.

9. ADVANTAGES OF COMMUNICATION THROUGH SOCIAL MEDIA

By correct communication could be avoided and solved many problems and disagreements. On the other hand, a lack of communication or poor communication can significantly affect business and reputation. Media are able to put themselves in promoting trends, which, short and long term can be of positive or profoundly negative effects on society. Various organizations and groups use media in different ways, they fight for their "share of voice" and influence the public. (Perić 2011.)

Creating a reputation is a long process and could be lost in just a second. The main task of public relations and marketing is to create a positive image of the company or individual in public. Communication and education via a blog, social network accounts and etc are integral activities in creating and maintaining reputation. These two activities are closely related and the best way is to combine them. Social media are the platform for building confidence, and it requires not only a rational response, but also emotional. Technology without trust is just traffic and built without trust, the company will not be able to operate successfully.

One-way communication offered by traditional media such as television, radio, newspapers and magazines, is becoming obsolete and unacceptable (Vulić 2011), a new standard, thanks to technology platforms that have crisscrossed the people, organizations and society, becomes a "many to many" communication. One of the basic needs of every person is to make contact and to be a member of a group. Customers want to be connected, but the precondition that this relationship could work is that the company has to be honest and authentic.

10. CONCLUSION

Start of implementation of every new media was followed by skepticism, misunderstanding, inadequate methods of use, lack of understanding of real opportunities to fully. Since discovery of press, telegraph, television and radio, through internet to new social media, a content which those channels transmitted, in order to achieve marketing plans, varied and advanced. From the static, one-way communication, evolved in two-way, participatory, active, 'many-to-many mode of communication'. Number of users of social media tools is growing, and their advantages are more obvious, so the use of social media to achieve marketing activities becomes inevitable. Because of that the focus of marketing professionals is on detecting and tidying the problem of ways and opportunities for their adequate implementation. Specific features of social media require a whole new way of thinking and engagement of marketing experts, in order to efficiently and effectively used in achieving its goals. The methods used in traditional media will not give results. Cooperation, respect and understanding of both sides in communication and the desire to create strong, long-term relationships are the basic guidelines. The rules specific to social media activities include a holistic approach, listening to public opinion and desire and the realization of connection with customers. The main objective of engaging in social media is to achieve good relations and creating a strongly (evangelists) on the

other networks, which will be much more effective than paid advertising to achieve marketing objectives. Only the inclusion of users will be able to exploit the full potential of new media.

It is necessary to engage in conversation and start new ones. Contribute to communication on blogs and forums through comments and posts, and providing answers to questions. Companies can increase the impact of development by creating corporate blogs and groups on social networks that brings us to more visits and audience. In the existing communication or the creation of new one a special significance has maintaining transparency. In terms of maintaining presence on social media, social media campaign requires sustainability and continuity. The most effective way of winning over the attention of online audience is contribution and encouraging online communication. Marketing of social media and networking increase customer loyalty and enhance brand strength. To be successful, companies should be transparent in its efforts to achieve the goal of educating the public, selling a product or services. Further technology advancement will enable new ways and new channels of communication for the transmission of messages, and marketers on previous media example, must realize that in communication with the new generation's need to react fast, to adapt to changes and it is very important to understand opportunities and the essence of the new media, because without the proper use of all possibilities, the communication will not give the right results.

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USAGE OF SOCIAL NETWORKS FOR EXTERNAL COMMUNICATION OF INTERNATIONAL ORGANIZATIONS

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Abstract: *Changes of communication on a global level has induced global actors to reconsider possibilities of communicating ideas. The paper is based on the supposition that new communication technologies can save the external dialog of international organizations by restoring dialogic and participatory communication in the public sphere, thus preserving a role of public relations as two-way communication rather than propaganda and spin. This study examines how new social networking media could be broadly used by organizations to advance their mission and programs. New roles of social networks have also been discussed, proposing a specific role: social networks as a peace instrument. The paper finally suggests and outlines further research efforts based on the existing literature and the evolving contexts.*

Keywords: *international organizations, communication, social media, Twitter, globalization, public relations, peace instrument, influence*

1. INTRODUCTION

Authors seek to examine possible solution on how international organizations can play their role in modern world affairs. There are two principal reasons for undertaking this task. First, it is obvious fact that international organizations have grown in numerous of various, powerful entities that represents an important part of the contemporary world. Second, technological revolution and evolution has led us through new perspectives linked with every single process that local and global systems have, thus new approaches are needed. And finally, a focus on international organizations, rather than nations and states, as units of analysis, provides a fresh perspective on the evolution of international relations and enables us to reconceptualize modern world landscape. For example, the phenomenon known as globalization might be better understood if the ways in which international organizations have been seeking for decades to establish transnational connections - politically, economically and culturally - has been examined. One important dimension of globalization is increasing integration and exchange of information among countries. Role of international organizations are crucial for such global approach, considering importance of combining two types of international organizations: intergovernmental organizations and international nongovernmental organizations. The former category consists of institutions that come into existence through formal agreements among nations and represent the respective governments. The United Nations is the best-known example, but several thousands of them exist today. Another one refers to associations that are established by private individuals and groups. According to the Economic Social Council of the United Nations, any international organization that is not established by any agreements among governments is an international nongovernmental organization (further: INGOs). There are lot of ways of their categorizations, but most common is Harold Jacobson's one - three broad types: those INGOs concerned with security and peace, those with trade and economic affairs and those with social welfare and human rights.

A fundamental assumption seems to underlie the study of international relations through an examination of diplomacy (social, political and economic) and war: international affairs are seen as a sum of activities of nations as they try to safeguard their interests and enhance their power positions in the world while engaging in negotiations and preparing possible clashes of interest (Berridge, 2005). These organizations could make a difference if one construes world affairs in a different way.

Marshall McLuhan theorized that *message is a medium*. If communicating ideas and missions is in the scope of the international organizations' work, then the way of communicating the message to the audience should be taken as crucial. Year of 1960 and slowly growth of international organization's sector is way behind us, so structures of the very beginnings of their policies have to be changed. Sharing the ideas, gathering people and movements seek for transparent, world-wide tool representing a most efficient way to connect third party with medium-message. Thus it is understandable why nowadays communication of international organization messages and exchange of the ideas should be more focused on external instead of internal communication. Public presence of the ideas and policies is

preferable way for gathering interested parties. It is important that wide presence could be assured and extended. Public (external) relations of international organizations are updating and rebuilding its roots by discovering and implementing more ways for transmitting goals of the organizations. Ewan has pointed out (1996) "In regard to a more democratic future, then, ways of enhancing the circulation of ideas—regardless of economic circumstance—need to be developed. We need to imagine what an active public life might look like in an electronic age. We need to discover ways to move beyond thinking of public relations as a function of compliance experts and learn to think of it as an ongoing and inclusive process of discussion". Process of discussion represents as highly important for nowadays international organizations' positioning. Discussion in two directions will make NGOs transparent and globally recognizable, while their ideas should be wide-visible. The fact of two-direction communication, based on discussion-sharing is main point for understanding present and future role of the INGOs. We are facing a return to participation in the public sphere, brought about by the computer, the Internet, the World Wide Web, and wireless digital communication. Through the web-participation most ideas, people, countries and regions around the world are inextricably linked. Yet, as cultural, political, and economic differences persist, international representatives and managers must be able to develop a global mindset in order to effectively adjust, adapt, and navigate the changing landscape of international movements through international organization's work.

2. INTERNATIONAL PUBLIC RELATIONS AND SOCIAL MEDIA ACTIVITY

Even though public relations has been studied as a social science and formalized only in the 20th century, evidence of its practice can be traced back to ancient civilizations in Egypt, Babylon, China, Greece, and Rome, in medieval India, where story tellers spread rulers' messages, serving common public relations function.

Public relations have long been looked at with suspicion given its use of persuasion to influence public opinion. That suspicion turns to fear when public relations are linked to propaganda. The 1963 Senate Foreign Relations Committee's investigation into the Foreign Agents Registration Act provides an opportunity to explore the fear of the public's susceptibility to propaganda and the perceived role of public relations in shaping public opinion. Public relations practitioners working for foreign clients were portrayed in the hearings as mercenaries who worked behind the scenes to influence foreign policy. Within international organization's framework role of public relations is shaping public opinion.

The fear of public relations that emerged in the hearings appears to stem from a belief that international organizations operated behind the scenes, that individuals were influenced by public relations tactics because they were unaware they were being targeted. Identification of the source, it was believed, was vital if individuals were going to be able to resist persuasion (Taylor-Kent, 2010). Unless public relations practitioners come to terms with the history of the field and how it has been perceived, the profession will remain maligned and misunderstood. International activity through social networks represents social media as a very good instrument capable of resolving the problem of transparency of INGOs work, but also to over jump problem of INGOs introvert behaviour.

Since the late 1980s, there has been a remarkable change in the scale and significance of INGOs as they move to centre-stage in international development work in areas such as poverty alleviation, sustainable development, human rights and women's emancipation. The ideological ascendancy of neo-liberalism and globalisation trends in the late 20th century has prompted a massive emergence of new social movements as local communities and marginalised groups around the world strive to create their own self-identity. These agencies have been able to perform this advocacy role because of their simultaneous attachment to places and local cultures on the one hand and their critical engagement with the global on the other.

One of the main defining characteristics of INGOs is that they operate simultaneously at different levels of the global system. In principle, therefore, INGOs are able to link micro-level experience with macro-level policy. (Madon, 1999) A more recent approach adopted by INGOs to increase the impact of development projects has been to improve learning by establishing closer linkages with partner organisations. Rather than working directly within the structures they intend to influence, INGOs are choosing to increase their impact by lobbying interested parties and other structures from outside. It seems like nowadays there is no better way then social media usage strategy to be incorporated eithin INGOs work.

The emergence and increasing popularity of social media have changed the practice of public relations. Social media offer numerous opportunities for public relations practitioners to interact with a wide range of

stakeholders. In their annual social media study, Wright and Hinson in 2010 found most public relations professionals felt social media tools were important in their organizations. Specifically, 77% of respondents felt social networks like Facebook and LinkedIn were important (14% felt they were unimportant), 65% felt micro-blogging sites like Twitter were important (23% felt they were unimportant), 65% felt video sharing like YouTube was important (22% felt it was unimportant), and 57% felt blogs were important (33% felt were unimportant). Because of the high importance organizations place on social media as well as its growing popularity among various publics, international organizations are becoming more involved and interested in trying to measure and manage social media. As more forms of social media emerge, international organizations must understand what tools to use, how to use them appropriately, and how to measure their effectiveness. Social media change the relationship between an organization and its employees, customers, competitors, suppliers, investors, the media, and essentially anyone who has an impact on or who can be impacted by an organization. .

To communicate effectively, organizations must go to where their stakeholders are. In fact, as one participant stated, the greatest risk is to ignore social media and to allow conversations to happen without awareness or participation (Pain, 2009) Social media was seen as a cost effective way to receive greater reach for research, communication and timely targeted dialogue.

Tredinnick (2006) defined social networking sites as those sites driven by user-participation and user-generated content. Social media provide a variety of ways for users to become involved with organizations. Waters (2009) found that nonprofit organizations use social media to streamline their management functions, interact with volunteers and donors, and educate others about their programs and services. Through interactions with stakeholders on Twitter, Facebook and other social media applications, organizations seek to develop relationships with important publics.

Kelleher (2006) encouraged practitioners to use the Internet and social networking sites to advocate for their organizations and causes; however, the practitioners should be transparent in their online communication activities. For full disclosure, organizations must make sure to provide a detailed description of the organization and its history, use hyperlinks to connect to the organization's Web site, provide logos and visual cues to establish the connection, and list the individuals who are responsible for maintaining the social networking site profile.

Taylor, Kent, and White (2001) pointed out that Web sites should be useful for gathering important stakeholders. The usefulness of social net-working site profiles often focuses on the information that is being distributed. The most common forms of message dissemination include posting links to external news items about the organization or its causes; posting photographs, video, or audio files from the organization and its supporters; and using the message board or discussion wall to post-announcements and answer questions Including press releases and campaign summaries on their social networking sites should also be encouraged to maximize the impact of their presence on social networking sites (Waters 2009).

Finally, interactivity plays an important role in developing relationships online with stakeholders. Jo and Kim (2003) found that interactivity was essential if organizations were to develop relationships with their stakeholders. Asking for e-mail addresses and ways to donate online can increase interactivity, but organizations should provide a calendar of events or listing volunteer opportunities to involve stakeholders offline as well.

Carrera (2008) predicted that social networking sites would force public relations practitioners to rethink how they approach relationship development with their stakeholders. Practitioners have been exploring the interactive elements of social networking and experiencing benefits for their organizations. This study found that although nonprofits are open and transparent with their Twitter and Facebook profiles, they are not using the sites to their full potential to inform others and get them involved with organizational activities.

2. INGO'S EXTERNAL COMMUNICATION IMPLEMENTED THROUGH TWITTER

Increased use of new media is a growing trend in public relations, and this is particularly relevant for transnational organizations. These media enable activists to mobilize citizens across the globe by efficiently transcending national boundaries at minimal costs. *Communicating ideas through social media increases the influence of those ideas*. The types of new media include websites, blogs, podcasts, video casts/vlogs, and wikis. By saying of communication officials from transnational organizations, there are

five main functions of new media that are highly important: promoting the image of their organization, fund-raising, engaging and interacting with the general public, forging and facilitating networking with other NGOs, and providing journalists with easy access to materials regarding the organization. The greatest communicative phenomenon that has developed on the Internet from 2006 is certainly a Twitter. With a growth above 1400%, in the period between April 2008 and April 2009, it has more than 40 million users, mostly in the United States and the north of Europe⁹

Twitter has become the largest nanoblogging (micro-blogging) site on the Internet. Nanoblogging is an Internet-based publishing platform that consists of sending short text messages with a maximum length of 140 characters through tools such as Twitter. Its purpose is to explain what one is doing at a given time, share information with other users or offer links to other web sites. About 19% of all Internet users use Twitter, and strategic communicators recognize its ability to reach a large number of stakeholders, making it the most used social media application in official public relations, advertising, and marketing campaigns. 36% of Twitter users say that they use it for strictly professional purposes. Cortés (2012) considers that the main activity of public relations carried out by companies via nanoblogging platforms with the purpose of building and maintaining a positive image is the use of “the corporate account as an accessory or alternative channel to existing ones to communicate with the press, clients or shareholders by means of the publication of company news and activities”. While it may seem difficult to communicate in a meaningful manner with 140 characters or less, Twitter users have found creative ways to get the most out of each Tweet by using different communication tools. Its text limitations, however, should not be an obstacle for disseminating links that lead to reflection and to the building of the public relations body of knowledge, basically through links to other information media and platforms (e.g. World Wide Web).

Organizations today can choose new ways to connect with their stakeholders through social media, by providing them with a current info about organizational practice and engage in conversations. According to the research paper by Lovejoy, Waters and Saxton (2012) that looks into how 73 nonprofit organizations use Twitter to engage stakeholders through their tweets, but also through other various communication methods. The sample was taken from the 2009 listing of the “Nonprofit Times 100,” the 100 largest non-university affiliated nonprofits in the United States based on revenue. Of these 100 organizations, 73 had Twitter accounts. Specifically it looks into the organizations utilization of tweet frequency, following behavior, hyperlinks, hashtags, public messages, retweets, and multimedia files. After analyzing 4655 tweets, the study found that the US nation's largest nonprofits are not using Twitter to maximize stakeholder involvement. Instead, they continue to use social media as a one-way communication channel as less than 20% of their total tweets demonstrate conversations and roughly 16% demonstrate indirect connections to specific users. Examining the relationship-building features of their Facebook pages these studies concluded that organizations were losing opportunities to engage with key supporters on Facebook.

While an organization's updates, or tweets, serve as the organization's principal communication tool on Twitter, there are other aspects specific to Twitter that can aid in stakeholder engagement and organizational research. Posting a tweet with the “@” symbol before the username of a Twitter user directs the message to that user. The organization would see that a user mentioned them and have the ability to respond to the inquiry. Through these public messages, a dialog is created between the organization and the user, but it is also viewable by anyone following the organization's or the individual's account. Sending public messages demonstrates responsiveness and establishes a dialog between users and the organization. Public messages also reduce the redundancy of answering the same questions repeatedly in direct, private messages. The number of tweets that are public messages has varied in studies from between 12.5% and 22%.

Another common feature used on Twitter is the retweet (RT), a function of the Twitter service that allows one user to repost a tweet from another user while giving acknowledgement of the user by adding “RT@[username]” to the beginning of the message. Retweets can be used to highlight involvement with another organization or to share information that the organization finds pertinent. The use of hashtags, represented by the pound sign (#), denotes that a message is relevant to a particular topic. Hashtags make searching for information easier. Hashtags works best when they have been established and agreed upon, which usually happens when an organization recommends a specific hashtag to be used by those interested in an event or conversation. After the 2010 Haitian earthquake, the American Red Cross

⁹ www.hubspot.com; www.compete.com.

encouraged individuals to use the #Haiti hashtag to ask questions and spread news about their relief efforts.

Third-party websites have been created to help users share information as hyperlinks on Twitter. Sharing informative links can get followers interested in the story with their tweets in the same way newspapers use headlines. Organizations encourage followers to read the whole story by following links to non-Twitter websites. Two of the more popular media storage sites are Twitpic.com, which allows users to link to photos, and TwitVid.com, which allows users to link to videos.

Of the 73 nonprofit organizations featured in the sample, 37% operate in the field of public/society benefit, 26% were healthcare organizations, 18% were human service (non-healthcare) organizations, 15% were from the arts and humanities sector, two organizations were non-university educational groups, and one organization was a religious group (Xifra, Grau 2010). The nonprofit organizations followed an average of 2842 users. To examine the friending practices of nonprofits, the researchers set up a Twitter account that followed all 73 sampled organizations. The researchers' Twitter account was followed by only 17 of these 73 organizations. Following users that follow an organization gives the impression that the organization wants to know what they are interested in, even if they never actually read the users' tweets. Conversely, an organization that does not follow anyone gives the impression that they do not want to engage in a dialog. The sampled nonprofits sent out a total of 4655 tweets over the one-month period. Range for monthly tweet totals from a low of 0 to a high of 289. But we should keep in mind that followers expect organizations to be more active than individual users. Of the 73 organizations, 80.8% organizations were classified as active.

The majority of the nonprofits' tweets included hyperlinks to external information. At 68% of the total, the usage of hyperlinks by the nonprofits is considerably greater than the average individual user on Twitter, which has been estimated to be between 13% and 25%. Twitpic.com was used to send 61 links to photos (1.3% of tweets) by 21 organizations, and only one used TwitVid.com to link to one video. Sampled nonprofits used public messages in greater proportion than previously found. Of the 4655 tweets made during the examined month, 16.2% of the total were public messages, characterized as any message that started with the "@" symbol. Nonprofits in the sample used the retweet function less often than Twitter users in general. Kim and Yang (2009) estimated that individuals use the function 27.8% of the time. The nonprofits in this sample had 755 (16.2%) tweets that shared other users' tweets.

Nearly 30% of the nonprofits' tweets included one or more hashtags. The use of hashtags by these organizations is likely a sign that the nonprofits have a better understanding of how searches occur on Twitter and focus more on search engine optimization than the others in the sample. The findings reflect similar studies in that one-way information dissemination (e.g., hyperlinks and retweeted messages) were the dominant communication tools used by the sampled nonprofits.

Although some organizations are using Twitter to create genuine dialog, most are using it as just another way to send out information such as that found in traditional newsletters, media kits, and annual reports. Although it may seem counterintuitive that real interactions can happen in 140 characters or less, Twitter can be used as a tool for stakeholder engagement—if practitioners use it proactively or to use it reactively for customer service.

There may be a more simplistic reason for the lack of interaction on organizations' social media accounts. Practitioners may neither understand nor believe that social media is the cure-all for organizational communication efforts. While Twitter is the leading social media outlet for organized campaign efforts, strategic communicators still remain puzzled over how to best use Twitter to connect with their external stakeholders on a daily basis (**Table 1**).

Additionally, the number of communication tools has changed since the data for this study were collected. Twitter now allows users to create lists of users, which could aid organizational communication to specific groups, and allows users to share their geographic location with their tweets, which organizations could use to attract audiences to specific events. However, perhaps one of the most beneficial studies would examine how shared links are being used. Are the hyperlinks shared on Twitter sending users to interactive spaces, such as blogs or Facebook, where online communities can form, or are they merely serving as a gateway to the organization's website, where the virtual brochure strategy continues to dominate? Exploring where these hyperlinks connect would reveal insights into how organizations view social media's role in organizational endeavours.

Table 1: Examples for increasing INGOs network¹⁰

Good practice	Bad practice
Defining the audience	Generic organizational announcements
Identifying the area of contribution	Public communication with your stakeholders
Clarifying main goal and strategy mapping	Lack of Twitter strategy
Highlighting most important information	
Communication strategy	

Two examples of good practices of external communication of international organizations on Twitter are:

1. **@Road to Rio+20** an international organization organized as an international support for United Nations conference that is going to be held this summer in Rio de Janeiro
2. **@Generations for peace**, an international organization for peace building promotion funded by HRH Prince of Jordan

Both are highly recognized on the social network by gathering people, institutions and stakeholders, constantly enhancing the dialog and interaction among their followers. More than 70 countries are involved in each of these international organization's online entities with more than 2600 followers from all over the globe. The transparency, open interaction and every-day possibility for contribution and involvement making these two examples appropriate, signifying notification for others how usage of social network can share the message and increase the presence world-wide.

6. CONCLUSION

It is important to stress out that most of the humanitarian organizations keep in secret their communication policies and results, because of the sensitivity of the public communication strategy that needs to present the organization in the positive light. There are also some unique challenges that humanitarian organizations faces, different than other non-profits. Example of UN humanitarian organizations briefly describes their communication strategy. The question that occurs is what are the most common challenges of using social media as a tool for external communication? The most common challenge for the organization is accepting the lack of control associated with social media and not knowing what people might say or do. Overall, they are all exposed to internal and external crises. Internally organizations must be concerned with issues such as intellectual property leakages, criticism of management or the company, and embarrassing employee behaviour that can damage a brand. Criticism, false information and activist groups were the biggest external concerns.

In almost every professional publication that you look at today, someone is making a claim about the power of social media communication technologies to improve public relations practice. The question today is not so much a question of "if" but "*how*" to use social media in external relations. The demand to use social media and new communication technology is also influencing public relations education. In only a decade, the role of technology in public relations has grown tremendously. Web sites are an omnipresent communication tool and e-mail has become the norm of internal and external organizational communication. The newest technology on the scene is social media allows one to obtain information from literally billions of sources. Obtaining and sharing information among billions represents a tremendous possibility for forwarding good and not so good ideas and practices. Remains on international organizations to assure that this possibility will develop in a positive, globally important way. Forwarding peace ideas and peaceful actions and campaigns seems as most important task that global society could archive. Twitter, for e.g. with its specific structure of *following* and *retweeting* could be an excellent peace instrument for a peace implementation among global population. For further research, authors suggesting *measuring organization's influence* at social network such Twitter is. Those measurement and specific

¹⁰ <http://bloodandmilk.org/2008/10/20/five-mistakes-international-organizations-make-when-using-twitter/>.

relations based on influence could be recognized as leading points for predicting the longitude of spreading peace through various societies by different communications and actions.

Authors strongly believe that international organizations worldwide will recognize the importance of active presence on social networks, but also the importance of developing their presence, concerning that social media represents probably the most efficient communication tool, but surely the most common tool of contemporary world.

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IMPACT OF SOCIAL NETWORKING ON DAILY LIFE OF THE SERBIAN YOUTH IN A POSTCONFLICT ENVIRONMENT – A CASE STUDY

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Abstract: *The paper presents the results of empirical research with an aim to explore the intensiveness of the impact exerted by the most popular social networks (Facebook primarily) on daily lives of the Serbian youth population in Kosovo and Metohija. The province of Kosovo and Metohija is currently experiencing a post-socialist and a post-conflict transformation. The research starts from the presumption that the Kosovo and Metohija Serbian youth socialize in a rather different way than their fellow generation from other parts of Serbia. The advantages of the use of the Internet and social networks were supposed to be explored as a way of socialization, social promotion and, in particular, decreasing the feeling of isolation which the Serbian youth in Kosovo and Metohija have in comparison to the rest of Serbia and the world. On the basis of the earlier research “Daily Life of Young Serbs in Kosovo and Metohija”, the authors have carried out additional research using poll questionnaires, focus group discussions and observation with intervention (including communication via social networks). The interviewees were young Serbs – secondary school and university students, from the north of Kosovo and Metohija and isolated Serbian areas in the south of the province (also known as enclaves). The results of the research have indicated that the Kosovo and Metohija Serbian youth massively use the Internet and social networks as a way to escape from their gloomy reality. This gives them an impression that they do not live on the margins of the world. The compiled answers and the contemporary topic may guide the authors towards further and far more extensive and comprehensive research on the impact of social networks on the social lives of the Serbian youth in Kosovo and Metohija.*

Key words: social networks, Facebook, youth population, Serbs, daily life, Kosovo and Metohija.

1. INTRODUCTION

Social networks (primarily Facebook¹¹) are treasure of knowledge, information sharing and a way how to spend spare time. The invention of social networking in the late nineties¹² of the last century and in the first five years¹³ of the XXI century had an immense effect on the amplified Internet usage. The virtualization of people's lives in the spheres of society and labour has considerably occupied a larger portion of the physical area of society and work. The intensive usage of social networks by people of all ages, races, ethnic and social origins, confessions, and both genders, and their dominant influence on people's daily lives, society and culture, indicate a necessity for a continuous scientific research on such an impact. With regard to the popularity and influence of social networking, the global enlargement of Facebook is undoubtful. In spite of the fact that the former Harvard's student Mark Zuuckerberg's initial idea in 2004 was to create a social network which would connect the Harvard's students, it could soon connect more American universities, colleges and IT companies. Finally, in 2006, Facebook offered a free access worldwide. At the end of March 2012, 901 million monthly active users were registered. Approximately 80% of the Facebook's monthly active users are outside the U.S. and Canada. There are 526 million daily active users on average in March 2012. There are 488 million monthly active users who used Facebook mobile products in March 2012 and more than 500 million mobile monthly active users as of April 20, 2012. More than 125 billion friend connections were established on Facebook at the end of March 2012. On average, more than 300 million photos were uploaded to Facebook per day in the three months ended March 31, 2012. An average of 3.2 billion Likes and Comments were generated by

¹¹ The paper was written within Project 178028 – Material and Spiritual Culture of Kosovo and Metohija, financed by the Ministry of Education, Republic of Serbia.

¹² The first online network was *Six Degrees.com*, established in 1997, but it was closed in 2000. Still, the beginning of social networking could even get back in early nineties (*Geocities* in 1994, *The Globe.com* in 1995). Even back in 1971, when the first email was sent with the two computers sitting next to each other, one can count the beginning of social networking.

¹³ The largest number of social networks was created between 1997 and 2004, of which some are the most popular worldwide and regional as well: AOL *Instant Messenger*, *LiveJournal*, *AsianAvenue*, *MiGente*, *Tribe.net*, *BlackPlanet*, *Cyworld*, *LunarStorm*, *Ryze.com*, *Friendster*, *LinkedIn*, *MajSpejs*, *Orkut* and finally *Facebook*.

Facebook users per day during the first quarter of 2012. There were more than 42 million Pages with ten or more Likes at the end of March 2012¹⁴. Facebook is now available in more than 70 languages¹⁵. On their official web page¹⁶ is stated that their mission is to make the world more open and connected. People use Facebook to stay connected with friends and family, to discover what's going on in the world, and to share and express what matters to them". **According to statistics of Socialbakers¹⁷ for the last six months, Facebook penetration in Serbia is 42.00%** compared to the country's population and **75.11%**¹⁸ in relation to number of Internet users. The **total number of FB (Facebook) users in Serbia** is reaching **3084880**. The largest age group is currently **18 - 24** with total of 925 464 users, followed by the users in the age of **25 - 34**¹⁹. **These figures confirm the current major significance of social networks' impact on daily life of youth population but it may predict the continuous trend in future as well.**

2. ABOUT THE RESEARCH

After several years of observing the massive use of social network Facebook, we have decided to explore its influence on the youth population. The research was conducted in the north of Kosovo and Metohija – in the Serbian community. Twelve years after the arrival of international forces in the province, it is still undergoing through a post-conflict transformation process and low intensity conflict. In such a social and political framework, sustainable future of Kosovo Metohija Serbian youth population has become questionable. Starting from this presumption, and following our earlier major research, titled "Daily lives of the Serbian youth in the north of Kosovo and Metohija"²⁰, we did an extra research from January to May 2012, by using poll questionnaires, focus-group discussions and observation with intervention (including communication via social networking). The respondents were young Serbs – the secondary school and university students who originate from the north of the province and from isolated Serbian communities all over Kosovo and Metohija, known as *enclaves*. The *results* illustrated the immense use of Internet and social network (Facebook) by the Serbian youth in Kosovo and Metohija, primarily as a way to escape from their gloomy and insecure reality. The *results* clearly indicated poor quality of their daily life, a substantial lack of options for popular spending of free time among teenagers (in particular, it refers to the enclaves), and finally, the absence of optimistic vision to their future.

There have been four focus groups conducted in the field: the first and second one were age-homogeneous but place-mixed, composed of secondary school, i.e. university students each, from the north and south of the province, the third and fourth ones were age-mixed but place-homogenous, composed of secondary and university students who are studying in Kosovska Mitrovica but originate from the southern enclaves, i.e. originate from the north.²¹ They were divided in such an order as we wanted to explore and compare eventual differences in answers by Mixed and Homogeneous groups, by both criteria: age and place of origin. The results have shown instead that there are no significant differences in the students' answers; the interviewees' answers were rather uniformed. In addition to the obvious popularity of Internet and Facebook as global social networking phenomena, there was a specific value of them to the Serbian youth population in Kosovo and Metohija - the *immense use of Internet as a way out from physical, political and cultural ghettos, a way to escape from insecure and pessimistic reality*. The participants talked of their lives in a very open manner. Social networks make a very important segment of their lives.

¹⁴ <http://www.socialbakers.com/facebook-statistics/>

¹⁵ The data were taken at the official Facebook Page on 30 April 2012:

<http://newsroom.fb.com/content/default.aspx?NewsAreaId=22>

¹⁶ <http://newsroom.fb.com/content/default.aspx?NewsAreaId=22>

¹⁷ *Socialbakers* (<http://www.socialbakers.com>) is a global social media and digital analytics company with customers in 75 countries representing every continent. Socialbakers helps companies measure the effectiveness of their social marketing campaigns across all major networks, Twitter, Facebook, YouTube, LinkedIn and Google+.

¹⁸ According to source <http://www.internetworldstats.com/stats4.htm#european>, these figures are significantly less – 56% (4,107,000 out of 7,310,555) without Kosovo, while the Internet penetration for Kosovo, according to this source, is 20,7% (377,000 out of 1,825,632). As for the Facebook penetration, the statistics for Serbia is similar to the Socialbakers's data – 43,3% (3,173,440)

¹⁹ <http://www.socialbakers.com/facebook-statistics/serbia>

²⁰ Ivana Artonovic, Tatjana Lazarevic, "Daily Life of Young Serbs in Kosovo and Metohija ", "Baština, sv.32", 2012, currently in printing

²¹ The students were from the Gymnasium, both from the art and science, "Mihajlo Petrovic Alas" technical school, Economy-Trade school, Medical school, all from Kosovska Mitrovica and Secondary technical school from Zvečan. Focus groups were composed of students with the Medical, Pedagogy, Philosophy, Economy, Law and Sport faculties.

In this explorative research, sixty respondents were interviewed, and they were all equally represented on the basis of socio-demographic parameters.²² The most common research methodology was a focus-group discussion, as one of the most eligible methods in explorative researches, in such cases when the researching phenomenon is not well known. The reason why focus groups are used in early research stages may be also the structuring of hypothesis ensued from the results of the focus groups discussions²³. It facilitates easier the adoption of decisions on field research strategy that will come up in later research stages (Djuric, 2007). The reason to choose a focus group methodology as the principal one in this research is the development of a social interaction among group members. The aim is to identify the specific standpoints, opinions, beliefs, experiences and reactions of the group members which cannot be easily found by using other research methods. Those standpoints, opinions, beliefs are partially independent from the group or social environment, but the simplest way to discover them is through the members' gathering in their mutual interactions, as the basis on which focus group exists and stimulates.²⁴ We have directed the groups' dynamics towards our aim to receive sincere and open answers from the respondents. In particular, we strived for a stimulation of mutual cooperation among respondents, apropos the task of the moderator to reduce eventual tensions. Due to the pleasant and comfortable atmosphere that enables frank and open discussion (the emphasize of participants' standpoints), the success rate of the focus groups interviews and validity of the received data is of a very high score. According to Djuric (2007), "individual characteristics of participants shall affect on behavior of other participants, interaction quality, cohesion and compatibility of groups. This creates the ambient in which all participants will feel free or poky, motivated or indifferent, relaxed or afraid."(33).

Our focus group participants spoke sincerely of reasons for such an intensive use of social networks and Internet in an open and pleasant atmosphere. The spirit of sincerity during the discussion could be best seen while speaking of the side effects on their qualitative school attendance, preparation of classes and exams, communication with other people and finally, the literacy. Their answers got deeper into the sphere of virtual world, rather than describing a physical socializing in real world as the virtual life replaces more their physical surrounding.

3. SOCIAL NETWORKS AND THEIR INFLUENCE ON DAILY LIFE OF YOUTHS

While discussing "Social networks and their influence on daily life of youth population in Kosovo and Metohija", the participants have emphasized that they use Internet for several hours on daily basis (two to four hours is the average, although this varies as per age, season of the year, daily and school obligations, current emotional spirit of the youths etc.), and that they all have profiles on social networks²⁵, among which, Facebook is the most dominant and most popular. With new generations of Smart Phones and new applications (Google Android for instance), the access to Internet and social networks through cell phones²⁶ became common and more frequent. In fact, almost all interviewees have answered that they make their access to Internet and Facebook through their cell phones often per day, in spite of the fact that almost all of them possess their own PC. Cell phones have evolved to the level of mandatory personal equipment. It enabled more intensive and more often visits to the Internet and social networks.

²² The discussions are audio recorded, so the transcribed answers are fully original. The participants were have demonstrated high level of motivation for discussion on subjected matters. There were no negative verbal or nonverbal participants' reactions, nor rejections of giving answers. Moreover, we noted that the participants of all groups felt a need to openly talk of their lives and standpoints; there was a very intensive interaction within the groups.

²³ Besides explorative, the focus-groups interviews can be also used in a phenomenological (experiences) researches, which is characterized by the researchers' possession of basic knowledge about the interviewed subject. In such a research, the researcher's aim is to expend his/her knowledge and clarify eventual doubts. A phenomenological approach fulfills the objectives of triangulation and confirmation as well i.e. researcher is comparing derived data with results from previously used methods, and final data compares with own previous standing points and knowledge on researched phenomenon(see: Sladjana Djuric, ment. work, 2007, 33).

²⁴ For a researcher, it is more difficult to control a focus group than an individual interview, as the focus group participants may take over the initiative and be in control of the situation. Therefore, it is a must for a researcher to be in well knowledge about the research process. In combination with observing, a focus group enables the researcher to collect more information within a shorter time.

²⁵ Facebook and Twitter

²⁶ Similar findings were established in the earlier cited research „Daily Life of Young Serbs in Kosovo and Metohija." The uniformity in answers was obvious in both generations, among secondary school pupils and university students and in both geographical areas – north and south. Such equality in answers lead us to a conclusion on a continuous absence of creative and progressive opportunities to live daily life among the Serbian youth in the province, limited to all side effects of a post conflict society, of which one is the lack of freedom of movement. Social networks thus became a virtual space, dividing not anymore in 'us' and 'them', offering the Serbian youth in Kosovo and Metohija unlimitedly to exercise their freedom of speech and movement. This refers in specific for the enclaves.

The last generations of cell phones have enabled its users to personalize their access and visits to the world network, which is resulting in their greater dependence on Internet and virtual communications. Our respondents use Internet and social networks for several hours, many times a day. A vast majority connects to the network between 2 and 5 times, and spends 2-4 hours on it, mostly on Facebook, playing video games. It appears however, that the university students are somewhat more rational and spend their time much efficiently than the secondary school students. The latter mainly spend their Internet time by playing games, chatting with friends from their immediate physical environment, personalising their own profiles and visiting other Facebook profiles. Although the university students spend the same time on Facebook like secondary school students, unlike the teenagers, they are still able to set their priorities and go on sites relevant for their studies. They are seeking for useful information about various faculties, including the sites of their own faculties, study programs, but also political-informative sites and fun pages. On question "What do you mainly do on Facebook or other social network?" five participants from the place-mixed group of secondary school students, mainly play video games. Most of them currently played a few times day, or long evening hours the most popular game of "Puzzle". Those teenagers who originate from the southern enclaves communicate with their relatives in Serbia, or with their friends from Kosovska Mitrovica, when they stay in their homes. In general, most of interviewees from all four groups chatted with friends outside of their places of origin (a bit less than two thirds) and all of them check News Page. They also "spy" on other peoples' profiles, mainly of their sympathies, boys/girls or "competition", regardless age, gender or place of origin, but their emotional wellbeing and sphere of personal interest. On question: "What do you mainly do on Facebook or other social network?" all university students answered that they want to see what their friends do. Most of them use that network to chat with friends from other places. As above mentioned, this is in particular the case for the students from enclaves. Much of the Internet time which they spend in their homes in the south, they actually spend to communicate with their relatives and friends in Serbia, as the only way to stay connected with them. In contrast to the secondary school students from the north, who still have not expressed any need to contact with friends outside of Kosovska Mitrovica, the university students apparently need to stay in contact with friends through Facebook. The secondary school students are obviously "locally oriented" on Facebook, mainly communicate and visit profiles of their peers who they see and with who they meet on daily basis. The university students are also more active in Facebook networks/groups. In spite of the fact that the secondary school students are each registered within a few Facebook groups, they are rather passive members, who, by time, forget about these groups. They are considerably less active members of those groups, unlike the university students. The biggest similarity in answers from all groups is that most of them play games as already mentioned and are also aware of spending much time on Facebook. However, it seems that the university students are much more ready to take some measures in reducing time which they spend on Facebook. They are also aware of obligations they have on faculties. One student mentioned that he was "deceiving" himself for months sitting by the open books on the desk and with "online" presence on Facebook. Although he did not intend to stay long hours on his profile, he would anyhow end up online. His time waste was self-excused by his arguments of knowing all material from the book, until he realized that a deadline was approaching to take the exams. It was then when he deactivated his profile for more than a month. The results of that decision were obvious. He passed several important exams for a short time, and regained the concentration for learning. The university students also noted that they were aware of the Facebook addiction risks.

M.A. (pupil, KM): „I post songs on my wall and play video games.”

Lj.P. (pupil, KM): „I play games.”

V.S. (student, KM): „I play games and I check if there is something new with my friends. That is written on the first page, so I do not stay long on those pages...”

P.R. (student, Vitina): „I rarely go on Facebook as I have no permanent access to Internet, including my friends from the enclaves. I usually use weekend to chat with my friends and girlfriend, because she lives in the enclave and we can only communicate via Internet.”

Dj.R. (student, Vitina): „I disconnected my profile for a month and a half. It can be done as a temporary action, and I wanted to see if there will be any difference in the quality of my time and my success in studying for the exams. And there were. I passed more exams than earlier. I renewed my contacts with some other friends. It meant a lot to me. And then I reactivated my Facebook profile again as I cannot stay long without Face.

S.D. (student, Klina): „I stay connected with people who are not from here. We have created our own faculty group, so we stay in touch with our professor, who sends us some useful links. The negative side is that we use them too much, a positive side is that we have a plenty of them”.

B.V. (student, Gracanica): „I check messages and announcements. Sometimes, I play games. I keep in contact with my enclave friends, because they don't have telephone connection.

A.T. (student, Laplje Selo): I exclusively check my messages. I log in FB for even ten times, but I just check if there are some news and I log off.

On question: "Which are, according to your opinion, advantages for the youth to use of Internet and Facebook/other social networks?" their answers clearly showed that the Internet served paramountly as source of information and socializing: it keeps them in contact with people, provide them with faster and richer access to information. However, the participants have rather spoken of side effects of the Facebook's popularity. In their opinion, Facebook created a new addiction among new generations; when they are not online they feel like being cut off from the rest of the world, 'missing all that is important'. In addition, the addiction to Internet/Facebook is an irreversible process that influenced on people to get estranged from each other. They cited a few examples of the people who they know, who spend their time in caffe bars having coffee, but who are actually mentally all the time "online". These kinds of people, as they say, explicitly feel a need to expose their private lives to "the whole world" by announcing what are they doing and how are they feeling in "every moment". Interestingly, the students were more critical oriented instead of giving benefits. They talked more about disadvantages and dangers related to incautious use of social networks. Even more interestingly, among them were also the students from the southern enclaves who, shortly before giving the answer to the last question, had positively talked of Facebook as a tool that connects their physically isolated places with others. As the question was targeting the advantages of the use of Internet/Facebook, and all groups rather directed their answers towards negative consequences, we assume that young people either keep well in mind the information about the sideeffects or they experience about negative aspects of Facebook use.

S.D. (student, Klina): „Communication with other people, especially those that don't live in the same place.”

A.T. (student, Lapje Selo): „We are in contact with people.”

B.V. (student, Gracanica) „When I have no electricity and Internet, I feel like I'm not alive. I always think that something important is going on without me. Then, the power is on again and I see nothing big happened”

D.K. (student, KM): „When I log in and see a few requests, it is great, and then there is nothing more but the games invitations, I get *pissed off*, as too many friends are for nothing, no one writes messages, at least not on regular basis.”

I.S. (pupil, KM): We meet new people, we get new knowledge on technologies. But, there are dangers as well. There are always talks on TV about dangers of Facebook. I am always careful while accepting somebody's request, and I always double check if I know that person or not.”

On question: "Is there any advantage of using Facebook/other social networks for young Serbs in Kosovo and Metohija", many participants from both geographical areas – the enclaves and North Kosovo clearly stated that they use Facebook as a way to contact with the world outside – families and friends. In particular, this refers to the participants from the southern places while staying in their homes, as have no other communication option, due to the dismantlement of Serbian telecommunication system.

P.R. (student, Vitina): „Unfortunately, there are places without telephone, so Internet is the only connection. Our provider is an ethnic Albanian, he personally comes to our village and charges us for that...but we had to stay connected as had no other option to communicate. There are no Serbian mobile operators, so, apart from some private Internet providers, run by ethnic Albanians, most of the Serbian areas in the south use PTK²⁷ as an Internet provider.”

V.A. (student, KM): „Facebook itself is negative as we spend insufficient time socializing together. We used to know earlier where to find our mates, either in the playground, or in the street. The Facebook's advantage however is a fast circulation of information.”

Đ.P. (student, Vitina): „My parents found their school mates via Facebook.”

S.D. (she-student, Угљаре): „I have a sister who is living abroad. We communicate via Internet and Facebook. Otherwise, I would not afford to talk to her, or even make a phone call “

I.H. (she-student, KM): „This is our *window to the world*.”

J.P. (she-student, KM): „I found many seminars via Internet, which helped me to improve my skills. We learn a lot from Internet and social networking and can have better options to travel and meet new people.”

On questions; "Imagine that Facebook does not exist anymore, like any other social network? What would you do? How would you spend your free time?" we estimated that both university and secondary school students could not even imagine such a situation in real life. Many of them admitted that it would be very difficult to manage without it for the very first days but they would eventually get used to it in later time. The majority have connected it with the creation of a new network. The participants from all four groups have emphasized that the use of social networks is an irreversible process; there will be another network created in case Facebook disappears. Very few of them are of the opinion that there would be no major change, so they could easily manage their daily lives without social networking. Our impression was that the interviewees of all four groups have not really taken out the question seriously; it was only upon our

²⁷ The Post telecommunication Service of Kosovo

insistence that they should give an effort to imagine such a situation without Facebook, that we have got the cited answers. Those answers indicate that young people cannot really imagine their life without Internet and Facebook, as they play an active role in their daily life. Indeed, the facial expressions in non verbal communication of some of our interviewees who originate from the enclaves clearly showed a certain discomfort after being faced with the idea of life without Facebook. They have outlined for several times that Internet and Facebook are their only connection to the “world outside” i.e. their families and friends outside of their ghettos. Finally, Internet is also their source to stay informed about security and political situation in Kosovo and Metohija. Political situation namely has become ‘the culprit’ for the recent ‘explosion’ of Facebook groups; You tube posts, other blogs and news threads on Kosovo. All of them can be categorized in a social journalism genre. Vivid criticism against the former Serbian government and western international policy for Kosovo and Metohija are in common to this pages/news. Their major value is however, the speediness and right-on-spot image, audio and video recording by which the news can immediately reach its Internet consumers. In regard to the North Kosovo crises²⁸, other national agencies have lost this battle.

S.V. (students, KM): „People are addicted, it is impossible to shut down social networks. There is no way back.”

A.T. (student, Laplje Selo): „I have a friend whose whole life is on Facebook. He is all day long in caffe bar, with computer... his world would be demolished. But he is not the only one, there are many people identifying themselves with Face.”

D.K. (student, KM): „I know a person who spends 18 hours a day on the Internet. She has a lot of back pain. I use Facebook for half an hour to one hour per week. I don't need Facebook and I could imagine myself without that network.”

P.R. (student, Vitina): „If cell phones would still exist, we could be in contact. Somebody would create an alternative solution.”

J.K. (student, KM): „The dismantlement of social networks would not be pleasant but, we would have to get used to it. Anyway, we will open profiles on some other networks... I cannot even imagine that there are no social networks...”

D.K. (student, KM): „It is one way journey.”

M.K. (pupil, Klina): „I use Facebook in order to check information related to my faculty. When I am at home, I don't watch TV, nor use Internet.”

M.S. (pupil, Babin Most): „I use Facebook to find pages and interesting things. For the first few days I would be in a kind of crisis.”

M.B. (pupil, KM): „A new social network would be created.”

Lj.P. (pupil, KM): „Most people are addicted to Facebook. Some use profiles to find job, and some to keep in contact with family that live abroad. I would like if this is to be shutdown, we associated much more although we had less friends before this network.

Unlike the focus group discussions with the university students, who gave more concrete answers to all questions, the secondary school students in all focus groups developed long discussions on their Facebook activities – which pages they visit, which songs and what kind of photographs they post on their profiles, why there are more girls who post their photographs in half-naked and provocative poses, while boys post the photographs from gyms; finally, why Photo Shop is so much used and popular among teenagers. On question “Do you visit other people's profiles?” the affirmative answer was mainly given by the female secondary school students, but others said “Yes”, too. They mainly visit their partners', or sympathies' profiles, or eventual 'competitor's' profiles. Except from watching the photographs and statuses, they carefully check on all news and friends' lists. As for the boys, they mainly visit the profiles of those girls who are “popular” for their physical look, by watching their photographs.

I. H. (pupil, KM): „I check my sympathy's profile.

Lj.M. (pupil, KM): „There is a boy checking his girlfriend. They exchange passwords and then check profiles of each other. This is called “love” and “trust” today.

M.B. (student, KM): „They are also watching photographs a lot.”

J.P. (she student, KM): „If we don't know a person, we watch his/her photographs.”

Answering question: „What is your experience of using Facebook now in comparison to ‘Facebooking’ three years ago, the interviewees have said that their Facebook profiles were opened in 2009, emphasizing that the way they use their time nowadays, and life in general, has radically changed to the way they lived three years ago. In their opinion, it is primarily due to the enhanced role of Internet and Facebook in their life. Furthermore, they are currently experiencing Facebook as a regular daily activity. They find a tangible connection between a greater usage of Facebook and limited options for spending

²⁸ This is in particular after the outburst of the so called July crisis in the north of Kosovo on 26.07.2011. It was after the attempt of Pristina government to gain a control over North Kosovo, by first taking the administrative boundary lines towards central Serbia under its jurisdiction.

their free time. As they spend most of their time in indoor activities during the winter season, they all emphasized that they use Facebook far more in winter months than in summer season.

L.J.M. (student, KM): „If I don't log in Facebook for the whole day, I expect to find big news there, and then I see nobody has sent me anything and there are no such news.“

M.A. (student, KM): „If I am at the seaside, three days later, I need to find an Internet cafe and a video play shop.“

L.J.M. (student, KM): „It is no problem for me to be without FB for ten to fifteen days, but then it becomes bad.“

J.P. (she-student, KM): „I deactivated *Face* for fifteen days which was my most productive lifetime. I read fifteen books for then days. But I also cannot manage my life without FB as it is also way to be informed.“

M.C. (student, Клина): „I am addicted to *Face*, but when we went for a six day seminar trip to Plav, I had not thought for a single day of Facebook. My all days were completed there, so I felt no need for using Facebook.“

M.C. (student, Бабин Мост): „I am equally addicted to Facebook, both here and in Babin Most.“

L.J.P. (student, KM): „I spend most of my time outside and I don't need *Face*.“

The answers which indicated that the Facebook networking became a mandatory daily routine showed us a strong influence of the social networking phenomenon, as a result of Digital Era, on the reconstruction of the youths' lives. Within a post conflict framework, this influence is even more intensified due to the lack of other urban, social, cultural and civic options, common to all peacekeeping societies. One should not be surprised therefore by such an immense popularity of social networking among the Serbian youth population in Kosovo and Metohija. They speak of social networking in both categories –it is their *compulsory daily activity* and a *window to the world outside*.

4. INSTEAD OF CONCLUSION

Through the explorative research of daily life of young Serbs in Kosovo and Metohija, by the use of a poll questionnaire, focus group discussions and observation with intervention on Facebook (as the most frequently used social network), we identified specific features of daily lives of the Serbian youth in the province. At first sight, it does not differ much from daily routines of any young people in other parts of Serbia. Using the research techniques mentioned above, we compiled a relatively large number of data which indicates a conclusion for further and deeper academic researches in this and similar fields. They need to be conducted on a greater number of interviewees. It applies in particular, to a focus group discussion, as “a number of the acquired data, likewise a group dynamic, which motivate participants to give certain answers and which might not be given during individual interviews, still reflect its numerous advantages” (Aritonović, 2010). This research resulted in a common feature of all interviewees: the daily use of Internet, particularly Facebook network. Apart from the global popularity of the World Web and social networking, they have a specific value for our interviewees – it is their *way out from physical, political and cultural ghettos, a way to escape from insecure and pessimistic reality*. Young Serbs from the southern Kosovo and Metohija enclaves have no positive alternative for qualitative spending their free time, but the use of Internet and Facebook. As a consequence of the dismantlement of the Serbian mobile network in the south of Kosovo, they have no other communication tool to stay in contact with their families and friends but by Internet connection, provided by Kosovo Albanian private operators and PTK (Kosovo Telecommunication Service). As for the young Serbs in the north of the province, they are living in a specific cultural ghetto, encapsulated for twelve years in one and half square kilometer, with a high density of the predominant Serbian population, limited to spend their free time in a more qualitative way. In addition to the shortage of qualitative options for spending free time, they simply know that all of their friends are always *online*. The intensive use of Internet and social networks became thus their daily routine and an unquestionable category. In spite of such a fact, they are well aware of negative consequences of the *excessive* use of social networks – much hour consumption which affects their health, quality of studying and other daily activities. In particular, they are well aware of the negative impact of Facebook (wasting their personal time, supposed to be spent on studying or living a *healthier* life). Some participants stated that they had *frozen* their accounts for a while, after which they had scored excellent results in their schools and universities; they had time to read books and *truly* socialize with other people. They nevertheless, later reactivated their profiles with an excuse “Facebook is part of our lives. It is a strong information and communication tool”. Clearly, the participants could not give any definite answer to the question on the ceasure of social networking; they simply cannot imagine their life without virtual social networking. To them, it is an irreversible process - *one way road*. In spite of much criticism of Facebook and “web surfing”, Digital Era has made life easier to the Serbian youth population in Kosovo and Metohija. Internet has decreased their feeling of inferiority, which they have in comparison to the rest of the world; it is specifically in regard to their peers in central Serbia. Without Internet, they said – “*we would feel as if living at the end of the world.*” The research has also shown that the addiction to Internet and social networking create distance between young people and activities in real world. It

deepen apathy, sense of helplessness and negative emotions due to people's lives in a limited post-conflict environment. Hence the intensive initiatives of young Serbs to *change* their *grim* daily routine by spending several hours on the Internet and social networks, is their *window to a distant and better world*.

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METHODOLOGY FOR EVALUATION OF THE EFFECTIVENESS AND EFFICIENCY OF BUSINESS MEETINGS

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Abstract: *The competitiveness of a business system in today's global market requires increased effectiveness and efficiency of its processes and activities. Within management activities, the most widespread form of communication is the meeting. However, not all business meetings are purposeful. Some research confirmed that managers spent much more time in meetings than necessary, and also that more people than needed attended them. Meeting Management is defined as the application of appropriate management techniques for planning, organizing and leading, which will enable effectiveness and efficiency of meetings. Every management requires prior measurement and meetings should therefore become measurable, so that they could be managed. This paper aims to provide a methodological basis for measuring effectiveness and efficiency of meetings in a business system. The basis for collecting data is a pre-designed questionnaire covering relevant areas of research into meetings, as follows: basic information about the business system, the manager and perpetrator, effectiveness and efficiency of the meeting, and the attitudes of managers and perpetrators toward effectiveness and efficiency of meetings in the business system. The research should provide answers to the current meeting effectiveness and efficiency in business systems in Serbia, as well as guidelines for their improvement.*

Keywords: *methodology, research, meeting, manager*

1. INTRODUCTION

Business system that intends to be competitive in today's global marketplace must certainly take into account the effectiveness and efficiency of its processes or activities. In this context, a managerial activity of communication should be considered, which is one of four key elements of subjective support of management (communication, leadership, motivation and decision making). During the performance of managerial activities of communication, most common type is group work. The term group is defined as a group of people referred to the interaction in order to achieve a common task. In this regard, particularly in the functioning of groups of managers and the dissemination of information, an important management tool in working with people is a meeting (Bulat, V., 1997).

Since those business meetings are an important part of overall managers business, their importance is indisputable. However, not all meetings are meaningful, which is confirmed by some studies that suggest that managers on average spend 3.5 hours a week in meetings, an average of eight people attend meetings, including the presence of at least three of them that are not necessary, and so on (Portal o sastancima, 2007). Poor management of meetings by managers in the business system can negatively affect the decision making, time management, level of organization, human relations, as well as overall business results. It is clear therefore that the management of meetings comes to the fore. Management of meetings presupposes the adoption of appropriate techniques for planning, organizing and conducting meetings, which will enable them to become meaningful and effective and efficient, which will contribute to improving the overall business.

Each control includes pre-measurement. Therefore, management of meetings requires that meetings become measurable on several grounds. Only in this way the meetings will become manageable. This paper intends to provide theoretical background and methodological basis for measuring the effectiveness and efficiency of meetings in the business system. Future research should provide answers to the current state of effectiveness and efficiency of meetings in business systems in Serbia, as well as guidelines for its improvement. In this sense, hereinafter research model for assessing the effectiveness and efficiency in meetings in the business system is designed.

2. DESIGNED MODEL FOR EVALUATION OF EFFECTIVENESS AND EFFICIENCY OF BUSINESS MEETINGS

Model for assessing the effectiveness and efficiency of meetings in the business system includes research design (research subject, research aim, hypothesis and research method), the sample, questionnaire (identifying relevant factors and variables), the empirical work (data collection in the field), data processing and data analysis. The concept of the above research model is explained hereinafter.

THE RESEARCH DESIGN

The research subject is to evaluate the effectiveness and efficiency of meetings that are organized and carried out in the business system.

The research aim is to identify relevant factors that influence the effectiveness and efficiency of meetings in the business system.

The research hypothesis is that it is possible to measure the identified relevant factors, as well as the degree of their influence on the effectiveness and efficiency of the meeting.

For research method it is proposed a statistical method based on collecting data on a representative sample of respondents from business system. Collecting data is based on pre-designed questionnaire, which includes the relevant areas of research. Study respondents are managers and perpetrators from the same business system.

THE SAMPLE

The use of stratified random sampling is planned for the study (*Bojković, Krstić, Skorup, 2011*). The practice indicates that the sample is representative when the volume represents 10% of the population studied. Based on such sample conclusions can be derived with a high degree of probability and be valid for the whole examined population. For a population of 1,000 business systems it would be necessary for research to encompass approximately 100 respondents, that is managers (from different hierarchical levels) and perpetrators (who perform different tasks), and who working in tested business systems from different economic activities, as well as from different parts of Serbia.

THE QUESTIONNAIRE

Research is based on a questionnaire that includes relevant research areas, dimensions and variables. Relevant research areas are: basic information about the business system, a manager and perpetrator (Table 1), the effectiveness and efficiency of the meetings in the business system (Table 2), and the attitudes of managers and perpetrators about the effectiveness and efficiency of the meetings in the business system (Table 3).

Table 2: Relevant research domain: Basic information about the business system, a manager and perpetrator

Dimensions	Variables
business system in which manager and perpetrator work	the name of the business system (enterprise / institution), city, municipality, type of company, ownership status, industry, business, the total number of employees
chosen manager	managers name, name of the function in the business system, title, education, type of education, age, seniority, experience with another employer, career, hierarchical level of management, range of management, the total number of employees directly subordinated to manager
chosen perpetrator	perpetrators name, professional position, education, age, professional experience, qualifications and key skills

Table 3: Relevant research domain: Effectiveness and efficiency of the meetings in the business system

Dimensions	Variables		
	Manager		Perpetrator
	conducts a meeting	attends the meeting	attends the meeting
Quantification of the effectiveness and efficiency of the meetings in the business system	meetings function effectively (treat right things) (%)		
	meetings are effective (%)		
	average number of people attending meetings (number)		
	average duration of the meeting (hours)		
	average number of agenda items (number)		
	daily time spent in meetings in the business system		

Table 4: Relevant research domain: Perceptions regarding the effectiveness and efficiency of the meetings in the business system

Dimensions	Variables
	Manager / perpetrator
poor management of business meetings by the general manager	may have deleterious effects on overall business performance of organizations
	may adversely affect the management of time
	may adversely affect the level of organization within the company
	can negatively affect relationships
	may adversely affect business decision making
	have an impact on something else, what: _____
significance of the meeting	meetings are inevitable
	meeting is a place for information exchange
	meeting is a place for inventing the best solutions
	meeting is a place for creating ideas
	something else, what: _____
meeting as an opportunity	for the best troubleshooting
	for making group decisions
	to assist someone to make a decision
	for removal of discrepancies
	to address attitudes
	for planning
	for organizing
	for control
	for informing
	to create new ideas
	something else, what: _____
usefulness of the meeting	meetings are necessary
	meetings are a waste of time
	meetings last as much as needed
	meetings are attended by as many people as necessary
	meetings resolve key issues
	else, about the meeting
success of the meeting	chairman of the meeting has deadlines
	chairman of the meeting holds to the terms
	meeting starts at the scheduled time
	the chairman controls each agenda item
	selection of appropriate space for the meeting
	the appropriate time for the meeting is ensured
	the proper seating order of the participants is taken into account
	the proper way of conducting a meeting is ensured
	the equipment is provided (video projector, telephone, etc.).
	the debate is conducted only on the agenda
	limited time for participant to present its own attitude
	respect to others' opinions and attitudes

operationalization of the meeting	all meeting participants understand what was agreed at the meeting
	all participants understand which activities should be undertaken
	all participants understand the deadline
	all participants know who is responsible for every activity
improving the efficiency of the meeting	multimedia meeting
	forum (via Web)
	telephone meeting
	FAX meeting
	meeting at a distance
	corresponding meeting
The scale of variables measures: not at all, a little, quite, significantly, very significantly	

EMPIRICAL WORK

Realization of practical field data collection is planned to be through personal contact of interviewers with selected managers and selected perpetrators. The collected data would be entered on-site in specially designed patterns. After the interview, collected data would be transferred to the web questionnaire, which was created for this purpose in Google documents application (Figure 1), so data will directly flow into a common database of research, with the possibility of exporting it to Excel file.

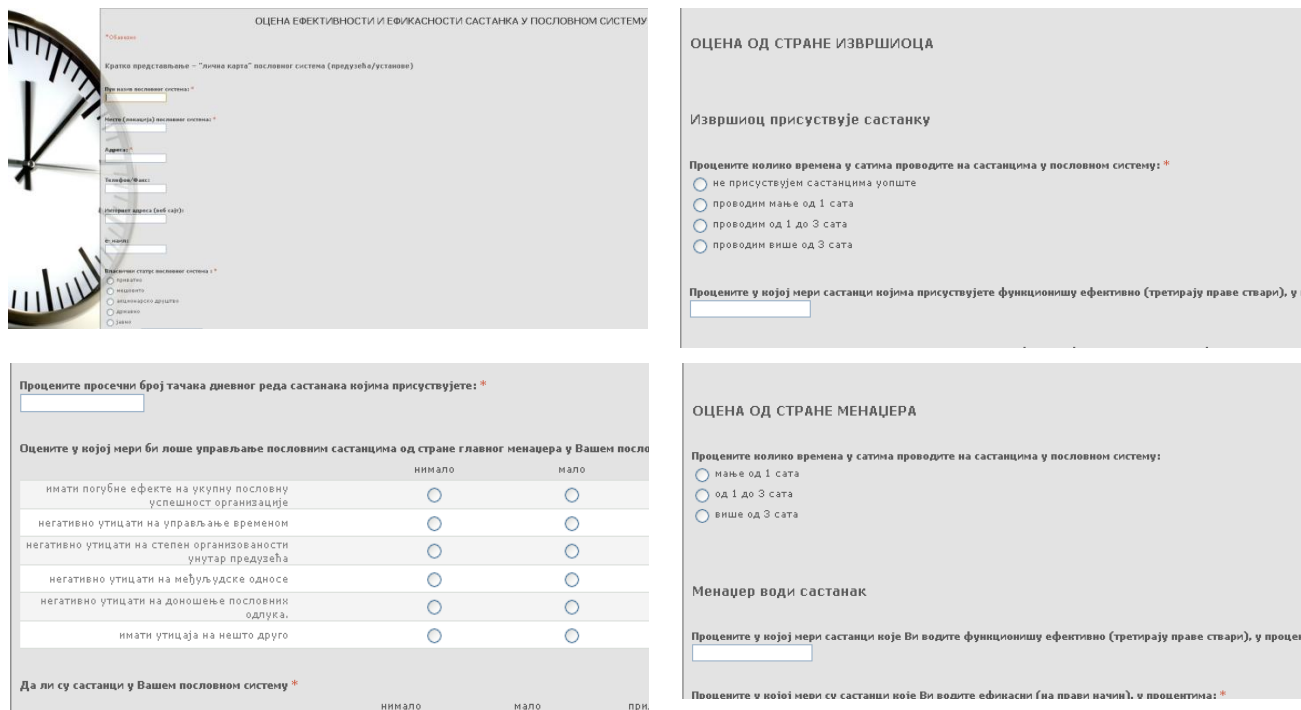


Figure 3: Inserts from the web questionnaire

DATA PROCESSING

It is planned that the processing of the collected data is based primarily on descriptive statistics, which includes the following tasks (Vuković, Živković, 2010):

- grouping and sorting of statistical data,
- presentation of statistical data, and
- determination of the basic indicators of statistical series.

For the presentation of research results the basic forms of statistical analysis of data will be applied, such as frequency distribution, relative frequency, valid percent and cumulative percentage, and the statistics will be displayed in tabular and graphical form. For graphic display of the results it is planned to use

histogram (for displaying of frequency distributions and distribution of relative frequencies), pie chart and polar (line) diagram.

Basic measures of statistical series, which will be used when displaying the results of research are:

- mean values or measures of central tendency (mean, mode, median),
- variation measures or measures of dispersion (standard deviation, range),
- measures of distribution shape (a measure of asymmetry, a measure of flattening).

DATA ANALYSIS

After conducting a statistical analysis, data analysis will be conducted, based on what will be said to what extent the research met its goal, and to confirm or refute the research hypotheses.

3. CONCLUSION

The study presents a model for assessing the effectiveness and efficiency of business meetings that contains all the necessary elements of research, such as research design, the research sample, designed questionnaire, empirical work planned and data processing.

The purpose of this paper is to provide a theoretical and methodological basis for future measurement of the effectiveness and efficiency of business meetings.

The next step for the research realization, based on the presented model, is the implementation of the empirical work, or the collection of field data in accordance with research design.

This research should first give an answer to the current state of effectiveness and efficiency of meetings in business systems in Serbia, and then based on that knowledge to breed clear and precise guidelines for improving the organization of meetings.

Presented research is ongoing, and the findings will be presented in subsequent papers.

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ROLE OF INTERNAL COMMUNICATION AT THE FACULTY – STUDENTS' PERSPECTIVE

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Summary: *Internal communication, if properly organized and developed, can become one of the greatest strengths of an organization. Without good internal relations, an organization cannot establish good external relations either. All this speaks in favor of the great importance of internal communication. Internal communication at faculties is quite an interesting topic which has rarely been researched in our country and, in practice, a pro rata amount of attention is paid to it. It is the internal communication at faculties that is the topic of research presented in this paper, with the Faculty of Organizational Sciences as an example. The results show students' preference for the major part of this communication to happen via the Internet. This can be a significant guideline in future endeavors to advance and perfect this type of communication.*

Key words: *internal communication, communication at a faculty, students, the Faculty of Organizational Sciences*

1. INTRODUCTION

Public relations are defined as a strategic process of communicating between an organization and its targeted public for the sake of creating relations of mutual satisfaction (PRSA, 2012). Internal relations with the public are among the core activities in public relations. The public is every group of people that has an interest for the business management of an organization (Kotler, 2006) but an organization will find the most attractive targeted public and make efforts to create relations with them (Filipović & Kostić-Stanković, 2008). The most common targeted public are buyers, the media, suppliers, investors but also the staff of the organization when we are speaking about internal public relations. Internal public relations are, thus, focused on internal public which implies the staff of the organization but also all those with whom the organization communicates regularly through work on daily basis (Brkić, 2002). Internal communication is a base of internal public relations. As a prerequisite of good internal communication there are well organized informational-communicational currents in the organization. Internal communication i.e. internal public relations are developed with the aim of creating interest of the internal public for the identity, image and reputation of an organization (Filipović & Kostić-Stanković, 2008).

Three forms of internal communication can be distinguished. Descending internal communication, ascending internal communication and the horizontal internal communication (Black, 1997). However, with the creation of the new forms of organizational structures and with the development of informational technologies and especially the Internet arises a need for a new form of communication which in itself sublimates the traits of all three aforementioned forms.

Following the definition that the internal public of an organization are not only its employees but also all those with whom the organization communicates through work on daily basis (Brkić, 2002) we can conclude that the internal public of a faculty are not only employees but certainly students as well. Not only does the faculty communicate with them constantly through every day business but it is also of great importance for them, apart from the employees, to embrace the values nurtured by the faculty and also the corporate structure. Communication between students and the faculty takes place in the classroom and outside of it and it is very important to manage both in a proper way. With the development of the informational-communicational technologies the potential of development of internal communication increases but also the number of channels that can be used. In this paper we will present a research on the topic of internal communication at the Faculty of Organizational Sciences, with the focus on communication between students and the faculty. Based on this research a clear image of ways of internal communicating at faculties in general can be created and the most common forms of communication can be defined.

2. THEORETICAL BACKGROUND

Internal communication

The term 'communication' comes from the Latin verb *communicare* which means 'to make something common' and the noun *communicatio* which might be translated as a 'community'. If we define an organization as a community of the individuals, created in order to achieve mutual goals (Jaško, 2008), it is clear why the effective communication within an organization is a prerequisite of its functioning. The communication within an organization is sometimes called internal communication and it serves to transmit the information within an organization and create a high degree of corporate culture (Filipović & Kostić-Stanković, 2008). This implies the relation mechanisms for making contact within an organization, as well as means and methods for transmitting the information in order to affect people and improve the execution of the work and tasks of the employees, responsible for the organization's goals (Kavran, 1991).

We have to have in mind that an organization is made of individuals who are often divided into smaller groups. In certain situations, these groups can become smaller organizations which are still based on groups, but also show characteristics that clearly make them a group. Those are having mutual goals, the distribution of work, the coordination and the control of activities. This is how smaller organizations within a wider organization are created (Mihailović, 2008). So, within an organization, we can detect smaller organizations created from the groups which again represent the basic form of the social association of the individuals. Thus, the clear conclusion is that the internal communication in these circumstances is made between these four segments: the wider organization, the smaller, internal organizations, the groups and the individuals.

There are seven factors that determine the internal communication: the organization's industry, the mission, the organizational structure and its size, the competitors, the organization's tradition, its image and its employees (Filipović & Kostić-Stanković, 2008).

Forms of internal communication

Three forms of internal communication can be distinguished: descending internal communication, ascending internal communication and the horizontal internal communication. Descending internal communication implies that the source of communication is found on higher organizational level and that the message is passed to the lower organizational levels. With the ascending communication it is reverse, communication starts at the lower organizational levels and it moves to the higher ones. The horizontal internal communication takes place between the employees on the same hierarchical level (Black, 1997).

Internal communication can be divided to formal which is determined by the hierarchical structure of the organization and informal which is based on personal relations. As the most common forms of the written formal and informal internal communication there are letters, notifications, newsletters, internal newspapers, e-mail and suggestion boxes. Formal communication, which does not imply the written communication, is manifested through direct communication, meetings, gatherings of staff members, training and various festivities (Filipović & Kostić-Stanković, 2008).

Internal communication at the faculty

If we observe the faculty as an organization whose meaning we already defined, then every kind of communication between the faculty and the internal public might be seen as internal communication. Since the internal communication is made between the internal public, which includes not only the employees but rather everyone who the employees communicate with during their work (Brkic, 2002), then, beside the employees, this term also includes the students.

The importance of communicating at the faculty is immense and much should be done in order for it to be as simple and pleasant as possible for all students, because the uncomfortability and the fear of communication with certain students can affect their academic success (McCroskey & Andersen, 2006).

Involving the so-called shy students in communication is one of the seven goals which The American Society for High Education set for itself, in order to improve the educational system (Chickering & Andersen, 2006).

The communication between the students and the faculty is made both inside and outside the classroom, and the researchers have only recently recognized the latter as an important one, as well. It is interesting that among the factors affecting the communication success outside the classroom, the students' perception on teachers' empathy and their gender proved to be the prominent ones (Nadler & Nadler, 2010). The research also accentuates the relation between the communication between the students and the faculty outside the classroom and students' motivation (Jaasma & Koper, 2009), which clearly confirms the importance of this kind of communication and the validity of its further improvement. During the development of the successful internal communication at the faculty, and especially the communication between the students and the faculty outside the classroom, informational and communicational technologies are very important, given that more and more students are using the internet. For example, 51,6 % of Serbian homes in Belgrade had internet connection in 2011, whereas 42,2 % of Serbian population in general has used the internet in the last three months, mostly people with high or higher education (Serbian Bureau of Statistics, 2011).

3. METHODOLOGY

The study was based on primary data collection using online questionnaire as a research tool. The study was carried among students of Faculty of organizational sciences, where the total population was nearly 2500. The sample size was 205 examinees. They were selected randomly to ensure indicative and representative results. The response rate was 96,6% (198 examinees correctly fulfilled all the answers). The sample consisted of 130 women and 75 men. There was an equal participation on the part of students of all years and departments from the faculty.

The pilot test with 14 persons was conducted in order to insure questions readability. Thus prepared the final questionnaire was used for data collection. Data was captured by trained assistants and was entered and analyzed in the SPSS version 17.0. Quantitative data were analyzed with demographic statistics: percentages, means and standard deviation. Qualitative data were analyzed with Pattern analysis.

4. RESULTS

Doing research on the internal communication at the Faculty of organizational sciences, with the primary focus on the communication between the students and the faculty has shown which forms of communication students choose most frequently, in order to get information on mandatory and extra reading.

Table 1: Descriptive of various forms of internal communication

Frequency	N	Mean	Std. Deviation
Frequency of use students' internet forum	199	4,1784	,87449
Frequency of engagement older students	201	3,5647	1,20241
Frequency of use social network	199	3,6106	1,26345
Frequency of use students' society site	201	3,2910	1,13076
Frequency of use official site of Faculty	199	2,7990	1,16007
Frequency of use courses web page	197	3,3934	,99042
Frequency of engagement professor	200	2,6225	1,11240
Frequency of engagement teaching assistant	198	3,0505	1,03736

Most frequently, students use students' internet forum (Fonforum.org- the forum for the students at the Faculty of the organizational sciences) for getting the information on mandatory and extra reading, and the average value on 1-5 scale here equals 4,18 (SD=0,87). At the second place, there are social networks

with the average grade of 3,61 (SD=1,26), and at the third place there is communication with the older fellow students about the mandatory and extra reading, with the average value of 3,56 (SD=1,2).

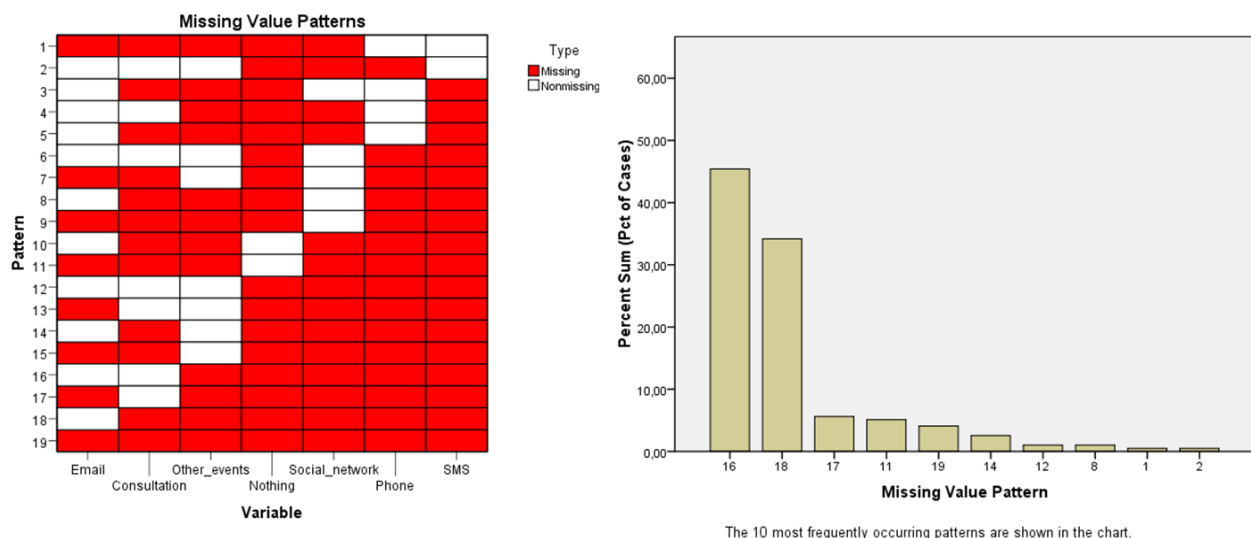
Since the students use primarily the internet for getting the information on mandatory and extra reading (i.e. informal and horizontal communication), it is interesting to see how often they communicate with their teachers and teaching assistants outside the term period and the lectures, and how satisfied they are with this sort of communication. The students answered to these questions on the 1-5 scale.

Table 2: Descriptive statistics on communication with teachers and teaching assistants

	N	Mean	Std. Deviation
Examinee tells how often they communicate with teachers	205	2,07	,826
Examinee assesses the communication with teachers	203	3,21	,882
Examinee tells how often they communicate with teaching assistants	203	2,97	1,005
Examinee assesses the communication with teaching assistants	199	3,81	,806

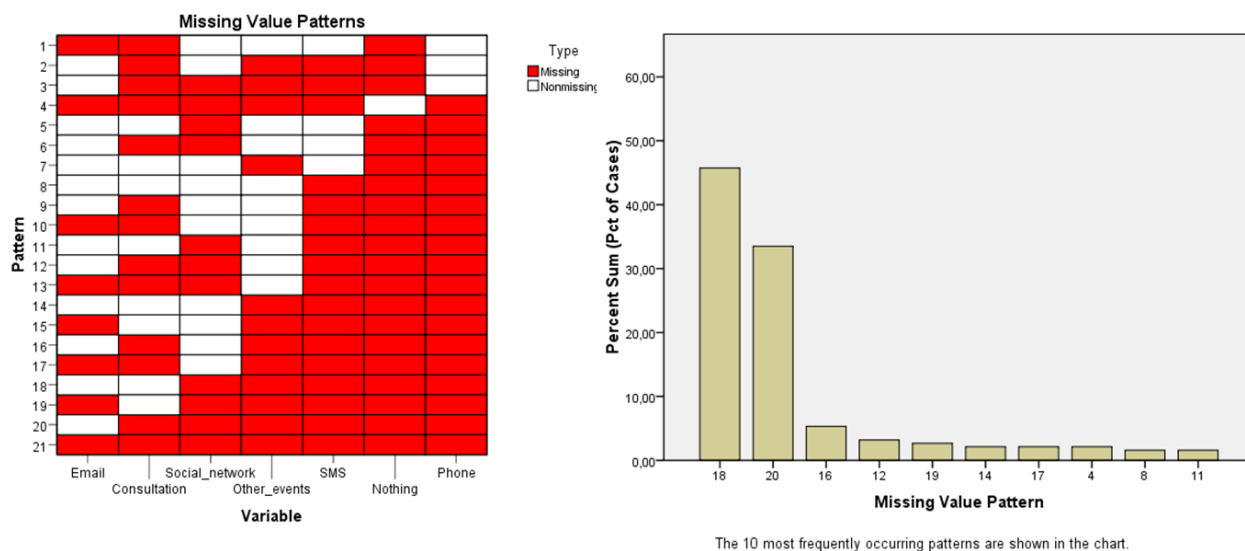
Students communicate with teaching assistants more frequently, and the average value here equals 2,97 (SD=1,005), more than with teachers where the average value equals 2,07 (SD=0,826). As for their satisfaction with this, they are more satisfied with the communication with teaching assistants, with the average value of 3,81 (SD=0,81) whereas the average value is 3,21 (SD=0,88) when it comes to teachers.

Using pattern analysis, the most frequent way of students communicating with teachers is determined. The three most frequent patterns are 16, 18 and 17. So, students most frequent use the following behavioral patterns: communicating with teachers via e-mail and during consultation hours (Pattern 16), using only e-mail (Pattern 18) and only during consultation hour (Pattern 17).



Graph 1: The analysis on the patterns of communicating with teachers and frequency of the patterns

The pattern analysis has shown that, when it comes to communicating with teaching assistants, the following three patterns are the most frequent: communication via e-mail and during consultation hours (Pattern 18), via e-mail (Pattern 20) and there is the communication pattern via social networks and e-mail (Pattern 16) at the third place, which is not the case when it comes to communication with the teachers.



Graph 3: Analysis of the patterns of communicating with teaching assistants and frequency of the patterns

5. CONCLUSION

Based on the presented results it is obvious that students show the greatest inclination towards communicating via the Internet. Two of the most common ways to get the information about the exam literature are the Internet forum of the students from the faculty and social networks. It can be stated that students incline toward informal and horizontal communication which also encompasses the third most common way of getting data about the literature and that is communicating with older colleagues.

When it comes to formal communication of students with teachers and assistants in two of the most common patterns of communication as a form of communication there is electronic mail while in communication with assistants there is, as the third most common pattern, communication through electronic mail and social networks which is data that emphasizes the students' inclination towards the Internet communication. If we would relate the students' preference to mostly communicate via the Internet to the fact that they rarely communicate with teachers and assistants then the solution for increasing the frequency of this kind of communication and for creating steady and open channels of communication should be sought in the possibilities offered by the communication via the Internet.

Communication between the students and the faculty occurs in the classroom and outside of it and researches point to a connection between communicating outside of classroom and students' motivation (Jaasma & Koper, 2009). As it was already said discomfort and fear of communicating with some students can influence their academic results making them worse (McCroskey & Andersen, 2006). All these are clear reasons for faculties to work on establishing and maintaining efficient internal communication that suits the students by which a good information awareness and an equal participation on the part of all participants can be achieved.

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MANAGEMENT OF LOBBYING STRATEGY – STAP MODEL

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Abstract: Lobbying is a communication phenomenon which emphasises the possibility of an organisational entity to achieve influence on decisions makers. The purpose of this activity is to provide appropriate decisions that have great importance for an organisation. Multidimensional forms of lobbying activities have created a demand for designing the projection and implementation of an appropriate project management methodology. The analysis of the literature (research and book publications), as well as practical experience, identifies the main approach of research methodology, which includes comparison and modelling as the main methods, as well as the usage of specific methodology approaches: description, context analysis, analysis-synthesis and induction-deduction. The research shows that lobbying is a complex activity that should be managed. In the following section, we offer STAP modelling for the management of lobbying operational strategies. With this model, through separate phases, we have developed a strategy for the implementation of lobbying activities, based on stakeholders' analysis, regulations and ethical limits, communication strategies and the evaluation of the ratio between achieved goals and used resources. This model for lobbying operation management can be of practical value to all kinds of organisations (commercial, public, institutional), which ought to have influence on decision makers with the purpose of achieving organisational benefits.

Keywords: management, lobbying, interest representation, influence, decision makers, STAP model.

1. INTRODUCTION

Lobby is an English word for corridor, hall, and has got roots from Latin word „labium“. In modern sense of business and political understanding, this word is recognized as preface of decision making process in law, administrative, political and business institutions. Lobbying is a process which develops and implements a strategic planning communication project, influencing the decision-makers to enhance the interest of a particular organization. Thus, lobbying is a communication process of formal and informal exchange of information between organization/stakeholders and authorities to influence the final decision, relating typically to the law and regulation bodies, state institutions, policy-makers and all the other authorities which raise the importance of its stakeholders interests. In other words, lobbying is communication form which purpose is to achieve influence on the law and regulation bodies, state institutions, policy makers and all the other authorities which are important to our interests.

As Cassidy (1999) points out, “lobbying is a healthy and necessary part of an open democratic society” (p.8). Thus, we may consider with certainty, that lobbying is a legally-based, legitimized activity in all democratic societies, with a developed role and impact of law, as well as anticorruption and accountability-based regulation.

Questions are: what is lobbying, who is lobbying and how lobbying could be the most effective and measurable activity?

2. PRACTICAL LOBBYING

Lobbying is an activity which main course is to influence on public policy, procurement, social issues, business success (or failures), environment, health and other wide areas of ordinary, day-to-day issues. Question is: are we in a position to have influence on our lives through lobbying activities?

Professionals report analysis, media stories and scholarly papers provide us an orientation through the knowledge-based process of lobbying. Of course, collecting of analytic dates from NGOs and specific agencies could also ensure that lobbying exists in modern democratic society as legitimized and (hopefully) legally based activity.

Examples of lobbying could be found in wide area of stakeholders activities: public policy development, area for new investments, as well as conditions of substitution for investments, capacities building of product base, technology and health standards for safe environment, etc.

Certainly, we can divide lobby groups (professional or *ad hoc*) into economy and political lobbies. Economy lobbying is mostly involved in realization of same business arrangement, either by representing client as “desirable”, “socially responsible” or loyal to the same higher interest. (Alzola, 2006; McWilliams et al. 2002; Rehbein & Schuler, 2006; Windsor, 2006b). We can consider public procurements (Kambrod, 2007), land usage (Nownes, 2006), new technology demands, new market opening (Kennedy, 2008) as possible forms of economy lobbying. Through lobbying activities, a lobbyist would introduce the capacities of his client, as well as the expected effect and efforts which should be achieved by the client engaging with the decision-makers. Task for lobbyist is to represent client as effective, reliable, time and schedule responsible as well as profit orientated. Most effective and productive is, if lobbyist will succeed to connect lobbying project efforts with wide public, as well as with expert's group opinions. The purpose is to make synergy of corporate profit orientation with health environment and clean technology, which are mostly desirable public messages that decision-makers wish to be connected to.

Political lobbying couldn't be clearly divided, because, finally, all decisions have profit based orientation, especially if we consider lobbying in political institution (Griffin & Mahon, 2006), or in campaigns. However, policy built lobbying as a part of political activities could consider as different form of lobbying. Anastasiadis (2006) points out that “policy outcome refers not only to the outcome in a narrow sense, but to any outcome in the political environment. To use a military analogy, this component refers to both ‘individual battles’ and the ‘war’ as a whole; the difference in the case of lobbying being that the political process never ends.” (p.17) If we have in mind that we can consider lobbying, regarding Cassidy (1999), as the “process of information to officials and legislators so that measures are better thought out in the hope of reducing the effect of the political law of ‘unintended consequences’” (p.9).

We can analyse lobbying from various points. For example, lobbying can be either ‘proactive’ or ‘reactive’ in sense that proactive lobbying is practiced by authorities, policy makers (e.g. European Commission), and by many pressure groups that encourage them to produce a proposal. For example, the single market policy of European Union was the result of proactive lobbying by businesses. Also, the wide range of environmental directives is a result of lobbying by environmental pressure groups. Reactive lobbying is necessary when the European Commission produces a “green paper” or a discussion document, or holds a public hearing. This frequently anticipates a future directive. These kinds of activities provide opportunity for interest and pressure groups to respond with reactions, ideas and suggestions. The increased use of green papers and discussion documents by the Commission needs vigilance to make sure that comments are submitted in sufficient time for the officials concerned to take them into account, before moving to the next stage which may be a draft directive. Reactive lobbying increasingly arises as a result of widened powers of the European Parliament over legislation, whereby the Parliament and the Council (of Ministers) jointly decide on legislation in ‘co-decision’ (Cassidy 1999). Of course, multidimensional sphere of lobbying depends of various actors, stakeholders as well as interest subjects (Coen & Richardson 2009).

Policy building as part of politics includes procedures which are deeply technical, bureaucratic, structural, organizational and publicly exposed (e.g. Bomberg 2005). The public carefully listens and watches current topics that consider their daily life burden (working conditions, social issues, foreign policy, laws and justice, medical care, education quality, environment protection, etc.). Sometimes the interest group will find a way to connect with the public opinion and win the public support, and sometimes it won't be the case. However, one thing is certain – the interest group will try to make a connection between political campaign, economic interest and public/social importance (Baumgartner [et al.] 2009). Successful lobbyist will find a way to connect their (client's) interest with socially acceptable, media well-covered and publicly desirable goals.

Some kinds of action, for example the process of involving new law or regulation at the national or institutional level, necessarily leads to engaging experts and implementing a project management approach. From this point of view, economic aspect again rises on stage, because engaging the experts or consultants, means necessity of budgeting and available money existence. Consideration of social benefits within the community is necessarily connected with public support processing, meaning: effects and results that community provides benefits are shown. By this means, effective psychological profiled communication, pointed to build awareness, develops public support. This is a future-oriented, pre-emptive activity, such could be involved in a future project preparation and political support for re-election

and opening doors for political campaigns for a new nomination (Nownes, 2006). At that spot, we can notice circling connectivity between economy, politics and public.

Questions could be raised about methods and means of lobbying instruments use, legislative regulation, codes of conduct, and ethical and moral norms of communication. For avoiding these legal and moral dilemmas, probably the most useful thing to do is developing of communication strategy which is based on project management theory.

2. BASIC CHARACTERISTICS OF LOBBYING

Most significant characteristics of lobbying are:

- The existence of more than one decision maker in process;
- Permanent presence of public (oversight and interest);
- Market activities in the sense that information are exchanged as goods;
- Compromise achievement through negotiation;
- Creation of coalition, based on common values and shared interest;
- Existence of procedures and more levels of decision making, which points out the necessity for organizational management support (Anastasiadis, 2006).

Interest representation is a multidimensional approach to achieve interest, or impact that has been made. If we analyse subject of lobbying, we can notice that different interests are focused at same spot. From our position, as a lobbyist, we can consider two types of interests: business interest of our own (achieved business goal leads to profit, positioning itself as successful and reliable partner for future clients, as well as experience and references collection), and interest of client (commercial and corporative interests regarding state institutions and state bodies). Companies regarding state institutions are represented in the frame of “package offer”, solutions for core systematic problems, improvement of efficiency and through projects of wider public interest (environment, social and health care, education etc.). State institutions represent themselves on behalf of corporative subjects through development and involvement of standards, promoting presenting and support of implementation of outside stakeholders programs and projects (EU, US AID, GTZ, and other projects in area of development and supporting of civil society, non-profitable organization and other NGO actions). Area of activities covers strategic society layers: energy, agriculture, entrepreneurship, public administration, health etc.

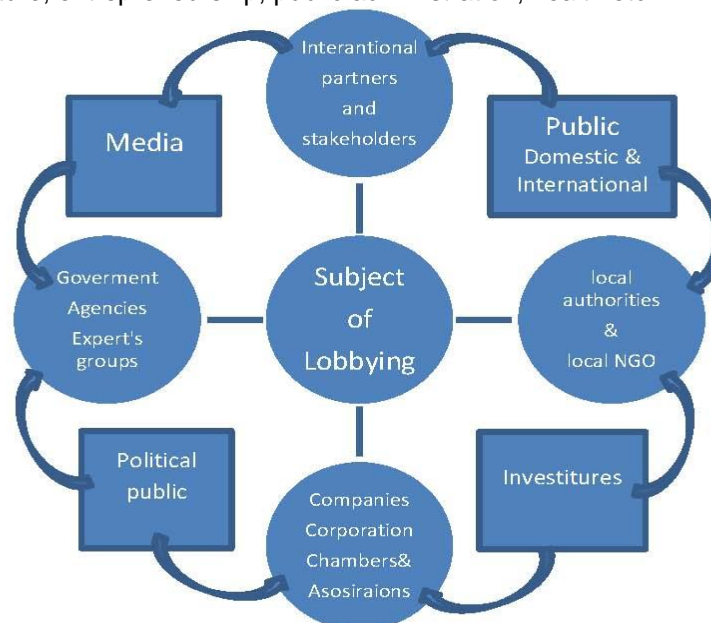


Figure 1: General overlay of multilateral characteristics of communications in processes of lobbying activities from lobbying subject perspective.

3. APPROACHING TO CREATING OF LOBBYING STRATEGY

The organizational approach of lobbying activities considers development of strategy which should tend to establish a balance between objective (level of achievement), costs (planned, not planned and hidden) and efficiency. A well-developed strategy is characterised by: continuity of action, putting resources in purpose of goals, understanding and forecasting political trends, taking the initiative and respecting time and schedule.

Regarding the goals, most efficient method is to define chain of more than few easy achievable goals. In this way, we can estimate successes in each phase of our project's implementation, as well building coalitions, self-awareness, and implementing eventual corrections. This means that intermediate goals should be: (1) designed within the wider context of possible future policy and market trends, (2) based on long-term goals, (3) sequentially relevant to bigger political or market goals, (4) reliable and with effective dynamics in their implementation.

Hidden goals could also be achieved as secondary results. They represent better image (of client) in public as "socially responsible" subject, network development (of client and us), and credibility building (mostly for us).

According to Bouwen (2002, 2004), information is one of the core elements and most valuable commodity in lobbying, providing "Access Goods". As exchange of information takes place through communication, further so lobbying is not possible without effective communication. Thus, lobbying is a communication process within a specific environment through which information has been exchanged with the specific aim of influencing the decision-maker.

However, without credibility and reputation, lobbying communication is like an empty shell. Hillman and Hitt (1999) point out that "the most important determinant of success in advocacy and public relations advertising was the credibility or reputation of the source" (p. 833). Moreover, this is un-avoiding substance in our efforts to be presumed as serious and reliable partner for talk's. Additionally, we concluded that reputation, or, in other words, credibility has direct influence on effects and results of lobbying (Hillman & Hitt 1999).

Following previous conclusions, information, communication and reputation are in core of lobbying process. Also, based on fact that Access Goods use communication canals to reach consumers "stakeholders", we can easily identify lobbying as Information Strategy (Hillman & Hitt's 1999). If we consider that the key elements of lobbying are information, intervention and argument (Hillman, 2003), only Implementation of Strategy means practical implementation of (above) stated elements.

Considering that Anastasiadis (2006) pointed out that "the nature of the information communicated in lobbying is surely a key to an organization's impact on society" (p. 32). Therefore, we should carefully consider the approach of targeting stakeholders as well as the wider public/society. Regarding Information, it is very important to be in possession of yet non-publicized information. Also, information should be based on expert's knowledge, to be reliable and future-oriented. If this information succeeds in fulfilling the needs of the stakeholder, the lobbyist would be considered as desirable partner, and doors to the stakeholder would open relatively easily. Intervention needs careful preparation based on analyses of power based connection and valuable orientation regarding subjects of lobbying. Intervention is based on communication strategy development and to practically implementation of chosen PR instruments.

Argumentation is part of communication contents with purpose to:

- build confidence,
- provide information,
- win hearts and minds,
- to convince.

Useful principles of success argumentation are: credibility positivism, use of exact facts and numbers, adapted decision, and innovative approach.

4. STAP model of managing of lobbying project

As key elements of lobbying are information, credibility, appropriate communication, ethics and legally-based relations, thus development of a model for implement offering a project management-based, sustainable and foreseeable lobbying process are considered in following section. Designing of STAP model has root from circling process model that has been illustrated in Figure 2.

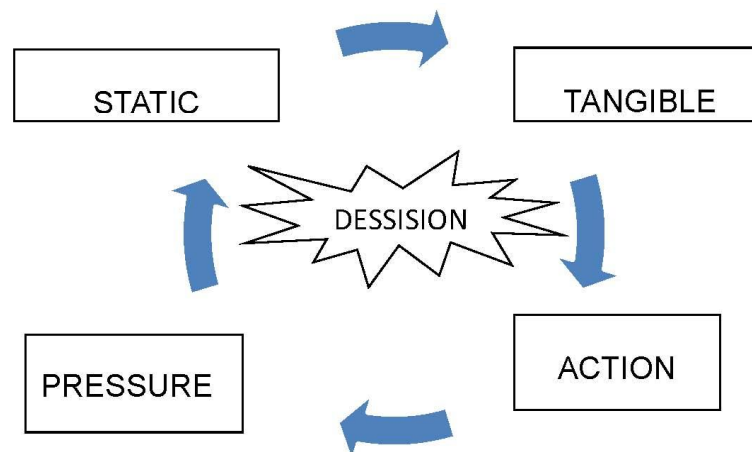


Figure 2:

The core structure consists of four main action phases: Static, Tangible, Action, and Pressure.

Static - the phase of the lobbying process phase, whose purpose is to analyze all so-called “given” parameters of all relevant political, business, cultural and marketing aspects of the environment in which our organization intends to have influence. At the very beginning of development of lobbying strategy, several important things should be borne in mind: laws, state and institutional strategies, organizational procedures, customs, ethics, tradition, cultural environment, good and bad practice, trends. All those external parameters should be analyzed thought our aims (organizational, strategic, business, etc.). Tendency is to build analytical approach for defining our goals and may to achieve them through the lobbying strategy.

Purpose of this phase is to connect all important stakeholders, having on mind stakeholder theory approach (Buchholz & Rosenthal, 2004; Driscoll & Starik, 2004; Freeman, 1994; Hendry, 2003; Mahon, 2002), and project environment with goals of our lobbying project. Most effective approach is to make detailed analyses of all stakeholders, and to try clarifying the interconnections, correlations and possible future trend in area that represent our interest arena. Key is to connect concert goal of our organization with important facts which have influence on our organizational success and to create connection between (our) organizational goals and goals of (our) lobbying campaign. This will be very important in evaluating phase, otherwise we can conclude (sadly, at the end of the process) that our strategy was wrongly directed, and that we wasted the resources (money and time). Final product of STATIC phase should clarify: stakeholders (number, influence strength, organizational form, etc.), goals (of lobbying campaign), social environment (laws, bureaucracy structure, procedures of communication, costumes, ethics, and cultural habits), and foreseeable future (policies, trends, strategies, analyses conclusions and forecast of future needs).

Tangible - tare that follows recognized and systematized stakeholders and their inter-relations. Putting all the stakeholders and static parameters in actual relational form, having dynamics and shape, putting “life” into the process and making all static variables tangible and alive, giving them a shape and interaction. Interaction is shown by the intensity, polarity and publicity dimensions. Intensity shows how strong relation is regarding our subject from the stake holder’s point of view. Polarity implies a positive or negative stakeholder’s altitude towards ours interest. Public exposures of lobbying processes declare how lobbying activities could be noticed by non-actors. Placing all these impact factors (intensity, polarity and publicity) in the same three-dimensional coordination system, we can design a “Power Map” (PM). This is a basic point for developing the communication strategy. The conclusions are reached by analyzing correlations, impacts, value orientations, as well as previous experience of public expressions on our target issues and are used to create an appropriate communication strategy. Bearing in mind that the final goal is to inform, influence, and to build alliances, the communication methods have to be considered carefully to avoid misunderstandings.

Action - up to this point of our process environment we have stakeholders, correlations among them, positions regarding subject of lobbying, cultural, law and policy environment, coalition potential and visibility level for non-actors. In the next phase we develop, design, and impellent communication strategy. As Anastasiadis (2006) pointed out “Communication is patiently essential in conveying information on preferences or positions. Lobbying simply cannot happen without it. Communication would thus appear to

be the process, or action, by which lobbying happens” (p.13). This phase is active based and means usage of communication instruments with purpose to inform, expose, negotiate, promote and marketing tools. Andrews (1996), arguing about connections of political lobbying and marketing notices that “Lobbying is ‘Machiavellian marketing... political lobbyists routinely utilize marketing concepts and techniques in pressing their case” (p.76). Also, for the same point of view (e.g. in Schendelen 2010) arguing, we can consider all lobbying activities as “Machiavellian” activity.

Depending on situation, stakeholder’s position and attitude regarding lobbying subject, we will choose some of communication instruments: one-to-one meeting, public hearing, public promotion, media covering story, publishing experts articles, using public debates, organized (or just take a part on) special events and all other wide range of PR tools to express our lobbying subject. In this phase, very important is the use of evaluating tools, to measure impact of our message in “heart and mind” of targeted audience, since expectable stakeholders reaction and changing or powering altitude. Feedback data can provide us evidence of any change in position on the PM, and can help in rationalizing our use of resources (time, money, organization capacities, etc.). If we notice some changes, it is useful for redirecting the message and influence beam, encouraging alliance and coalition efforts in same time.

Pressure - considers activities recognized in most lobbying projects as “grey” zone of communication. However, we have on mind pressure as influence and argumentation based activity, which purpose is to create pressure which result will be new quality “tectonic” plates, based on interest. Pressure doesn’t usage of personal disability, or social characteristic as instruments of trying to minimize the influence of same stakeholders. Also, it doesn’t consider corruption or use of some non-legal money contribution (for political campaigns), or expensive gifts (or paid holidays, for example). On the other hand, pressure is using of all legal and ethically approved communication tools to support stakeholders’ awareness about our lobbying subject. It means networking engagement, legal contributions, promoted social respond activities, building personal dignity based on ethical norms, following good practice and connections.

6. CONCLUSION

Lobbying is a complex activity built on interest-based communication. Considering results, we can analyze the “market” impact of our interest in terms of decisions made by stakeholders. Regarding the value of Information as Accesses Goods, we try, by using communication channels, formal and informal social groups, and PR instruments to inform decision makers about fact that it is useful for them either, to support and implement or suggest for future policy, laws, standards, etc. To make open doors, we have to be quality oriented and deterrent to constant development of reputation and personal ability. Complexity of Lobbying process involved necessity of project management based approach in designing and implementation of lobbying operation. STAP model in details allowed projecting of quality based programming of lobby process and including the use of various tools in each phase of the project. Depending on the sort of lobbying demands, and on the type of lobbying (economic, policy built, political, etc.) the relevant strategy, implementation tactics and tools should be developed. Development and practical putting into practice of STAP methodology will gradually improve the effectiveness of our lobbying efforts, in meaning of resources, time and money allocation.

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REGULATION OF MOBILE TERMINATION CHARGES

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Abstract: *This paper analyzes the influence of mobile operator competition on the prices of fixed-to-mobile calls. A model with multiple mobile operators and a single fixed operator is used. Mobile operators' market shares are similar. A situation where the mobile operators are not close substitute and their market shares are effectively fixed is considered. The results achieved in this research show that unregulated mobile termination charges will cause higher prices than monopoly call prices. The regulation of termination charges and prices may lower these rates. Direct mobile charging for termination can also lower the total fixed-to-mobile call price. It has been shown that profits of the fixed operator and each mobile operator decrease with an increase in interconnection costs under direct mobile charging. Also, with an increase in the number of mobile operators on the telecommunication market, the total price of fixed-to-mobile call increases.*

Keywords: *interconnection, mobile operator competition, termination charges, interconnection fees, price regulation*

1. INTRODUCTION

A terminating service involves the carriage of a call from a point of interconnection between two operators to the consumer who receives the call. The terminating operator directly bears connection costs from the point of interconnection to the receiving consumer while the originating operator bears the costs from the caller to the point of interconnection. Under the standard calling party pays principle of charging, however, the caller is charged for both the originating and terminating services. The originating operator collects the call charge and that operator and the terminating operator must, in turn, transact for the terminating service. In the absence of regulation, interconnection charges may be used by an incumbent operator either to prevent rival operators from becoming effective competitors (Armstrong, 1998), or to facilitate collusive outcomes under competition (Laffont, Rey & Tirole, 1998a, 1998b), (Armstrong, 1998), (Carter & Wright, 1999). Both possibilities suggest a role for the regulation of termination charges. Regulators, however, face a number of tensions when determining rules and charges for termination. If only the dominant operator's termination charges are regulated, entrant operators may have a competitive advantage and competition may be artificially biased in favour of new entrants. At the same time, if regulators limit the termination charges of non-dominant operators, this can affect an important source of revenue, thereby, making entry less attractive for new operators. With fixed-to-mobile pricing, the termination charges that are set independently by competing mobile operators influence the prices set by a noncompeting operator-the fixed operator. As termination charges influence the value to a mobile operator of attracting a customer, they play an important role in mobile competition. The competitive effects of mobile termination charges are influenced by *customer ignorance*. By convention, in many countries (an exception is the US for calls to mobiles) the caller pays for making a call. However, fixed-line customers often cannot identify the specific mobile operator that they are calling. They might wish to call a certain person or class of people who have mobile phone numbers, but they will often not be able to determine which mobile operator is associated with each person or number. Even if fixed line operators take differentials in mobile termination charges into account when setting fixed-to-mobile prices, the inability of fixed-line customers to identify mobile operators and, consequently, any price differentials in calls to them, means that fixed line customers are likely to base their fixed-to-mobile calling patterns on average prices. Alternatively, the fixed line operator will set its price for fixed-to-mobile calls on the basis of average termination charges. These averages depend on the observed market shares of mobile operators. As a result, an increase in one mobile operator's termination charges raises the average price of fixed-to-mobile calls and lowers demand for all of these calls. There is a horizontal externality imposed on the termination revenues of other mobile operators as well as a vertical externality imposed on the fixed line operators. Both of these externalities are potential sources of inefficient pricing. High mobile

termination charges will adversely affect fixed-line operator's profits. This may increase the incentive for vertical integration. By integrating with a mobile operator, the fixed-line operator can potentially internalise the vertical externality. High mobile termination charges will also raise regulatory concerns (Gans & King, 2000).

This paper is structured as follows. Section 2 describes the effects of changing termination charges. Section 3 presents the model, which is then analysed in the case of direct termination charging, in the case of operator identification and in the case where both direct termination charging and operator identification are used. Direct setting of termination charges, intervention for only a dominant operator and regulation by setting fixed-to-mobile price are also observed. Results obtained using the model are analyzed in Section 4. In the final part of the paper concluding remarks are given.

2. FIXED-TO-MOBILE TERMINATION AND CALL CHARGES

When mobile operators change their termination charges there are two types of effects. First, a higher termination charge will increase the fixed-to-mobile price and decrease the demand for fixed-to-mobile calls. This will generally change the profits from terminating fixed-to-mobile calls to each mobile customer. Second, any increase in termination profit per subscriber will make mobile customers more valuable, causing mobile operators to compete more aggressively to capture such customers. When the fixed-line operator can set differential fixed-to-mobile prices depending on which mobile operator calls terminate on, competition will lead mobile operators to set termination charges at the same level as would be set by a single monopoly mobile operator. A competing mobile operator, that can determine its termination profit per subscriber by changing its termination charge, will face an additional incentive. As termination profit per subscriber increases, it will increase the marginal profitability of attracting subscribers. This will make it compete more aggressively. Regardless of whether rival operators also compete more aggressively (operators compete in prices) or if this softens rival's reactions (operators compete in quantities), operators will generally benefit from increasing their own marginal profitability. Thus, each mobile operator will maximize its own marginal profitability by maximizing its termination profit per subscriber. The result is termination charges set at the monopoly level. When the fixed-line operator sets a uniform fixed-to-mobile price, competition will lead mobile operators to set even higher termination charges (Wright, 2002).

Unregulated mobile termination charges can result in fixed-to-mobile call prices above those that would arise under monopoly conditions. This outcome is a combination of consumer ignorance and horizontal and vertical separation. If the operators were not vertically integrated, with the mobile operator setting its termination charge independently then, when it can only set a uniform termination charge, it is likely to set that charge above its actual marginal termination cost. Otherwise it would not make a profit. The end result is double marginalization. The mobile operator will tend to raise the price of termination above marginal cost so as to increase its own profits. But this raises the cost of mobile call termination as seen by the fixed operator. To the extent that the fixed operator has any market power, it will tend to set its fixed to mobile call prices by marking up this price over cost. However, the cost observed by this fixed operator is not the true marginal cost of termination, but the higher termination price set by the mobile operator. As a result, termination charges tend to be marked up over cost twice – once by the mobile operator and once by the fixed operator. As the mobile operator raises the fixed operator's marginal cost of fixed to mobile calls, the price of those calls is higher. This result in lower consumption, reduced consumer surplus and also lower profits for both operators than would arise under vertical integration.

Horizontal separation of mobile operators combined with customer ignorance serves to exacerbate the double marginalisation effect; causing fixed to mobile prices to increase further. First, when consumers on the fixed operator cannot easily determine the precise price of the mobile operator they are calling, the fixed operator can do no better than set the same fixed to mobile call charge regardless of the operator being called. This price will be set on the average termination charges. Consequently, an increase in one mobile operator's termination charge will raise this average and raises fixed to mobile prices in general, rather than simply raising the price to the operator with the inflated termination charge. Put simply, the mobile operator that raises its termination charge gets all the benefit of that price increase (in terms of greater revenue from each fixed-to-mobile call it receives) but shares the economic cost of that price rise, as it only suffers a proportion of the fall in fixed-to-mobile calls. Thus, an increase in one operator's termination charge has a negative external effect on the termination profits that other mobile operators receive.

This effect is strengthened further when mobile operators recognize the influence of termination profits on their own competitive interactions. When competing against each other, mobile operators will recognize that attracting a customer not only gives them revenues from the calls made by that customer but also termination revenues from calls made to that customer. A mobile operator with a higher termination charge will, therefore, receive more profits from a given customer without any reduction in calls to that

customer; the calls to that customer are not influenced by the operator they subscribe to because the caller cannot identify this operator. So by having a higher termination charge, a mobile operator effectively receives greater benefits from attracting a given customer and hence, can afford to offer more attractive subscription terms to that customer. What this means is that in competing for a customer, an operator is going to be able to afford to offer better terms to a customer if its per customer termination profits exceed that of other operators. Because of customer ignorance, by increasing their own termination charge, a mobile operator will improve its competitive position to the detriment of other mobile operators. Competition will, therefore, drive termination charges upward. That is, termination charges may, in equilibrium, be so high that the fixed operator is unable to profitably offer a fixed to mobile service.

One response to this may be for the fixed operator to utilize its monopoly position to favor one mobile operator relative to another. Other non-favored operators may be required to pay higher termination charges for mobile-to-fixed calls made from their operators to the fixed operator. This would leave the non-favoured operators in a weakened competitive position and hence, price competition among the mobile operators would be weakened. This, in turn, would enable the favoured mobile operator to seize a greater market share and (as it then supplies a larger fraction of the fixed-to-mobile calls) would lead that favoured operator to reduce its mobile termination charges. In effect, a fixed and mobile operator would be getting together in a form of “quasi-integration” to eliminate the negative externalities associated with customer ignorance and vertical separation. This, of course, would have a detrimental effect on the degree of mobile operator competition and would potentially eliminate non-favoured mobile operators.

In the absence of any favouritism, vertical integration does not significantly improve the problem of market power and mobile termination charging. Integration will tend to reduce the average termination charge, as the integrated operator sets its implicit termination charge equal to marginal cost. But this will cause the non-integrated mobile operators to raise their termination charges. The end result is that the integrated operator will receive a lower level of profits than if it was vertically separated and integration without favouritism will not be advantageous. Only when integration leads to the ability to favour a single mobile operator and soften price competition will such integration be profitable. This will reduce fixed to mobile prices but at the expense of a softening of price competition in the mobile market and the conferral of market power on the integrated operator.

There are two drivers for regulation of termination charges for fixed-to-mobile calls: unregulated termination charges are set too high resulting in a loss of both consumer and producer surplus, the fixed line operator may utilize discriminatory call prices to exclude some mobile operators (Gans & King, 2003).

3. REGULATORY RESPONSE FOR FIXED-TO-MOBILE TERMINATION

Consider a model with n independent mobile operators and a single fixed operator. Mobile phone customers are exogenously distributed between mobile operators where s_i is the market share of mobile operator i . The marginal cost of terminating a call on a mobile operator is given by c_T^M while the marginal cost of originating a call on the fixed operator is c_O^F . The marginal cost of trunk services is given by c_1 so that the total marginal cost of a fixed-to-mobile call is given by

$$c_{FM} = c_O^F + c_1 + c_T^M \quad (1)$$

Let P_i be the price of a call from the fixed operator to mobile operator i . This price is either a price per call or a price per minute of the call. The fixed operator sets this price. The average price determines demand and is given by

$$P = \sum_i s_i P_i \quad (2)$$

The demand for fixed-to-mobile calls is given by $Q(P)$. It is often convenient to assume that this demand is linear so that

$$Q = \frac{1}{2b}(a - P) \quad (3)$$

The linear demand assumption allows us to explicitly calculate prices and charges and to compare these charges over different regimes. The fixed operator will set the price of fixed-to-mobile calls taking into account both the demand for such calls and the cost of those calls. If the fixed and mobile operators are owned by separate firms, then the marginal termination cost that will enter the fixed operator's pricing policy is not the true marginal cost of termination, c_T^M but rather the marginal termination charge set by the relevant mobile operator. The marginal termination charge is set by mobile operator i by T_i per call.

A useful benchmark price for this analysis is the uniform monopoly price for fixed-to-mobile calls. This is the profit maximising price that would be set by a single operator that owned both the fixed operator and

the only mobile operator. This price is $P^m = \frac{1}{2}(a + c_{FM})$ and the associated monopoly quantity is $Q = \frac{1}{4b}(a - c_{FM})$. Monopoly profits from the sale of fixed-to-mobile call services in this situation is denoted by

$$\Pi^m = \frac{1}{8b}(a - c_{FM})^2 \quad (4)$$

3.1. Direct mobile charging

The key problem of mobile termination is related to the clarity of information available to customers, the tendency to average prices over mobile operators and the tendency for double marginalisation. The most direct means of controlling anti-competitive pricing of termination services would be regulating those prices. There is clearly a range of regulatory rules that could be introduced by the authorities. A minimal regulatory rule could involve the mobile operators directly charging calling party for call termination. The fixed operator would only charge a customer the origination and trunk fee for a fixed-to-mobile call while the mobile operator would charge the customer the termination charge. To make such a rule feasible, the actual billing would have to be done by the fixed operator, possibly in return for a regulated billing fee (Gans & King, 2003).

Direct mobile charging does not alter customer ignorance. Customers still do not know which mobile operator is associated with a specific number until after they have been billed. But it does alter the strategic interaction between the fixed and the mobile operators. Direct charging also introduces regulatory clarity. Any manipulation of prices is clear and transparent.

Suppose that the fixed operator sets a price for origination and trunk carriage of O . The total price for a call from the fixed operator to the mobile operator is $P_i = O + T_i$. Under customer ignorance, with the shares of each mobile company given by s_i , the expected price that the customer pays for a fixed to mobile call is

$$P = O + \sum_i s_i T_i \quad (5)$$

First, if there is a single mobile operator, $O = \frac{1}{3}(a - c_T^M + 2c_O^F + 2c_1)$ and $T = \frac{1}{3}(a - c_O^F - c_1 + 2c_T^M)$. The total price of a fixed to mobile call is given by

$$P = \frac{1}{3}(2a + c_{FM}) \quad (6)$$

This price is below the standard double marginalisation price, as direct mobile charging has reduced the effect of vertical separation. At the same time, direct mobile charging introduces a new element of horizontal separation. The fixed and mobile components of the call are now complementary inputs from the consumer's perspective, but are provided by different operators. Thus, direct mobile charging still leads to a price above the integrated monopoly price.

Second, suppose that there are two mobile operators with potentially different market shares. In this situation, $O = \frac{1}{4}(a - c_T^M + 3c_O^F + 3c_1)$ and $T_i = \frac{1}{4s_i}[a - c_O^F - c_1 + c_T^M(3s_i - s_j)]$. The expected total price is

$$P = \frac{1}{4}(3a + c_{FM}) \quad (7)$$

The total price of a fixed to mobile call is independent of the actual shares of the mobile operators with linear demand. But the price is lower with direct mobile charging than with standard vertical separation. The specific termination charges set by each operator will depend on their market shares and, as in the case without regulation, these termination charges tend to rise for an operator as its market share falls.

Third, consider n symmetric mobile operators. The total price is

$$P = \frac{1}{n+2}[(n+1)a + c_{FM}] \quad (8)$$

The price of fixed to mobile calls rises as the number of mobile operators increases even with direct charging.

Overall, direct mobile charging, even in the presence of customer ignorance, tends to result in lower fixed to mobile prices than no regulation. But at the same time, it still leads to prices above the integrated monopoly level, and the price tends to rise as the number of mobile operators increases (Gans & King, 2000).

3.2. Operator identification

An alternative regulatory approach would involve operator identification. At a minimum, this would involve advertising which operators were associated with which numbers to reduce customer ignorance. Even so, this would only be a short-term solution. Operator identification could involve a customer being informed of the identity of the mobile operator that they are calling after they dial the number but before billing commenced.

If operator identification perfectly removes customer ignorance then each mobile operator is independent and there is no horizontal spillover between operators. If there is no call substitution then the fixed operator and each mobile operator are, in effect, a separate vertical pair. As a result, the behavior of the fixed operator and each mobile operator will be identical to a single mobile operator. In other words, for each mobile operator,

$$T = \frac{1}{2}(a - c_O^F - c_1 + c_T^M), P = \frac{1}{4}(3a + c_{FM}) > P^m, \quad (9)$$

Operator identification completely removes the effect of horizontal separation but it has no effect on vertical separation. Suppose that there is perfect substitution between calls to different mobile operators. The customer does not care which firm or person they call and will simply choose the firm or person associated with the cheapest fixed-to-mobile price. This leads to perfect competition between the mobile operators, and termination charges will be set at marginal cost. The fixed operator, however, retains all of their monopoly power and can set the price of fixed-to-mobile calls equal to the monopoly price.

3.3. Operator identification and direct mobile charging

If these regulatory options are both implemented, then the result for the fixed operator and each individual operator will be like the situation of direct mobile charging with only one mobile operator. In other words, for each mobile operator,

$$O = \frac{1}{3}(a - c_T^M + 2c_O^F + 2c_1), T = \quad (10)$$

The total price of a fixed to mobile call is given by

$$P = \frac{1}{3}(2a + c_{FM}) \quad (11)$$

This price is below the price established with just operator identification, but remains above the integrated monopoly price. As substitution between mobile operators increases, termination charges under direct mobile charging will decrease until, with perfect substitution, the charges equal marginal cost. The fixed operator retains its monopoly power so that the origination charge will be set at the monopoly level $O = P^m - c_T^M$.

3.4. Direct setting of termination charges

Suppose the regulator establishes a termination charge τ that must be set by all mobile operators. The fixed operator will then take this regulated charge as given and set the price of fixed to mobile calls to maximise profits. As the termination charges are now simply a cost to the fixed operator, and all strategic interaction is removed, the profit maximizing price of fixed to mobile calls will be

$$P = \frac{1}{2}(a + c_O^F + c_1 + \tau) \quad (12)$$

If this is compared with the integrated monopoly then $P - P^m = \frac{1}{2}(\tau - c_T^M)$. If the regulator sets the marginal termination charge equal to the marginal cost of termination, then the price will equal the integrated monopoly price.

If the regulator sets a termination charge above marginal cost then the fixed-to-mobile price rises, while if the regulator sets a termination charge below the marginal termination cost, then the fixed-to-mobile price falls below the monopoly price. The socially optimal price for fixed-to-mobile calls is given by the marginal cost of these calls, c_{FM} . The regulator would have to set the termination charge at $\tau^* = c_O^F + c_1 + 2c_T^M - a$, before profit maximization by the fixed operator was aligned with the social optimum.

For any higher termination charge, $t > \tau^*$, social welfare will be decreasing as the termination charge rises. In particular, note that it is not optimal for the regulator to set the termination charge equal to the marginal cost of termination. This only leads to integrated monopoly pricing and monopoly profits for the

fixed operator. Rather, to raise social welfare the regulator needs to set the termination charge below marginal cost. This creates a problem for the regulator and the mobile operators will make a loss on terminating calls.

One alternative for the regulator is to set termination charges at zero. Such termination charges will help offset the monopoly pricing by the fixed operator. If a is large relative to c_{FM} , then a zero termination charge can still exceed τ^* . But if a is relatively close to c_{FM} or c_T^M is relatively large, then zero termination charges may be below the socially optimal level. Zero termination charges have the advantage that they are easy to implement. The regulator simply does not allow mobile operators to charge for termination. At the same time, zero termination fees will result in the mobile operators making a loss from terminating fixed-to-mobile calls.

3.5. Intervention for only a dominant operator

If only a dominant operator's termination charges are regulated then call prices may be reduced, but that this reduction will be mitigated by an increase in the (unregulated) termination charges of other operators. Suppose that the termination charge of one operator, with the largest market share, is regulated while other termination charges remain unregulated. Then, all other things being equal, the regulated operator faces higher costs than the unregulated one. This is because the termination charges the regulated operator pays to other unregulated operators will tend to be higher than the charges the unregulated operators pay to both the regulated operator and to each other. With fixed market shares, lowering one operator's termination charges will flow through into the prices charged by other operators and average prices fall. But, at the same time, non-dominant operators have an incentive to partially undermine this flow through and seize some of the benefits for themselves by raising their termination charges. With uniform prices, reducing a dominant operator's termination prices tends to lower non-dominant firms' prices, as noted above, and this leads to a competitive response from the dominant operator. But this is partially offset by the reduction in the dominant operator's termination revenues. Operators use these revenues to compete more vigorously for subscribers, and reducing these for one operator reduces that operator's competitive position. Between two non-dominant operators, a regulated termination charge can increase competition and lead to lower prices because termination charges are set too high. Regulating non-dominant operator's termination charges will reduce their profits but only to the extent that they were earning monopoly rents. When the non-dominant operator has a sizeable market share, regulating its termination charge will put upward pressure on its call price but it will put downward pressure on the dominant operator's call prices. This may lower prices on average. In contrast, when the non-dominant operator is relatively small, the dominant operator may actually raise its call price in response to the higher price by the non-dominant operator (Gans & King, 2001).

An alternative to direct price setting for all mobile operator termination charges would be to just set the termination charge for a dominant operator. Suppose that there are n mobile operators, and they have asymmetric market shares. Let $s_j > s_i$ for all firms $i \neq j$ so that operator j is the dominant operator. The regulator directly sets operator j 's termination charge for fixed-to-mobile calls at τ . All other operators then simultaneously set their termination charges. Given these termination charges, the fixed operator sets the price for fixed-to-mobile calls. To simplify, assume that all non-dominant (and non-regulated) mobile operators are symmetric with market shares $s_i = \frac{1}{n-1}(1 - s_j)$. Then, for each non-regulated mobile operator,

$$T_i = (n-1) / n(1-s_j)(a - c_o^F - c_1 - s_j \tau + (1-s_j) / (n-1)c_T^M), \quad (13)$$

$$P = \frac{1}{2n} \left[(2n-1)a + c_o^F + c_1 - s_j \tau + (1-s_j)c_T^M \right] \quad (14)$$

$P > P^m$ even if $\tau = c_T^M$ so long as $n \geq 2$. Even if the regulator requires the dominant operator to set its termination price at marginal cost, the resultant fixed-to-mobile price will always exceed the integrated monopoly price whenever there is at least one other mobile operator. Regulation of one mobile operator leads to lower fixed-to-mobile prices than no regulation so long as the regulated price does not exceed the marginal termination cost by too much. The effect of dominant operator regulation in reducing the equilibrium fixed to mobile price is small compared to the effect of additional mobile operators in raising this price.

3.6. Regulation by setting the fixed-to-mobile price

An alternative solution to the problem of fixed-to-mobile charges might be the direct regulatory setting of the fixed-to-mobile call price. Setting the end price for fixed-to mobile calls avoids some of the problems with regulating mobile termination charges directly. In particular, it avoids issues of regulating operators that only have a relatively small market share. Once the final price is established, termination charges would then simply be a device used by the operators to divide any profit that exists under the regulation. While the setting of these charges could lead to considerable dispute, such a dispute is more about sharing profits than about raising prices to the detriment of final customers (Gans & King, 2000).

4. ANALYSIS OF THE RESULTS

Telecommunication market with n mobile operators and a single fixed operator is considered. Figure 1 presents profits of the fixed operator depending on interconnection costs by customer category and periods of traffic loads. It may be noted that profits of the fixed operator decrease with increasing of the interconnection costs, which is the most prominent for residential customers in the period of high traffic load. Business customers are less sensitive to changes of interconnection charges, especially in the period of low traffic load.

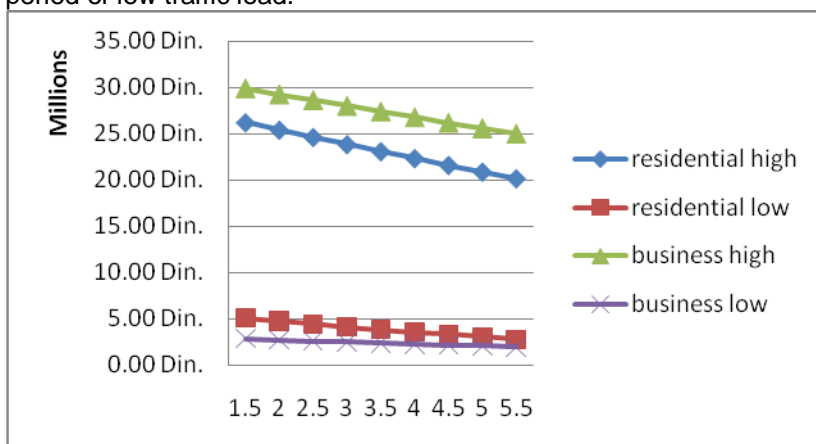


Figure 4: Profits of the fixed operator by customer category and traffic load

Profits of each mobile operator also decrease with increasing of the interconnection costs. That effect is also the most prominent for residential customers in the period of high traffic load, as shown on Figure 2.

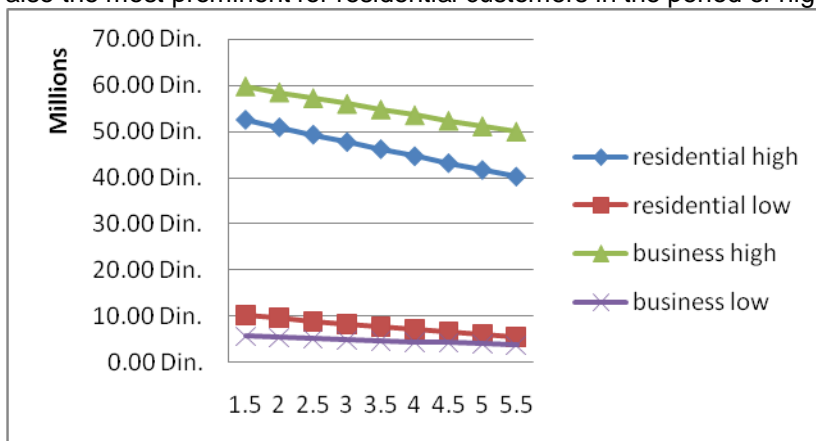


Figure 5: Profits of each mobile operator by customer category and traffic load

Figure 3 presents the total prices of fixed-to-mobile calls for business customers depending on interconnection costs for the period of intensive traffic flow. It may be seen that changes of interconnection costs have slight effects on the total price of fixed-to-mobile call. With the increasing of number of mobile operators in the telecommunication market, the total price of fixed-to-mobile call increases.

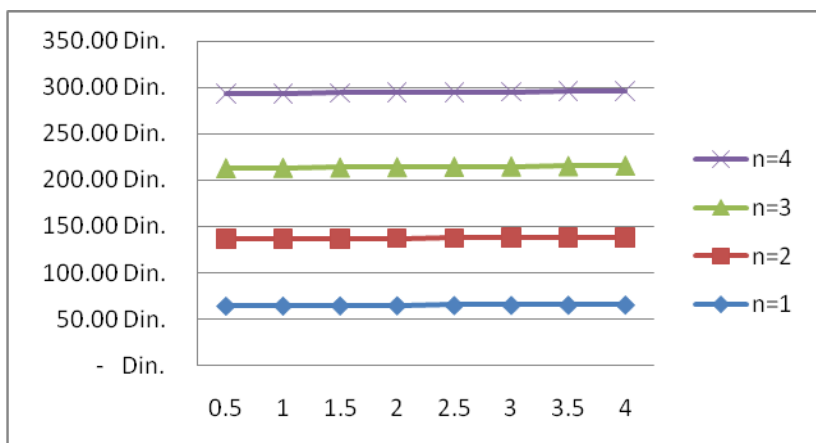


Figure 6: Prices of fixed-to-mobile calls for business customers in the period of high traffic load

Figure 4 presents the total prices of fixed-to-mobile calls for residential customers depending on interconnection costs for the period of intensive traffic flow. Like in the case of business customers, changes of interconnection costs have slight effects on the total price of fixed-to-mobile call and the price also tends to rise as the number of mobile operators increase.

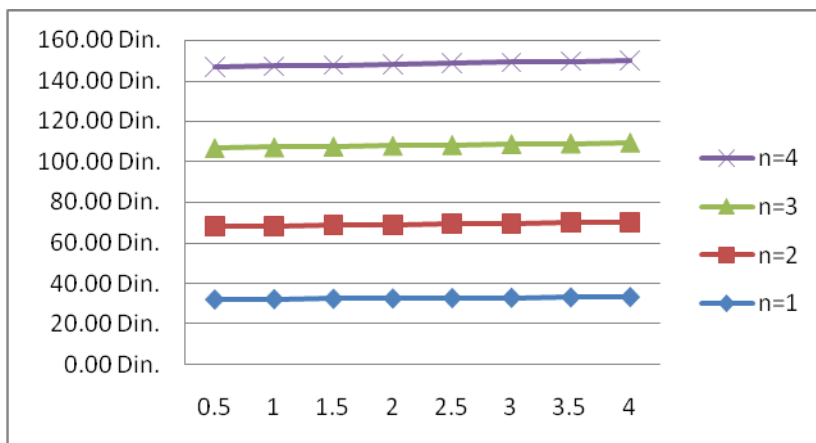


Figure 7: Prices of fixed-to-mobile calls for residential customers in the period of high traffic load

6. CONCLUSION

Direct mobile charging can lower prices of the fixed-to-mobile calls, but still remains above the integrated monopoly price. With increasing of the interconnection costs, profits of the fixed and each mobile operator are decreasing. The total price of the fixed to mobile call is independent of the actual shares of the mobile operators with linear demand and rises as the number of mobile operators increases. The most sensitive customers are residential customers, especially in the period of high traffic load. Also, the total price of the fixed-to-mobile call is nearly independent of the changes of interconnection costs for both business and residential customers.

ACKNOWLEDGEMENTS

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THE IMPACTS OF ORGANIZATIONS' SOCIAL RESPONSIBILITY ON THE SUPPLY CHAIN MANAGEMENT

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Abstract: *Following an increased interest in the concept of the integrated supply chain management and its application, the related management issues are becoming clearer and more visible. One of them is about the issue of social responsibility, which emerges along with the economic benefits stemming from the supply chain integration. Many organizations exerting the strongest impact within their supply chain deal with this by creating rules of behavior that they impose on the other supply chain participants, which may be regarded as an approach to the management of the entire chain. Within the scope of the above-said lie the foundations of some key topics of this paper - i.e. what are the limits of responsibility of a particular organization regarding the behavior of other members of its supply chain, what are the directions of the dissemination of socially (ir)responsible behavior, as well as within which scope it is possible and useful to exert this impact and what are the obligations that emerge from this.*

Keywords: *social responsibility, supply chain, stakeholders, interested parties, management*

1. INTRODUCTION

In the world of modern business new areas are continuously revealed, which organizations try to reach in order to find the one in which they can exercise their competitive advantage. One of them is the integrated supply chain. As this subject become more and more present, so become clearer and more visible the problems of supply chain management. One of them relates to the questions of social responsibility which arise in parallel with the economic benefits stemming from the supply chain integration.

Many organizations which exercise the strongest impact within their supply chain, solve this issue by creating rules of behavior which they impose to the other supply chain participants – what may be regarded as an approach to the management of the entire chain. Within the scope of the above said lay the foundations of some of the key topics of this paper - i.e. what are the directions of the dissemination of the socially (ir)responsible behavior through the supply chain, as well as within which scope it is possible to usefully exercise this impact.

One of the questions which arise is about the responsibility boundaries of one particular organization regarding the behavior of the other members of its supply chain. Organizations increasingly accept the concept of business networking through integrated supply chains. Integrated supply chain represents a vertically coordinated network of organizations which are bounded by various activities connected with the production and distribution of products (goods and services) to the final users (Chopra & Meindl, 2001). This problem was once solved by a concept known as vertical integration, which was considerably simpler and which materialized so that each of the vertically integrated organizations performs its activities separately. However, recently, the significance of the outsourcing or external acquiring of services which are generally out of the scope of the core business, becomes more important, so it is necessary to take more care about organization and coordination of the flows of goods, documentation and, of course, money. In such a way, the participants in the supply chain now become more or less forced to start sharing a joint vision and values, to exchange information more intensively, which sometimes may be very “sensitive” in the business sense, even to start to directly connect inputs and outputs stemming from the processes, and all of this with an aim to achieve results which otherwise would not be possible and, ultimately, be more competitive than another, “rival” supply chain.

Such a behavior becomes necessary when taking into account factors such as globalization of the competition, increasing speed of changes and increased complexity of customers, development of information and communication technologies and attempts to establish standards within specific business activities. Integration of the supply chain leads towards decreasing costs of production as well as transactional costs, the product development is accelerated, and members of the chain have an easier access to the various types of resources, especially knowledge (Möller & Halinen, 1999). The cooperation

described herein can hardly evolve on its own – usually one of the organizations which are members of the supply chain, the most powerful and, as described by the standard ISO 26000, the widest “scope of influence”, has to play the main role.

On the other hand, besides the benefits, with this come the new commitments. Organizations with the widest scope of influence will experience further expansion of their obligations towards social responsibility of organizations within their supply chain. This trend, to some extent, also has a defensive character, as it represents a unique approach to the risk management. In addition to the benefits stemming from the integration of the supply chain management, managers often fear that such changes in relations may lead to the loss of management capacity and to the increase of vulnerability of the most influential organization in the chain, and such fears certainly have realistic foundations (Kolk & Tudder, 2002). Therefore, with an increasing proliferation of the supply chain management, the pressure of the organization on its partners to increase effectiveness and efficiency rises, whereas, simultaneously, exactly such practice exposes the majority of companies to an even higher risk.

Another dimension of the risk related to social responsibility of organizations within the supply chain is related to the extent upon which the reputation and general standing of an organization, which is a member of a supply chain, may be jeopardized by the activity of another member - by such an activity which may have a bad echo in the general public, which sometimes may include accusations related to illegal types of behavior. In a same way in which the members of the supply chain can share the benefit from something good, they can feel the consequences of bad behavior of others in the chain. Due to the above facts, the managers in the supply chain are increasingly focused to the problems related to achieving the trust of customers that goods and services are rendered without deterioration of ethical and environmental standards.

2. THE FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT AND ORGANIZATIONS' SOCIAL RESPONSIBILITY. LINK BETWEEN THE CONCEPTS

Supply chain represents a set of business processes which connect suppliers, producers, wholesalers, retailers and everyone who is involved in the processes of creation, sale and delivery of products to the final users. In such a way, the supply chain encompasses the flow of product, information and financial means between business partners, i.e. between organizations which are members of the supply chain (M.-Nikolic et al., 2004).

By the traditional approach, supply chains are linear systems in which the raw materials serve as an input and the final product in the hands of users, as an output. The members of the chain behave as closed, independent entities, with very little or even without direct information about the other participants. Organizations usually keep large stocks of supplies and secure excess capacities in order to protect themselves from changes and instability of demand. However, experience teaches us that such an approach, due to possible fast and big changes in the contemporary market, represents a big risk with potentially negative consequences.

Modern supply chains have to be dynamic, flexible and responsive networks, which operate by the principle of “feel and react”, contrary to the traditional approach “make and sell”. Fast response to the changes in demand requires efficient solutions in all elements of the chain: production, warehousing, supply, transport and distribution. This means that, in such competitive conditions, key factor of survival and development of organizations becomes the intelligent and efficient use of the available resources. The optimization of the use of the available resources has to be achieved through the adequate planning and management. The real processes in supply chains must take into account an extremely large number of interconnected variables. Their modeling requires an experience with mathematical methods and finding of optimal solutions requires the use of advanced software packages, the so called optimization software (Vujosevic & Vukmanovic, 2003).

Supply chain management encompasses flows of materials, products, services and information from the original supplier to the final user. It requires coordination between various participants such as producers, suppliers, distributors, freighters and retailers. The aim of this type of management is the delivery of the right product, in right time, under the right conditions and under the right price (Chopra & Meindl, 2001).

The social responsibility of an organization should be understood as a multistakeholder approach, whose basic methodology may be described through a process of identification of interested parties, recognition of

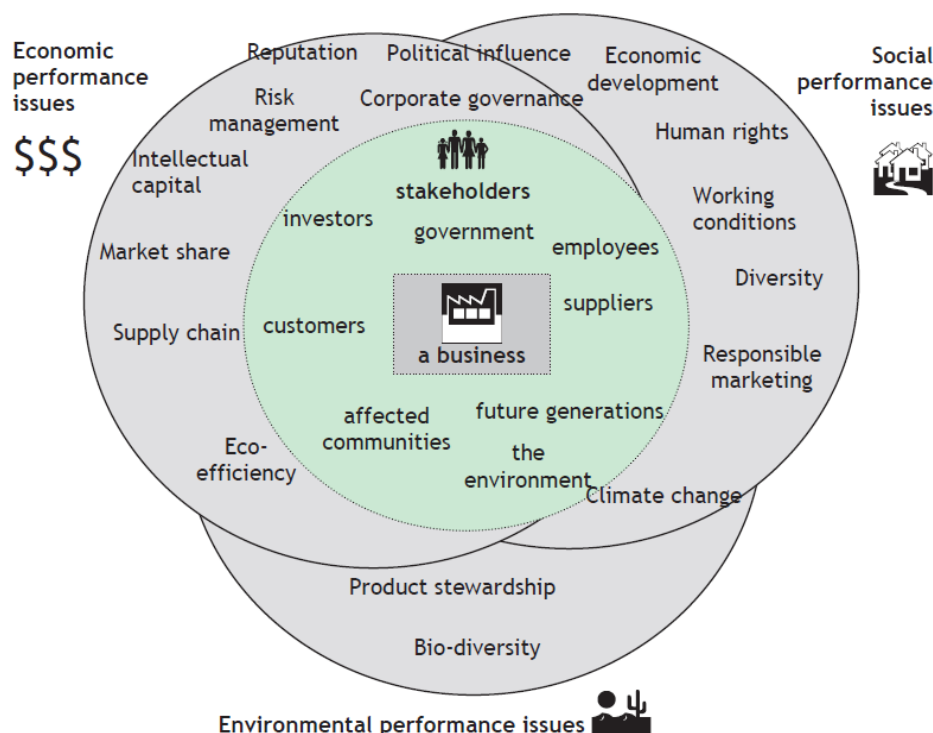
actual and anticipation of potential problems which may arise from establishing relations with them and the creation of adequate strategies, policies and processes for dealing with these issues. The use of the SR (Social Responsibility) concept should expand the horizons of social accountability of an organization, i.e. to elevate its level of awareness about financial, environmental and social implications of its behavior to the wider social community (Filipovic et al., 2008). Within this context, it is necessary to overview in high detail the relations between such influences and various stakeholders and interested parties of an organization.

However, before moving to this, it is necessary to clarify the difference between definitions of a stakeholder and an interested party.

Stakeholder of an organization is every individual, group, organization etc. which can be associated to at least one of the following three characteristics (Mitchell et al., 1997):

- Having an influence on the organization,
- Participation in any sort of legitimate relationships with an organization,
- Having priorities in requests towards the organization.

Interested party is a wider concept, which, besides stakeholders, encompasses all other parties which do not possess any of the above stated characteristics, but there is a possibility that they might acquire some of those characteristics through their operations and actions (Filipovic & Djuric, 2010).



Picture 1: Spheres of influence of an organization to its surroundings depicted through various stakeholders and interested parties (Source: Corporate Social Responsibility – Implications for Small and Medium Enterprises in Developing Countries, United Nations International Development Organization, 2002)

Picture 1 presents typical groups of stakeholders and interested parties of one organization, that are important for the application of the concept of social responsibility, that is, which are significant from the perspective of organization's economic, social and environmental impacts.

The most important interested party for this paper's topic are the suppliers. The suppliers are very interested in the economic impact, but they, in case of their own application of the social responsibility concept, as part of the supply chain, are also indirectly interested for social and environmental impact (Filipovic & Djuric, 2010). This particular problem of interrelatedness (now already clarified to a certain extent) of the concept of social responsibility and supply chain will be the subject of further considerations in this paper.

3. OVERVIEW OF STANDARDS ISO 26000 WITH REGARD TO THE SUPPLY CHAIN CONCEPT

Standard ISO 26000 entitled “Guidance on social responsibility”, was published in November 2010, and the official Serbian version in 2011. In this section we will pursue the examination and interpretation of the concepts from the mentioned standard, which are important for the relevant topic, in accordance with this international standard. Many terms which the standard defines explicitly are important for the relations between these two concepts. Among them, particularly stand out “social responsibility”, “sphere of influence” and “supply chain”. According to this standard, they are defined as follows.

The social responsibility represents “the responsibility of the organization for effects of its decisions and activities on society and environment, through open, public and ethical behavior that:

- contributes to sustainable development, including health and welfare of society,
- takes into account the expectations of stakeholders,
- is coordinated with relevant law and respects the international norms of behavior,
- is integrated across the entire organization and applies in relations with others.

With this definition there come a note that the “activities” include products, services and processes, and “relations with other” include the organization’s activities within its sphere of influence.

The supply chain is defined as “series of actions or sides (suppliers, foreign acquired workers, contractors etc.) that provide products or services of the organization”.

In standard ISO 26000 concept of “supply chain” is explicitly mentioned in two points. In paragraph 7.4.1 “Awareness raising and building of competency for social responsibility” it is said that the construction of competency for implementation of socially responsible behavior practices may include strengthening or development of skills in some activity fields, such as including of stakeholders and improving of knowledge and understanding in dealing with the key issues of social responsibility (as the key issues of social responsibility, the standard ISO 26000 recognizes the organization headship, human rights, work practices, environment, a fair business practices, customer problems, including and community development). Such efforts should include and use the existing knowledge and skills of people in the organization. Where appropriate, these efforts should include the competence building and training of managers and workers throughout the supply chain. For some problems, a special training can be very effective.

Thus, the standard in some way extends the concept of social responsibility on the whole supply chain, recommending to organizations to share their experiences with their business partners, that can lead to improvement of overall performance in some fields of social responsibility (we should note that usually it is not field in which organizations achieve the competitive advantage).

Next, in section 7.6.2 “Increasing of confidence in reports and statements related to social responsibility”, it is said that there are many ways to increase this confidence, and these ways include, among others, the taking of additional steps so that organization acts publicly and openly, providing information of some kind and in some form, that their accuracy can be easily verified by others. For example, instead of publishing reports with statistic data concerning the performance, the organization could also provides details about information sources and processes that are used to get these statistic data. In some cases, the organization can increase confidence in claims concerning its supply chain by providing a list of locations where these activities take place. In this way, the organization actually uses the socially responsible behavior of its suppliers (if it is really such) for the purpose of quality assurance. Thus, the standard induces and the specific situation from which the organization can benefit because it work properly throughout the supply chain, linking the organization with the social responsibility concept.

The sphere of influence is “range or width of the political, contractual, economic and other relationship through which the organization has the power to influence decisions or actions of individuals or organizations”.

It is noted that the power to make an impact, by itself, does not imply that the power is actually going to be used. Also, with this definition is note that wherever the standard uses this term, it should be understood in the context of guidelines from items that are named „Social responsibility and the sphere of organization influence“ (5.2.3) and „Application of Impact“ (7.3.3) which we will pay additional attention.

In paragraph 5.2.3 it is said that the organization is responsible for the effects of its decisions and activities over which it has formally and/or de facto control (de facto control includes situations where one organization has the power to conditional decisions or activities of another side, even when there is no formal or legal authority to do so). Such influence can be far-reaching. In addition to being responsible for its actions and decisions, in some situations the organization may have power to influence the behavior of other sides with which it has a certain relationship. In these situations, it is considered to be under the sphere of influence of the observed organization.

This sphere of influence includes relations within the supply chain of an organization, but sometimes even beyond. However, this does not mean that the entire supply chain in every situation fall within the sphere of influence of the organization. It can include formal and informal relations with all stakeholders, as well as other organizations and competitors.

The organization does not always have the responsibility to use its influence, just because it has the power to do so. For example, it can not be responsible for the effects of other organization action in respect of which has some influence, if these effects are not the result of its decision or action. However, there are situations where the organization is responsible for the manner in which it apply this influence. These situations are determined by the extent to which relationship with other organization contribute to the realization of negative effects.

There are also situations where, although the organization has no responsibility to implement its influence, it may be requested in addition, in any case to do so, on its own. The organization itself decides whether to enter into a relationship with another organization and, if so, how and to what extent. There are situations where an organization has a responsibility to signal and warn of the negative effects of decisions and activities of other organizations, and to take stapes to avoid or mitigate negative effects in terms of its relationships with such organizations (Spekman et al., 2005).

When evaluates its sphere of influence and when determines its responsibilities, the organization should proceed very carefully and conduct a detailed analysis of all the potentially critical factors – the so-called „due diligence“, to avoid getting into a situation that may contribute to the achievement of negative effects through its connections and relationships.

4. THE EXPANSION OF SOCIAL RESPONSIBILITY THROUGH THE SUPPLY CHAIN

Slowly, therefore, it becomes clear that the growing demands for the social responsibility of organizations extend to the activities that take place throughout the supply chain. This is one of the most important questions about the whole issue of social responsibility in supply chains – **should we consider the whole organization's supply chain as a part of this organization?**

If the answer to this question is positive, then we can bring into question whether some organization can, in this context, be in any degree independent from the other with which it cooperates, and from which is de facto legally independent. If it is negative, then the next issue is – is it appropriate to expect that an organization (usually the one that is the most powerful in the supply chain) takes responsibility for what happens beyond its legal responsibility, which can lead organization to situation where its socially responsibility actually extends to the entire supply chain.

Why an organization would be responsible for the way in which some other organization, legally independent from the first one, works? In this logic, we can say, for example, that customers are responsible for the mode in which some store, where they buy groceries, works or for anything related to it. This attribution of unlimited responsibility for supplier acting to organization, which is user of his products or services, certainly is not correct, because it would undermine the autonomy and independence of each organization. In most countries and their legal systems, the company is given a status of legal entity. It is usually considered, legally, that the organization is not responsible for some forms of socially responsible behavior of its employees or stockholders (Mamic, 2005).

Then, how to determine to what extend it is legitimate to expect from an organization to take responsibility for the behavior of others?

5. POSSIBLE IMPACTS WITHIN THE SUPPLY CHAIN

The organizations usually exercise the impact on the supply chain upstream, in terms of accepting the socially responsible behavior - this affects suppliers. It seems that the direction cannot be the opposite, even when seemingly true nature of the relationship shows that the one which is affected (though formally user), is supplier in some way. Considering the way in which this impact is realized, we can find some possible answers for this observation.

The ways in which an organization can spread its impact on others in the supply chain, in terms of their social responsibility, include:

1. standards and organizational rules of behavior that the organization imposes to others in the supply chain;
2. organizational culture;
3. taking role of stakeholders (e.g. of non-governmental organizations) which influence the development of social responsibility through public pressure on companies;
4. staff development.

Codes of conduct and standards of the organization-customer make it clear to the supplier which system of values is expected to follow. This kind of agreement can be reached by direct consultation with the current supplier or at the conclusion of the first contract with a new supplier, when the two organizations engage with each other for the first time (Amaeshi et al., 2008). Such consultation with each interested party is not possible if there is no real two-way communication. It is not uncommon for organizations to practice just formally some form of communication with their stakeholders, but this is actually one-way communication – it essentially does not allow the voice of interested parties to be heard, but it is a form of risk mitigation, development and protection of the organization reputation and creation of the competitive advantage.

Instead of this, communication should be characterized by true intentions, honest dialogue, connection, trust and fair relationship. Organizations which act in this way, have awareness that they can really add value through their relationship with stakeholders. They go into this relationship for reasons that go beyond calculating, wrongdoing and increasing profit. Such organizations often take responsibility to spread the culture (and practice) of socially responsible behavior throughout the supply chain (Crane & Livesey, 2003).

Also, the user organization has legitimacy to establish the process of periodic reports delivery about checks of the socially responsibility of its suppliers from them and, in some way, has duty to ensure that any form of quilt, discovered by the auditor or by the public, is going to be known. Sometimes, these things can lead to the termination of the contract. In the same logic, organizations can establish certain forms of rewarding suppliers which continually meet these standards and codes of conduct. This reward usually is not, nor it should be, of financial nature – may include sharing of good practice, establishment of joint training and the like.

Another possible way in which the most powerful organization in the supply chain affects the other members of the chain is to serve as **a model for others through its organizational culture** based on social responsibility. The customer cannot request from supplier the model of behavior which itself doesn't follow – in many situations, even, it must serve as an example. In this case, this example would be in terms of organizational culture, which is for an organization the same as the personality or character for a person, if we take this analogy. That diversity in the system of values, beliefs, work modes and relations make a major difference between the two organizations – as there are bad and good people, so there are both – bad and good organizations. However, the question is – why an organizational culture is good or bad. To simplify, the organizational culture could be considered good if it respects its stakeholders and interested parties in decision making, creating policies, processes and systems, therefore, the one that respects the principles of social responsibility at all levels, from the mission and vision statement to the ways in which organization carries out daily activities. With the development of such an organizational culture, an organization can become a model that the others in the supply chain wish to emulate. Some researches confirm that companies have a tendency towards imitating the most successful and powerful (Amaeshi et al., 2008).

Another option includes **changing the source of pressure on companies to behave socially responsible**. Sometimes, and in some situations, various non-governmental organizations were the ones who made the greatest pressure on companies to behave ethically, usually by bringing the public attention on what they do wrong. This change, in some way, changes the nature of the pressure, it no longer has to be

perceived as something threatening, but as an incentive - of course, if the strategy for this kind of impact on the supply chain is designed properly (Djuric & Filipovic, 2008).

Successful organizations can share their knowledge and good practice through the supply chain **by organizing trainings for employees of those on whom they want to influence**. Usually these trainings are designed to be common for employees of the organization and other members of the supply chain and include the identified needs of both. In this way, they contribute to solving the problem of individual behavior, often in conjunction with the appearance of corruption, unprofessional (sometimes very unethical) behavior and the like, that can not be fully reached by the organizational culture (Djuric & Filipovic, 2008).

6. THE ESTABLISHMENT OF SOCIALLY RESPONSIBLE RULES OF BEHAVIOR FOR PARTICIPANTS IN THE SUPPLY CHAIN – DIFFERENT APPROACHES

Even the most cautious organizations which apply the most effective suppliers monitoring practices and meet the conditions set by contract, may sometimes find themselves having their suppliers make the problem in the field of social responsibility. Of course that each serious organization attempts to influence the resolution of this problem (or, if it is not possible, they terminate the contracts with the supplier), but this kind of reaction to such situation, without any prior action, suggesting the absence of application of a systematic approach to the field of social responsibility and supply chain management.

Organization leaders in some industries, which have shown a willingness to overcome the existing legal norms and adopt sustainability as one of the fields of competition, were the catalysts of change and not only in their industries. For example, in the fashion industry it was “Levi Strauss & Co”, which was among the first to introduce a model of supply chain management, which many accepted (Emmelheinz & Adams, 1999). On the British market, known by its liberalism, company “B&Q” has launched several social and economic initiatives, particularly in terms of sustainability in forestry, and in cooperation with some non-governmental organizations and other members of the industry, developed a system for certification, known as “Forest Stewardship Council” (United Nations International Development Organization, 2002).

Let's see what can go wrong in this situation. Powerful organization will not hesitate at first to take an action, or to use certain amount of resources to help the other organization to solve observed discrepancies. If it fail, consequences are likely to be termination of the current contracts or cutting any thoughts of future contracts. This is the worst possible scenario. Simply, suppliers usually work under pressure and they are faced with certain political and cultural barriers, even when try to comply with what is proven to be the best practice. Ending the relationship with supplier as soon as some nonconformity is discovered can hardly contribute to the overall goals, such as ensuring human rights and labor rights, and environmental protection – if the organization that commits an violation has more users, it is difficult to be distracted from the bad practice because one of them left it (Amaeshi et al., 2008).

Sometimes this problem with the authority is the reason why organizations choose different approach – the responsibility for the behavior of partners in the supply chain can be transferred to the third side. There are organizations which deal with the development of generic codes of conduct for suppliers that can be applied across different supply chains. A certain number of international initiatives is focused on changes on the markets in certain sectors. For example, „The Fair Labour Association” has an impact on the U.S. apparel industry and in particular focus on college teams sports equipment, “The Ethical Trading Initiative” was launched by retailers in the UK, in collaboration with non-governmental organizations, standard SA8000 (Social Accountability 8000) has had widespread popularity among manufacturers of toys in China (United Nations International Development Organization, 2002). These emerging global standards aim to institutionalize and improve balance in specific industries, and above the limits of what individual organizations do.

However, beside the question of extend to which powerful organizations implement control over the activities carried out by their partners in the supply chain, it should be considered what this “big” organizations can do in return, without any excessive investment, for their “small” suppliers.

As a very common form of socially responsible behavior of a large organization, it allows small, less developed organizations' staff to attend training and events aimed at professional development, organized for employees of this large organization. Also, it is proven that the engagement of local suppliers and

tendency to employ members of the local community is a practice which is effective for creating a good reputation of the organization and for building good relations with the local community.

Some large organizations demonstrate their social responsibility by encouraging entrepreneurial initiatives in the territory where they belong. This is often manifested through the establishment of mentoring programs for initiating business ventures for individuals (so-called “start-up”) or by encouraging particular entrepreneur initiatives of already existing small and medium enterprises. Also, support for small organizations in the process of reporting about socially responsible activities, i.e. information about conducted activities, can be of great importance (Djuric & Filipovic, 2008).

7. CONCLUSION

As a main conclusion raises the fact that, since they have some benefit from disappearance of borders in the supply chain, organizations must be prepared to take care of risks related to the effects of the policies and actions of their partners, other members of the same supply chain, especially in the attitude towards eco and social environment. The concept of social responsibility can be a means by which organizations establish a balance between the benefits gained by “outsourcing” of their activities, for them especially specialized suppliers and the damage that can suffer through the loss of management activities that affect their business.

More and more organizations begin to understand the purpose of maintaining a balance between the advantages of supply chain integration and loss of control over certain activities outsourced to other organizations in the value chain. This understanding comes directly from the right approach to the field of social responsibility. Organizations which accept this responsibility usually do not hesitate to initiate the development of conduct rules that must be followed by their partners in the supply chain. However, responsibility for the behavior of partners in the supply chain can be transferred to the third side – there are organizations that deal with development of generic codes of conduct for suppliers that can be applied across different supply chains.

An important issue regarding this is – how much organizations may require from partners in the supply chain in terms of social responsibility. Overview of different codes of conduct for supply chain developed by both organizations from the chain themselves and from third side, indicating the existence of significant discrepancies. Differences in codes of conduct for partners in different supply chains open space for situations where for the same activities of organizations which belong to different supply chains is required more or less, and some of them in this way can come in a worse competitive position. In contrast, in some supply chains from the organizations is required too little, which leave the space for the loss of reputation or even a potential accusations.

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SOCIAL RESPONSIBILITY AND ETHICS OF MARKETING AND CORPORATE COMMUNICATION

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Abstract: *Considering the definition of corporate social responsibility given by The International Organization for Standardization and the dimensions of social responsibility adopted by academics who study this topic, the authors of the paper defined the theoretical framework for the integration of CSR principles and philosophy with marketing and corporate communication, with special emphasis on ethics. The paper defines economic, legal, ethical and voluntary responsibility of marketing and corporate communication. The ethics of communication are discussed by reviewing two different schools of thought, and the authors have concluded that marketing and corporate communication is, by its nature, not an unethical process, but that it can be lead in an ethical or an unethical manner. Managerial implications of the paper include the systematization of ethical issues in marketing and corporate communication with practical examples.*

Keywords: *corporate social responsibility, ethics, marketing communication, corporate communication*

1. INTRODUCTION

In an analysis of academic definitions, among the first more comprehensive approaches to defining the term of corporate social responsibility (CSR), the author Jones (1980) stands out suggesting that corporate social responsibility implies that companies have an obligation towards all interest groups within a society, not only towards their shareholders, and that this obligation goes beyond what is prescribed by law or a union contract. A more modern definition offered by Marsden (2001) states that corporate social responsibility refers to the essential behavior of a company, as well as its taking responsibility for its overall impact on the society in which it operates. CSR is not an optional 'add-on' to business operations, nor is it a single act of philanthropy (a donation). A socially responsible company is one that leads a profitable business, taking into account the overall positive or negative effect that it has on society, the economy and the natural environment. McWilliam and Siegel (2001) define corporate social responsibility as actions that reflect positively onto society, which are above the company's interests and that which is required by law. Likewise, widely cited is the definition offered by Pinney (2001) that corporate social responsibility, or corporate citizenship, can be simply defined as a set of management techniques that allow a company to minimize the negative and maximize the positive impacts of its operations on society. Probably the most common definition in the academic literature in the last 30 years is the definition by the author Carroll, which reads that the social responsibility of a business includes the economic, legal, ethical and voluntary/philanthropic expectations of society, in relation to the organization during an observed period of time (Carroll, 1979; 1991). Dahlsrud (2008) has conducted one of the more comprehensive studies of CSR definitions, and has concluded that all of the relevant definitions include some, or all of the following dimensions:

- The social dimension – Contribution to the welfare of society, by improving the quality of life of the social community in which the organization operates;
- The natural environment dimension - Care for the consequences of the organization's operations on preservation of the natural environment, by reducing the negative impacts and increasing the positive;
- The economic dimension – Preservation of profitability, and contribution to economic development;
- The stakeholders dimension – Establishment of relationships with all stakeholders, and fulfillment of their expectations regarding business responsibility;
- The voluntary dimension - Decisions and activities that go beyond what is required by law, which are guided by ethical principles, and implemented on a voluntary basis.

The International Organization for Standardization (ISO 26000, 2010) has defined the term as: *"the responsibility of an organization for the effects of its decisions and activities on society and the environment, through transparent and ethical behavior, such that it contributes to sustainable development that includes the health and welfare of the society; takes into account the expectations of its stakeholders; is in accordance with applicable law and international norms of behavior; and which is integrated throughout the entire organization and applied in all of its relations."* The authors of this paper consider this to be the most

relevant CSR definition for the purpose of analyzing the social responsibility of marketing and corporate communication.

In accordance with the philosophy of conducting socially responsible business, a company needs to make marketing decisions by taking into account the desires and long-term interests of the consumers, the demands of the employees within the company itself, as well as the long-term interests of the social community in which it operates (Kotler et al, 2007). Therefore, the purpose of this paper is to define the theoretical framework for the integration of CSR principles and philosophy with marketing and corporate communications, with special emphasis on ethics.

2. THE SOCIALLY RESPONSIBLE DIMENSIONS OF MARKETING AND CORPORATE COMMUNICATIONS

In this paper, the socially responsible dimensions of marketing and corporate communications are analyzed through the theoretical framework of “the dimensions of social responsibility”, by the author Carroll (1999). The given model can be applied on marketing and corporate communications in the following manner (see Figure 1):

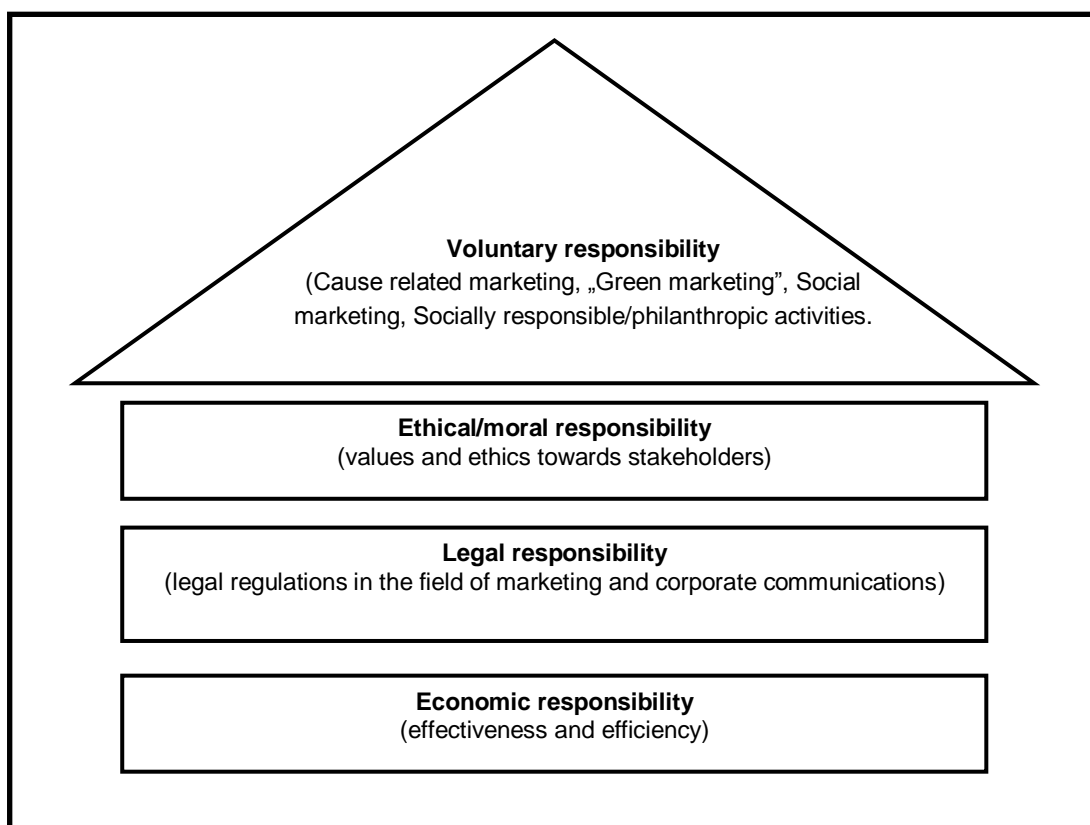


Figure 1. The hierarchy of the dimensions of social responsibility of marketing and corporate communications

Economic responsibility.

The first level of social responsibility in this domain implies that a marketing and corporate communication is planned and implemented in a way so that it fulfills its essential function within the organization (Filipović&Kostić-Stanković). This is most often an increase in sales and profits when it comes to marketing, while it is the improvement of reputation and relationships with stakeholders in the case of corporate communications. The main indicator of the economic responsibility of these two processes is the degree of effectiveness and efficiency, while the instrument of control involves the setting of measurable objectives and performance indicators (KPIs - *key performance indicators*), as well as evaluation, i.e. the objective measurement of satisfaction of the set objectives (Vlastelica, 2007).

Legal responsibility.

Compliance with legal regulations in the field of marketing and corporate communications represents the next dimension of social responsibility of these processes. In addition to legal regulation that directly relates to this field, such as the Law on Advertising, it is also necessary to know and respect the laws that regulate certain aspects of the communication process, such as the Law on Free Access to Information of Public Importance, the Consumer Protection Act, the Regulations on Marking and Labeling for Prepackaged Foods, the Law on Protection of Users of Financial Services, and others.

Ethical/moral responsibility.

Ethics in marketing and corporate communications is probably the most complex dimension of the given processes. The authors of the paper believe that marketing and corporate communications, by their nature, are not unethical processes, but that they can be lead in an ethical or unethical manner. Therefore, this paper provides a more detailed analysis of the ethical aspects of these processes.

Voluntary responsibility.

The process of integration of corporate social responsibility and marketing and corporate communications achieves the so-called "Voluntary responsibility". Namely, it refers to the overcoming of economic, legal and ethical expectations in terms of marketing and corporate communications, and the incorporation of social responsibility into the very heart of the processes. An example of this are the "hybrid" forms of marketing and corporate communications, such as:

- Cause related marketing
- „Green marketing"
- Social marketing
- Socially responsible/philanthropic activities.

3. THE ETHICAL ASPECTS OF COMMUNICATION

Ethics represent a set of moral principles and values that determine the behavior and decisions of individuals or groups (Berkowitz et al, 1997). According to the author Fill (2005), there are two basic schools of thought when it comes to ethics in communication, which focus on: the process, i.e. the activities, believing that certain actions are universally good or bad; while the second focuses on the consequences, and whose supporters believe that the evaluation of a certain activity as good or bad depends on the consequences of the particular activity's implementation. In this sense, there are also extreme views that any form of marketing and corporate communications are, by their very nature, unethical. In his article, the author Pollay (1986) presented an overview of the sociological literature on the subject of marketing communications, from which it is evident that the sociologists of the time considered this process to be a "powerful and intrusive means of communication and persuasion". The arguments for this view are most often the following:

- Marketing communications influence free will and the freedom of choice, by only emphasizing information that is of interest to those who are implementing the marketing communications, thus misleading the consumers (citizens, the recipients of the marketing messages);
- Marketing communications, according to their definition, promote materialism and consumerism, thus undermining traditional social values;
- Marketing communications influence the way in which individuals perceive others and themselves, they create artificial needs and affect social relations.

In the literature, it is also possible to find similar claims when it comes to ethics in corporate communications, primarily public relations and the media relations within them. The terms that are related to public relations among the public, such as "manipulating public opinion", "spin doctors" and such, indicate a wrong perception of the entire profession, which is the result of individual cases of unethical behavior by individuals, agencies or companies that are engaged in a particular field of business.

On the other hand, numerous authors state that it is precisely marketing and corporate communications that allow the public to "control" the operations of organizations that shape society, i.e. that they are a prerequisite for transparent business operations and greater public and consumer awareness, thereby limiting the power of the individuals holding the capital, and moving it towards the society.

As noted above, the authors of the paper believe that marketing and corporate communications are, by their nature, not unethical processes, but that they can be lead in an ethical or unethical manner.

The starting point of the analysis of the ethical issues in marketing and corporate communications is the choice of the theoretical framework. Namely, ethical problems can be analyzed from the perspective of:

- Values
- Stakeholders
- The process

The first approach involves an analysis of the basic values that are immanent in the process of communication, such as honesty, respecting of privacy, independence, transparency, etc. Most of the ethical codes adopted by professional associations start precisely from this perspective, and they prescribe the basic values that should be respected in communication. An example is the "Statement of Ethics" of the American Marketing Association (2012).

The ethical issues from the stakeholders' perspective are analyzed depending on whom the communication is referring to, i.e. which target group or target audience is under the influence of the communication activities. It may be consumers, competitors, as well as society as a whole. An example of an ethical code that is designed on the principle of stakeholders is the Code of Professional Ethics of the Public Relations Society of Serbia (www.pr.org.rs).

An analysis of ethics from the process perspective involves a review of the righteousness of certain activities within marketing and corporate communications, such as: public opinion and market research, the defining of prices, ways of promotion, etc.

Taking into account the given theoretical approaches to studying ethics, the authors of this paper distinguish the following areas of ethical and unethical marketing and corporate communications:

- **The ethical issues in public opinion and market research.**

Invasion of privacy is one of the main issues in the field of research. However, if a respondent is familiarized with all the relevant aspects of the research (the name of the client, the purpose of the data, how the data will be processed and in which manner it will be presented) and voluntarily agrees to participate in the study, this cannot be considered as an invasion of privacy, but a so-called informed decision of an individual. Furthermore, stereotyping, which is inherent to interpretation of research results through the analysis of demographic groups, is not in itself unethical, but stereotypes should not be used in communication "in a negative or dehumanizing way" (AMA, "Statement of Ethics", 2012). Protection of individuals' personal data, collected by the research, represents another ethical obligation within this process.

- **The ethical issues in "targeting" (the selection of a target group or target audience).**

The two basic occurring forms of unethical behavior in targeting are: selective marketing, in terms of deliberate exclusion of a certain group of consumers as undesirable, and the targeting of so-called vulnerable groups, which include children, the elderly, the poor, minorities and/or persons with special needs. The first form applies to, for example, deliberate exclusion of an offer to obese people, homosexuals, or members of certain minorities. On the other hand, common are examples of inadequate supply, place, and manner of promotion when it comes to children and the elderly. According to Kotler (2005) manufacturers of industrial crops are often criticized for the way in which they promote their products, which contain a low nutritional content and a large amount of sugar. Namely, the extremely strong appeals that are used in these campaigns, as well as the identifying personalities such as popular animated characters that kids love, overwhelm the rational defense and cognitive power of children, and lead to excessive consumption of these products. Similarly, certain companies take advantage of a lack of knowledge and a reduced ability to perceive all of the advantages and disadvantages of specific arrangements, such as various types of insurance or *time-sharing* arrangements, when promoting products and services to the elderly. The promotion of certain financial services, such as unaffordable loans to the poor with a conscious insight into their disadvantaged position within the arrangement, belongs to another form of abuse of the inferiority or vulnerability of a particular segment of the population, for the purpose of economic gain of the one communicating.

Kotler (2003), on the other hand, also states the example of communications directed towards children, which is not considered to be unethical. The Colgate Junior toothpaste for children, with specially customized content that allows for more frequent and longer brushing, represents a product whose promotion to children is justified, because of the immediate health benefits of its use.

▪ **The ethical issues in advertising.**

Advertising represents a marketing communications tool that is, in practice, the most susceptible to criticism regarding unethical behavior (Kostić-Stanković, 2011). The main areas, themes or dimensions within advertising, which are subject to ethical evaluation, are the following: truthfulness of an advertisement, completeness of information in an advertisement, the use of various techniques of persuasion, intimidation and manipulation, the content of the advertisement in terms of the use of illegal or inappropriate motives (sexuality, violence, etc.), the position of certain demographic groups in an advertisement, negative advertising, etc. Examples of manifestation of unethical advertising are shown in Table 1.

Table 1. Examples of manifestation of unethical advertising

Activity	Example
Concealing information regarding the total costs of a transaction	<ul style="list-style-type: none"> ▪ Advertising mobile phone services without stating the obligation of paying a certain sum in order to activate the service ▪ Advertising banking services without specifying the fees, interest rates, charges or other costs related to the activation and maintenance of these services ▪ Advertising airline ticket prices without specifying the airport taxes, whose payment is an unavoidable part of booking a flight
Use of vague terms	<ul style="list-style-type: none"> ▪ "Natural", "Organic", "Healthy", "Green", "Fresh", "Light", are only some of the terms used in advertising that can mislead the consumer. If situations in which it is allowed to use such terms are not regulated by law, their most common unethical application involves the use of these terms for promotion of a product, in which only one ingredient satisfies the given claim
Comparison	<ul style="list-style-type: none"> ▪ Using vague terms such as "better" or "best" in comparison with products from other manufacturers or "regular" products, without specifying in exactly which category or aspect the product is better, nor providing any evidence to support the given claim ▪ Using vague comparatives or superlatives, such as advertising in the film industry that promotes the "most charming movie of this fall"
Misleading consumers through the visual presentation of a product or service	<ul style="list-style-type: none"> ▪ Using photos or video that depict the product to be more than it actually is, or showing the product with accessories that are not included in the standard "package" that the customer receives for the price that it is communicated ▪ Promoting travel arrangements with a visual presentation of hotels or services (trips, massages) that are not included in the offer that is promoted
Fake testimonials	<ul style="list-style-type: none"> ▪ Presenting paid actors or models as scientists, doctors or experts, who guarantee that the product satisfies the function that is being communicated ▪ Testimonials of "fake" users of a product, in which they claim that they have solved a problem (obesity, insomnia, pains) by using the particular product ▪ Using celebrities and implying that part of their success comes from the use of a particular product or service

- **The ethical issues in sales promotion.**

The majority of complaints regarding unethical behavior in the field of sales promotion are related to the organization of prize games and sweepstakes. Promising of gifts “to every customer, user, reader”, after which it turns out that “supplies are limited” and that the claim that everyone wins is false, represents a typical example of deceptive communication. This also includes discount coupons that do not clearly state for how long they are valid, i.e. until when the customer can use them, or for which particular products the discount is applicable. Another example is the promotion of discounts for certain products, for which it turns out that they are out of stock, where the advertiser’s intention was to attract customers to the retail facility, so that they can purchase other products at a higher price than the one that was promoted.

- **The ethical issues in direct marketing.**

The basic ethical postulate of direct marketing, which is based on the existence of a target group/customer database, implies respect of the target group’s privacy. This primarily applies to junk mail (*spam*), whether physical or electronic, telephone marketing and sales, and the use of a client or potential client database for promotional purposes without obtaining prior consent from the clients, etc.

- **The ethical issues in public relations.**

Truthfulness, completeness and timeliness of information, represent the imperatives of ethical communication in public relations as well. Seeing as how the subject of communication in this field is much more complex, the ethical evaluation and ethical issues are also more complex. Namely, as opposed to marketing communications which are primarily focused on the very product/service, while the target groups are customers and consumers, the subjects of communication of public relations are most often corporate values, social issues and news concerning overall business operations, while the target audiences can be very heterogeneous: from the employees in an organization, through the media, public administration, non-governmental organizations, to society as a whole. Therefore, the first ethical obligation of public relations professionals is the introduction of ethical principles, values and codes of conduct at the corporate level. When initiating certain topics and raising public awareness on an issue, care should be taken to maintain objectivity, as well as a so-called *win-win* position between the interests of society and the interests of the organization on whose behalf the public relations are implemented. In practical terms and everyday activities, given that the media are the dominant target public through which public relations practitioners communicate with the broader public, the basic ethical dilemmas relate precisely to the various aspects of media relations. Namely, in the wish to improve the publicity of their client or organization, practitioners sometimes resort to unethical activities and instruments, such as: paying journalists to publish a report, paying for travel or other forms of compensation in order to be favored in the press coverage, disclosing information that views a particular topic or subject only from the company’s point of view, etc. It is obvious that the ethical issues in media relations are closely related to journalism ethics. Progress in this area from which both professions, corporate communications and journalism, will have long term benefits, implies a synergy of the basic missions of the representatives of both professions: on the one hand, reporting contributes to the greater awareness and well-being of society (when it comes to journalists), while on the other hand, it promotes the reputation of the companies it represents, providing truthful and timely information regarding their business operations (when it comes to the representatives of Corporate Communications).

4. CONCLUSION

After systematization of the field of application of ethics in marketing and corporate communications, it can be concluded that the ethics in marketing and corporate communications can be improved in one of the following three ways. Education of individuals who are engaged in this profession, on the conducting of ethical and unethical business. Legal regulation, in the case when the unethical behavior from a single incident becomes a pattern of behavior in a particular field. It is usually under public pressure that a given field is regulated by legal acts. Activities of professional associations, which on the principle of self-regulation serve to reduce unethical behavior in the field of their profession. This implies the adoption of a profession’s code of ethics, the promotion of ethical conduct, the monitoring and control of the ethical behavior of members and organizations, but also the punishment of unethical behavior within a profession through public condemnation, by dismissal of a membership, or misdemeanor/criminal charges. For example, in Great Britain there is the Advertising Standards Authority, which is an independent organization whose mission is to “ensure that all advertisements are legal, decent, honest and truthful”. This organization continuously monitors advertisements, direct sales and direct marketing in the UK, and undertakes actions to affect

changes, or cancel marketing content that is deceptive, harmful or offensive. At the time of writing of this paper, work is in progress on the first “National code of responsible advertising”, organized by the international branch of the International Advertisers Association (IAA) in Serbia.

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ETHICAL ASPECTS OF THE DUTIES OF DIRECTORS AND MEMBERS OF THE BOARD OF DIRECTORS FOR THE PURPOSE OF COMPANY INTEGRITY DEVELOPMENT

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Abstract: *The authors of the paper aim to contribute to the knowledge of morality in business activity, as well as the influence of ethics and integrity of board of directors and supervisory board members on decision-making within those bodies in companies in Serbia. The relationship between ethics and company success is taken into consideration in the same context. Ethics and success may not necessarily be in conflict. Opting for the topic in the title, we analyze the hypothesis that the personal integrity of board of directors and supervisory board members has an impact on decision making within the boards, and that the company itself is as moral as the people in it.*

Keywords: *duty of care, members of the board of directors, ethics, integrity, company.*

1. INTRODUCTION

Individuals who are at specific positions in a company's organizational structure arrive there with personal convictions, moral attitudes to actions which the company requires of them in the sense of identifying them as either good or evil.

This also refers to the holders of the offices of directors, members of the boards of directors, i.e. company supervisory boards. Their duties towards the company in terms of the obligation of observance (Art. 63 of the Law on business companies of the Republic of Serbia, in further text LBC), obligation of reporting businesses or actions involving personal interest (Art. 65, LBC) (or the interest of related persons in terms of Art. 62, LBC), obligation of avoiding conflict of interest, i.e. obligation of loyalty (Art. 69, LBC), obligation of the prohibition of competition (Art. 75, LBC) as well as the obligation to confidentiality in business activities (art. 72 LBC) differ, as it is well-known, from the jurisdiction of board of directors. It also differs from the responsibility of the company as a whole towards internal and external stakeholders, that is to say, society as a whole, although these categories are mutually intertwined. In this paper, we analyse, that the mentioned obligations of directors have an ethical dimension along with the legal.

2. DUTY OF CARE – WORKING IN COMPANY'S BEST INTEREST.

In our positive law, the duty of care that binds directors and supervisory board members is understood as the duty of conscientious decision-making, i.e. participation in that process, with the diligence of a good entrepreneur in sincere belief that this is in the best interests of the company. The conscientiousness of a good entrepreneur is an abstract standard and it has legal, economic and moral dimension. It implies the level of care with which a diligent person would act, if he or she possessed the knowledge, skills and experience needed to fulfill his or her duties in the company. If the good entrepreneur possesses the specific knowledge and experience, these will also be taken into account in the evaluation of the level of diligence.

When directors make decisions, the law requires them to do it in a reasonable conviction that they are acting in the best interests of the company. Bearing in mind the requirement for reasonable conviction, we are in presence of a cognitive principle accepted by the legislator, when establishing the ethics of a decision. A common procedure for determining whether the ignorance leading to a certain conviction is justified or not (whether it is reasonable not to know something), is analyzing if an average person with good intentions would put an effort in becoming acquainted with the given circumstances or consider the possibility of consequences in question. (De Džordž, 2003.:122) The justified or insuperable knowledge of something, such as something that is impossible for us to know, results in excluding or diminishing moral responsibility both for the decisions made and the legal accountability.

We are morally, just as we are legally, responsible for immediate and obvious consequences of our actions, but also for other reasonably predictable consequences in the future. It is considered that directors and supervisory board members can base their actions on the information and opinions of other persons competent for the relevant area, who they reasonably believe will act conscientiously in that case.

Therefore, in order for a director or member of supervisory board to be morally responsible for acting or, failing to act, the action itself or its absence, has to be performed both consciously and willingly (on purpose or through negligence). An action is taken consciously when its agent is aware or is obliged to be aware that it can lead to certain consequences. In case the ignorance is unjustified or was preventable, given other conditions, the liability for the decision (action), or its absence, is possible.

If we are in presence of free will, i.e. the will expressed without constraint, threat, delusion, or deceit, we say that an action is performed willingly. If there are conditions which eliminate or diminish the free will choice needed, we cannot speak of moral responsibility as moral responsibility. Namely, ethical responsibility does not exist without free will. The same holds in case a director or a member of supervisory board is in presence of conditions which prevent the possibility of undertaking or not undertaking necessary actions by which, otherwise freely formed will, would normally be realized. At the same time, the responsibility itself should be differentiated from liability in terms of the obligation of indemnification. (*De Džordž, 2003. :126*) Being capable of responsibility for morally wrongful actions means that a person can be indicted for damaging effects of their actions towards others. Then it is necessary to determine the existence of cause and effect relationship with the damage, as well as the existence of the damage itself.

In order for directors, i.e. the members of supervisory board, to be morally bound to render accounts to those who are affected by their actions, it is necessary that they themselves have the ability to judge the morality of an action, which is related to the set of values, feelings and moods for a certain action to be performed or evaded. This is called conscience and every rational being has it to the level to which the being itself is rational. (*De Džordž, 2003.:128*) Conscience, together with personal goals, personal norms, personal beliefs, is also equaled to subjective standards of moral activity. They are determined by culture, religious tradition, that is to say, heritage, as well as social and, particularly, economic situation. There are various theories which address the problem of conscience, beginning with the emphasis on the connection between conscience with the Divine (Thomas Aquinas, Martin Luther), over the conscience as a function of autonomous mind in Kant's view. According to Lock, conscience is a product of social and upbringing determination and in Froyd's view of conscience - it is a result of moral conflict.

As directors and members of supervisory board are required to make decisions in the best interests of the company, it is clear that we are in the presence of the accepted concept of consequential ethical theory. The utilitarian approach is based on the belief that we should choose the way of acting which provides the most good for the highest number of the involved, so that it is qualified as a moral action. Here we proceed into the stakeholder theory which is fundamentally a utilitarian theory. The stakeholder theory, as the interest stakeholder theory of corporate responsibility, places the moral responsibility of a corporation in the corporation itself. In our view, this means in the board of directors or supervisory board, i.e. their members, given their key roles in creating the company's will. Among interest stakeholders as interest and risk bearers, there are those who have the interest of the ownership (shareholders), interest of other rights that they demand (employees, suppliers...) and the ones that have wider or general interest for the company's activity (environmental protection organs, local and wider social community). (*Krkač, 2007.:326*)

Persons, who prove that they acted in accordance with the duty of care, are not responsible for the damages that can result from such action in the company. However, the burden of proving it is lies with them. The obligation of loyalty of directors, i.e. the members of supervisory board, necessitates their decision-making in such a way that they place their interests in the function of company's interests. At that, they must not misuse the company's business opportunity; abuse their position in the company, the company's information or assets for their own purpose. If they do, they risk finding themselves in the conflict of interest and they become liable for the consequences of such a situation. The company can take action for damages and transfer of benefits to the society which it gained as a consequence of the breach of duties (Art. 71, LBC). Some ethical cases which appear most frequently in the sphere of the conflict of interest are: raising personal earnings to the prejudice of the owner's profit; giving or receiving bribe with the intention to critically affect the decisions against the company's interests or overlooking them; appropriating parts of the company's assets for personal interest. (*Krkač, 2007.:226*) When directors, i.e. supervisory board members find themselves in a situation which is an ethical case, they should determine if there are any business reasons which lead to the possibility of making immoral decisions, whether there are legal restrictions under

which the given action could fall into if performed in a certain way, or if the company has an ethical code which includes certain types of actions. Furthermore, managers should ask themselves what the common way of acting in the given area of business is, and whether colleagues would support the chosen course of action; also, what is the relationship between this course of action and the manager's personal values and attitudes. The criteria for making decisions are often contained in ethical codes of companies and they rely on one of normative ethical theories. (Krkač, 2007.:227)

A company, as a whole, has responsibility in terms of „...care integrated on voluntary principle of social issues and protection of the environment in its business activities and relationships with stakeholders (owners, employees, customers, suppliers, government, media and general public)“. (Krkač, 2007.:328) Nonetheless, apart from corporate social responsibility, there are in literature corporate social capability of responsibility as well as corporate social performance by which emphasis is placed on the results of corporate social activity. The totality of the three aspects mentioned is encompassed by the term of corporate citizenship. (Krkač, 2007.:329)

What the damage is from an ethical point of view is quite another issue within corporate social responsibility. Namely, the question is how wide is the circle of subjects which might suffer damages for a company behaving in a socially irresponsible way to be held responsible for its actions. In other words, how wide should the circle of subjects and their interests protected by directors be, i.e. supervisory board members of a company, so that the company is not declared a socially irresponsible one?

Of course, it is highly unlikely that we can agree easily on everything that is necessary to create an optimal board of directors, i.e. supervisory board. It requires independent, well-informed, ethical, experienced, proactive directors as its members. (Broutans, 2004.:50) In order to perform successful monitoring of management and fulfill basic, fiduciary duties, the directors are required to be involved, i.e. loyal and available. If they are enthusiasts, they will, regardless of the required time, be completely prepared and knowledgeable enough about business and be able to accomplish their role of a member of the board of directors (supervisory board). Furthermore, directors have to be proactive (initiative – innovative), to ask questions and insist on answers; otherwise they should not be on the board. They should also be informed, especially for the purpose of maintaining financial literacy which is necessary for measuring the financial performance of the company as well as for the maintaining the level of business common sense, which enables them to contribute to formulating and developing a sound company strategy. This is where the essential basis for acquittal lies after taking decisions using bad business judgment (business judgment rule). Furthermore, the ability and courage to manage challenge require independence in the board of directors (supervisory board) as well as the creating the atmosphere of constructive scepticism. Companies will benefit from the independence of the board of directors and its restrictedness in terms of decision-making and better judgment of what is in the best interests of the company. The board of directors (supervisory board) is responsible for creating corporate culture which censors wastefulness, dishonesty and selfish interests, while praising ethical conduct, integrity. In literature there is an emphasis on the need to avoid „check-the box“ mentality as well as the necessity of the structure of the board in terms of members with complementary knowledge, experience and skills. (Broutans, 2004.:57)

Directors are faced with dilemmas in their actions on a daily basis (practical dilemmas), in terms of whether they themselves or the circle of subjects to which they delegated the authority, are competent enough to make adequate decisions, i.e. to participate in decision-making; whether the operations they suggest are feasible or not; whether they are profitable or not; whether they are successful enough or not. It is possible that they share the opinions about each of the questions separately, but it still does not have to be accepted within the decision of the board as a whole. In principle, the obligation of every member is to be informed on all the agendas and to study relevant documents, but they are not obliged to participate in discussions, save exceptionally if they participate in the preparation of a draft decision, so it is necessary, at other members' request, for them to clarify some issues; then, when a person is invited as an expert to an area which is the subject of decision-making, or when they are in the conflict of interest, when their exclusion, as well as the explanation related to the matter, is necessary. In addition, if a certain board member disagrees with the decision of the majority, it is necessary for him or her to clarify his disagreement, in order for the fact to be recorded in written documents and reasoned adequately. In accordance with Article 415 and 447 LBC, if the damage in the society caused by violating a provision of the law, statute or parliamentary decision, is the result of the decision of the board of directors or supervisory board, all directors who voted for the decision are responsible for the damages. A director who abstained from voting is considered to have voted for the decision in terms of the existence of the responsibility for damages. Moreover, if the director was neither present in the board's meeting in which the decision was made, nor voted for it in any way, it will be

considered that he or she voted for the decision in terms of responsibility for indemnification unless he or she objected in written form within eight days after learning about the decision making. Ultimately, at the disposal of the director there is the possibility of insisting on the revision of the decision, on the demand upon the assembly of shareholders to review such decision and question the responsibility of the board and, finally, there is the possibility of submitting a justified resignation. (*Vasiljevic, 2007*) It can be concluded that the law provides instruments of protection of the legal and moral integrity of supervisory board members, i.e. directors, and it is upon them to decide, in accordance with all aspects of their personal integrity, if and which of the mentioned mechanisms they will use.

3. ON INTEGRITY IN GENERAL

It is a fact that integrity cannot be explained in one word only, but we defer to the opinion of Arnold Polman, according to which a person that is unbribable and honest with himself or herself (ethical dimension), coherent and irreproachable (psychological dimension), that is to say, complete (social and philosophical dimension) we consider to be a person of integrity. (*Buche, 2009.:13*)

As reported by Polman, a person of integrity wants to behave in accordance with his or her system of values all the time. However, it is still said that a person who possesses personal integrity is open to reconsidering his or her basic beliefs and is ready to dismiss them. In that sense, the person has to accept a whole range of commitments and resist temptations, especially attempts at seduction and manipulation. The person also has to create the impression of personal consistency. A person of integrity has nothing to fear as there is no reason for them to be attacked. (*Buche, 2009.:18*) Being true to oneself means that a person lives in accordance with their personal will, led by their personal principles, and that we discover their personal values in their words.

Creating a picture of oneself belongs to the area of psychological perspective of integrity. These aspirations can be found in the following areas: making a moral decision between what is best for the person as an individual and what is best for the community; decisions related to commitments towards oneself, but in different areas; making a decision among various different options.

Fairness means that a person has respect towards others, that the person recognizes irreproachable behaviour and avoids illegal means of putting pressure on others, such as corruption. (*Buche, 2009.:20*) Moral integrity is a characteristic of a person who is uncontested, whose views and interests are not in collision with attitudes and moral values of the environment. Potentially, a problem can appear if moral standards of the environment, in disturbed social relationship and values, are lower than the standards of the person in question. Consistency refers to people who stay true to themselves regardless of internal or external pressure, who keep their integrity and moral coherence even when others put them to tests. The social and philosophical dimension of integrity emphasizes the completeness of the three aspects mentioned above. (*Buche, 2009.:28*) Integrity means that the behaviour of a person is in accordance with the accepted moral values, and that the person himself or herself is honest, ethical and trustworthy. Values have to be moral, whereas the behaviour of a person should be ethical.

Integrity in companies refers to the humane side, corporate as well as individual. Organizations reflect the sum of the integrities of their people. A significant indicator of integrity is the extent to which a person is truthful and honest. Another indicator of integrity is the extent to which promises are kept. In addition, trustworthiness is also an indicator of integrity, i.e. the extent to which a person can be trusted that information communicated in confidence will not be passed on to a third party in an unauthorized or careless way. Integrity also implies taking responsibility for personal decisions and actions. (*Yukl, 2002*) The culture of integrity can be developed in organizations so that even employees with relatively low level of integrity can also develop. (*Ficke, 2005*) Virtues, such as honesty, self-control and others are not static as they develop through activities in different situations in life. (*Kretzchmar, 2002.:365*) Thus, active steps should be taken towards their development. Personal factors play the key role in the development of integrity of a company and its employees. The strategy of integrity involves systematic embedment of ethics in corporate values as well as in strategic planning. This includes interpersonal communication related to ethics, so that ethical conduct can be made into the key indicator of performance. The advice given in literature is that companies should consider the need for confidential process of informing which would neutralize deceit and other risks. (*Dekker, 2002*) Education in the field of ethics, especially through the devised trainings for managers and employees, should contribute to clarification of ethical values and improvement of their ethical

consciousness. Hence, the implementation of a two-way system of communication between employees and management is of vital importance.

The primary driver of integrity is a moral compass within which are property and life in accordance with the key range of values and principles. Integrity reflects key values which are universally accepted: respect, sympathy, intentions and objectives, self-control, optimism and enthusiasm. Inner drivers are: personal motives and ideals which affect integrity, general needs which lend them as a sensitive test for integrity, selfish and self-seeking behaviour. The functions of integrity can be cognitive and affective. Cognitive functions are: moral intelligence which is the ability to differentiate between right and wrong; self-inspection, which reflects self-knowledge (presupposes knowing one's personal mental states, including beliefs, wishes and sensations) and self-reflection (ability of a person to perform introspection and readiness to learn more about one's fundamental nature, purpose, and essence). The affective functions of integrity are: conscience as well as a rational and positive sense of self (self-respect).

The developmental context of integrity is created by parental roles and roles of other role models; religious context, cultural context and education; disciplined upbringing and idiosyncratic (unusual) life experiences. The competences (knowledge and skills) of integrity are self-initiative and self-motivation; moral courage and self-confidence; honesty; dedication; diligence; self-discipline; responsibility, fairness.

4. BUILDING MORAL INTEGRITY OF A COMPANY

When discussing the concept of building integrity of companies, it is inevitable to encounter contradictions. Namely, how is it possible to talk about a set of values and norms related to corporations when a management that decides on its behalf has its own values and norms which are often not in accordance with the behaviour of the company itself? How can the unity and completeness of a company be achieved, as *differentia specifica* of integrity, when the company itself consists of individuals who can work against its will at a certain point, consciously or not, under the slogan of working in company's best interests? In order to differentiate integrity of the company from the integrity of the members of supervisory board, it is first necessary to view the company as a moral subject. Three positions can be differentiated in response to the question of moral responsibility of company's activities (Kapteijn & Wempe, 2002):

1. *Amoral model* – This concept does not recognize moral responsibility as a significant concept. Moral responsibility in a corporate context is connected with personal responsibility of the employees of company. Namely, moral responsibility cannot be attributed to the company or the people who perform certain functions in it. This school of thought is related to representatives of neoliberalism (Milton Friedman, Friedrich von Hayek, and John Kenneth Galbraith). Starting from the assumption of free society, the idea of immorality of a company is just a cover for mechanisms which function badly in it.

2. *Functional model* – This model also rejects attributing responsibility to a company or stakeholders. It emphasizes that organizational character of actions in organizational context results in responsibility. The integrity of a company views, through responsibility, decision-makers on one hand, and on the other, the responsibility of employees themselves (participants). (Velasquez, 1983)

3. *Autonomous model* – views a company as a separate entity, as a social subject. The responsibility of a company viewed from the social perspective is separate from the responsibility of individuals who decide in its name.

So, all three models are related to a great extent and the fact that the integrity of a company is related to the integrity of decision makers i.e. directors or board of directors, can be assigned to them as a common denominator.

The autonomous model can serve as a good basis for determining the concept of integrity of a company. In this context, a company is defined as a collective body consisting of persons who act as moral agents and for this reason it can be morally responsible. (Velasquez, 1983) But the moral awareness of a company actually depends on the extent to which moral judgment is integrated in the actions of its employees. If the behaviour of supervisory board members, i.e. management, was hypothetically considered to be an activity of an adult mature person deprived of rational judgment when making decisions, then moral blindness could not be an excuse from moral responsibility of a company. Hence, company integrity depends on moral values of its employees. (Werhane, 1985)

A big advantage of this school of thought is its tendency to differentiate between the responsibility of individuals who decide in the name of company and the responsibility of employees without the possibility of decision-making and, of course, the responsibility of the company in general. The objectives of stakeholders, management, managers, employees and external advisers can be treated as primary intentions but keeping in mind that not all intentions of board members are part of corporate intentions. Therefore, intentions of a company can be treated as secondary intentions. (Werhane, 1985) The board of directors' intention is in the company's interest only if it helps the company to accomplish its corporate ideas. However, regardless of it being in the company's interest or not, it is difficult, sometimes even impossible, to separate the company's activity in general from the actions taken by its management. As an example we can state a gender and minorities discrimination lawsuit which company AT&T was charged for. (French, 1984) Namely, a high number of women and members of minority groups were dismissed as collateral damage caused by economic crises, while the number of the members of these groups who had ever been appointed to any of the managerial functions is very small. Although perhaps none of the employees discriminated against them consciously in direct contact, the company was still guilty of structural discrimination and was publicly stigmatized as such.

Summing up, a conclusion imposes itself - the integrity of companies cannot be judged based on one specific situation. It is more expedient to follow its activities over a longer period of time. The intentions of a company and related behaviour, as well as the consequences of such behaviour can be seen in different ways so that it gives rise to dilemmas. All actions that a company takes speak of its integrity. The situations in which stakeholders' expectations are opposed are especially interesting. At that point, a dilemma appears in terms of which current and course the company should defer to and why the chosen direction is superior to its alternatives. It should emphasize that even when a company is not capable of responding to the requirements of every stakeholder, it can still be responsible. A company's integrity does not only lie in the choices it makes, but also in the manner in which the choices are made. Which values the members of the board of directors were led by when they were making decisions which affected significantly the course of action of the company and its identity, but also whether at the same time all rights and demands of all stakeholders were taken into consideration and valorised as such. A company's integrity does not only lie in the choices it makes, but also in the manner in which the choices are made. In addition, it is determined by the values which the members of the board of directors were led by when they were making decisions which affected significantly the course of action of the company and its identity. And finally, the integrity of a company also depends on whether all the rights and demands of all stakeholders were taken into consideration and valorised as such.

It is the company that provides a frame for activities for the people that represent it. That frame, in turn, stimulates them or distracts them while fulfilling their obligations. Consequently, a company is a social and legal subject which exists autonomously with its goals (structured and goal-oriented cooperation of individuals), with its tradition (cooperation which has a long-term character). (Kaptein & Wempe, 2002) A company can thus be seen as a moral subject that can be judged according to moral norms. Therefore, the integrity of a company is something that is continuously developed, improved and preserved as it is its influence on the surroundings that its essence lies in.

5. CONCLUSIONS

Based on the above mentioned, we conclude that, if a board member had a dilemma regarding legality or illegality of actions and opted for an illegal decision, solutions in terms of ethical consequences could open further questions. Thus, it is possible that not discharging certain obligations of a company (entering the sphere of illegality) enables preserving business as such. Nonetheless, we believe that the dilemma concerning the choice of legal or illegal actions does not actually exist as a procedure dilemma, as the laws are the ones that determine the extent of freedom with its imperative and dispositive norms (the latter especially in the sphere of business decision-making). Resolving any business, moral and ethical dilemmas make sense, that is, they can be expected to manifest, but only outside the legal sphere. The ethics of decisions of directors and members of supervisory board should be considered in that sense and context (ethical normative dilemma: morality or amorality). Managers incorporate their characteristics when making business decisions with the aim to fulfill their obligation. Additionally, they strive to create consequences which are in the interest of the company. In this manner, they can encounter ethical dilemmas in terms of whether to be led by their character, the duty which results from their position, or consequences which they perceive. In this typically ethical dilemma, they actually decide on the supremacy of one of the basic ethical theories, i.e. measures of moral correctness of their actions (theory of virtue, theory of duty or consequential theory). Furthermore, ethical dilemma, which he can potentially be concerned with, is whether to defer to

morally monistic or pluralistic concept, i.e. whether to be exclusively concerned with the interests of owners, i.e. shareholders, or to be also concerned with the interests of a wider group of risk bearers, the so-called interest (moral) shareholders, the so-called internal and external stakeholders. We suppose that if all board members are ethical, and view their interest as company interests, it is realistic that they manage the company in such a way that they balance interests of all stakeholders and make satisfying decisions in the long run, i.e. that they direct the company towards corporate social responsibility. In this manner, the company is also satisfied with them in the long term, which enables positive ripple effects (long-term better paid employment in the board of directors, i.e. supervisory board). If, while making a decision, a manager encounters a conflict of the courses of actions when applying the same principles (e.g. usefulness, equality, rights or fairness), or perhaps a conflict of different principles, then the manager can find himself in a moral dilemma. In addition, the manager can face a dilemma if he or she is in a conflict of an accepted principle and circumstances of a situation, or personal interest or individual situation.

If a concrete action or a moral or ethical attitude were discussed from the point of view of reality, rationality, objectivity, description and cognitivist as opposed to counter realism, irrationality, subjectivism, normativity, or emotivism, we would be talking about meta- ethical analysis, i.e. meta- ethical dilemma.

When making a decision, directors, i.e. members of supervisory board, should take into account one of the leading moral principles, the principle of fairness. Fairness can have different criteria: it can be based on the needs of those involved in creating a value, or their merits gained from creating the value. Justice consists of giving every person his or her due, treating equals equally and non-equals non-equally. The principle of rights, as the basic principle when moral decisions are made, is based on the respect of rights written in the fundamental and often the supreme legal acts of a state. The fundamental human rights cannot be suppressed by the principle of utility. If there are rights, there are also duties of those who have to respect those rights or create conditions so that they can be respected. Directors are certainly the people who are bearers of duties established by the law, which we have discussed. The principle of utility is based on the fact that moral activity is the one that increases the amount of good, and to this principle the principle of fairness is often added, too. A utilitarian analysis, measures both good and bad impacts of an activity on every person that is affected by it. Therefore, this analysis is established in the stakeholder approach to corporate management.

Rules can serve as a frame for creating public trust, for creating trust in corporate accountancy and creating a system of disclosure and indemnities. Nevertheless, for that trust to be actually incorporated in a corporation, the corporation has to be led by a proactive board of directors (supervisory board), who believe in corporate integrity and ethical behaviour, promote them, and in that way contribute to developing loyal employees, clients and other interest stakeholders.

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CORPORATE SOCIAL RESPONSIBILITY – IMPERATIVE OF THE CONTEMPORARY BUSINESS

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The accelerating economic growth and inefficient use of natural resources, following intensive industrialization in the second half of the 20th century, has reinforced structural effects of the global crisis that is most strongly reflected in the field of ecology. Consumer lifestyles and environmentally destructive technologies have led to the intensification of the already existing environmental problems. Emerging problems of the entire human society can be solved by applying the concept of sustainable development and raising awareness regarding the necessity of implementation of basic environmental standards and social responsibility in business. Corporate Social Responsibility (CSR) is the responsibility of an organization for the impact of its decisions and activities on society, the environment and its own prosperity. It is a moral responsibility to the stakeholders that influence the activities of the organization by which organizations wish to harmonize their relations with all sorts of social actors who may have an impact on their business.

Following these facts, the authors analyse the social-economic environment and emphasise the importance of corporate social responsibility for contemporary business.

Keywords: economic growth, environment, pollution, ecology, sustainable development, CSR.

1. INTRODUCTION

Damage of the biosphere and the depletion of many raw materials, pollution and degradation of air, water and soil pollution, global climate change, endangering of the health and deterioration in quality of life, are the main manifestations forms of crisis that has gripped the planet at the end of the last century.

Technical and technological achievements were accompanied by demands for increased productivity and quality of products and services. On the other hand, these phenomena and processes in the global economy and society, have influenced the changes in the environmental sphere and to specific environmental problems are gradually gaining multiply growing, global dimension. Increase the physical volume of production in response to the growing needs of consumers and society, caused a disturbance of the environment by increasing pollution of the environment.

Therefore, in post-industrial society has developed the idea of the necessity of reducing the use of natural material resources for the benefit of increased use of non-material resources in the form of knowledge, information and new (green) technologies.

2. SUSTAINABLE DEVELOPMENT AND BUSINESS ENVIRONMENT

The accelerating economic growth and inefficient use of natural resources, following intensive industrialization in the second half of the XX century, reinforced structural effects of the global crisis that is most reflected in the field of ecology. Spending lifestyles and environmentally destructive technologies have led to the intensification of the already existing environmental problems. Taking into consideration today's development of science, it has been generally accepted that it is necessary to integrate ecological requirements and basic ecological standards into the concrete national developmental policies, as well as the global international developmental policy (Premović, Arsić & Boljević, 2012).

According to these global social and economic changes, at the beginning of the XXI century dominant role in national economy development has theory of sustainable development. The basis of the sustainability is the environment itself, and managing its capacities, in the function of further progress and development of people, but in such a way that the environment is not put in danger and completely destroyed. Having the basic meaning of the term in mind, sustainable development refers to enabling development during time.

Sustainable development has been defined in many different ways, but all definitions require systematic and holistic approaches which will allow us to understand the entire world as a complex system. The term

became an integral part of the vocabulary in the practice of developmental planning and political decision-making, after it had been used in the report "Our Common Future" the World Commission on Environment and Development in 1987. In this report, well known as the Brundtland's Report, sustainable development was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". It contains within it two key concepts:

- the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (WCED, 1987).

At the core of sustainable development is the need to consider "three pillars" together: society, the economy and the environment. No matter the context, the basic idea remains the same – people, habitats and economic systems are inter-related (Strange & Bayley, 2008, p. 27).

Sustainable development is a way of thinking about how we organize our lives and work so that we protect our most precious resource - Planet, a way to promote economic growth, rational utilization of resources, and environmental protection for the benefit of the quality of life. As a life philosophy, it is a complex and long-lasting process aiming to satisfy our today's needs, not destroying resources of the future generation! Defined like this as a responsibility toward environment, future generations and intensity of satisfying the needs, it can be applied as a national policy with different aspects: economic, demographic, social, cultural, urban planning, infrastructure, etc. (Sinadinovska-Shumar and Donev, 2010).

As Strange & Bayley conclude, sustainable development is about integration: developing in a way that benefits the widest possible range of sectors, across borders and even between generations. The concept of sustainable development has been used to articulate several essential shifts of perspective in how we relate to the world around us and, consequently, how we expect governments to make policies that support that world view. First, there is the realization that economic growth alone is not enough: the economic, social and environmental aspects of any action are interconnected... Next, the interconnected, or interdependent, nature of sustainable development also calls for going beyond borders – whether they are geographical or institutional – in order to co-ordinate strategies and make good decisions... Finally, thinking about human actions has had to undergo a temporal shift: put simply, we should consider the impact of a given choice beyond the short term (Strange & Bayley, 2008, pp. 24-26).

3. SOCIAL RESPONSIBLE BUSINESS

Contemporary corporations represent organizational systems with usually large number of interested parties in the results of their activities. Various parties have different interests and different objectives which might creates conflict in their realization. This is one of the most common problems that strategic management in contemporary corporations must face. The answer to this problem may lie in adequate implementation of stakeholder concept, which respects interests of all interested parties, but with their previously prioritization (Vujović, Stefanović & Vučurević, 2009, p. 273).

Companies that want to work successfully in contemporary business society must respect the presumption of sustainable development and environmental standards in planning their business activities and defining organizational goals. Therefore, in making many business decisions, modern managers need to analyze not only economic, but also the ecological and environmental dimension in the determination of cost-effectiveness of a particular job. In addition to responsibility for the successful operations of the company led by managers also have some social responsibility (Premović, Arsić & Milićević, 2011, p. 112).

Differences in business ethics can lead companies to take different views on what their responsibility is. The way each company makes and solves everyday business problems shows its attitude about its stance on social responsibility. In carrying out organizational activities managers must take into account the impact of internal stakeholder interests or insiders, but the external stakeholder's called outsiders.

Corporate Social Responsibility (CSR) is the responsibility of an organization for the impacts of its decisions and activities on society, the environment and its own prosperity, known as the "triple bottom line" of people, planet, and profit. Not only do responsible, sustainable and transparent approaches help build brand and reputation, they help strengthen the community and therefore the marketplace. A solid business plan,

embedded into the business culture, reflecting organizational values and objectives through strategic CSR application, will help to build a sustainable and profitable future for all (<http://www.mpiweb.org/About/CSR>).

Table 1. Forms of Socially Responsible Behavior (Gareth & Jennifer, 2008, p. 154).

Managers are being socially responsible and showing their support for their stakeholders when they:

- Provide severance payments to help laid-off workers make ends meet until they can find another job.
- Provide workers with opportunities to enhance their skills and acquire additional education so that they can remain productive and do not become obsolete because of changes in technology.
- Allow employees to take time off when they need to and provide health care and pension benefits for employees.
- Contribute to charities or support various civic-minded activities in the cities or towns in which they are located. (Target and Levi Strauss both contribute 5% of their profits to support schools, charities, the arts, and other good works.)
- Decide to keep open a factory whose closure would devastate the local community.
- Decide to keep a company's operations in the United States to protect the jobs of American workers rather than move abroad.
- Decide to spend money to improve a new factory so that it will not pollute the environment.
- Decline to invest in countries that have poor human rights records.
- Choose to help poor countries develop an economic base to improve living standards.

"The concept of sustainable development births a new concept - the concept of corporate social responsibility. CSR is assumed the involvement of the business entity in the social and community development programs in the field of health, environment, sports, culture, assisting vulnerable people, implementation of health (clean) technology, prudent use of resources, training employees on environmental protection, public reporting on success and its consequences, funding research projects of a wider social significance that are not strictly related to the activity of the company. Therefore, the socially responsible companies overcome once the primary target acquisition and distribution of profits by integrating into the process of solving social problems" (Boljević, 2008, p. 20).

Corporate social responsibility is the responsibility of enterprises for their impacts on society. Respect for applicable legislation, and for collective agreements between social partners, is a prerequisite for meeting that responsibility (European Commission, 2011, A renewed EU strategy 2011-14 for Corporate Social Responsibility, retrieved from http://ec.europa.eu/enterprise/policies/sustainable-business/corporate-social-responsibility/index_en.htm).

„Social responsibility refers to the task or duty manager to make decisions that respect, protect, strengthen and promote the welfare of the stakeholders of the organization and society as a whole. Corporate social responsibility is a moral responsibility to the stakeholders that influence the activities of the organization“ (Petrović & Vuković, 2009, p.184).

CSR is a process in which companies wish to harmonize their relations with all sorts of social actors who may have an impact on their business. According to Hitt et. al. „corporate social responsibility is concerned with the obligation corporations have to constituencies and the nature and extent of those obligations.

Companies have a wide variety of constituencies including current shareholders, customers, employees, specific communities, society at large, governments, and so on" (Hitt, Black, & Porter, 2009 p. 49).

„A company's stance on social responsibility is the way its managers and employees view their duty or obligation to make decisions that protect, enhance, and promote the welfare and well-being of stakeholders and society as a whole“ (Gareth & Jennifer, 2008, p. 153).

“CSR is about how companies manage the business processes to produce an overall positive impact on society” (Baker Mallen, CSR-What does it mean?).

Corporate Social Responsibility is a concept whereby companies integrate social and environmental concerns into their business operations and in their interaction with their stakeholders (employees, customers, shareholders, investors, local communities, government), on a voluntary basis...CSR is closely linked with the principles of sustainability, which argues that enterprises should make decisions based not only on financial factors such as profits or dividends, but also based on the immediate and long-term social and environmental consequences of their activities (www.industryplayer.com/corporate-social-responsibility.php)



Figure 1: Corporate social responsibility (www.industryplayer.com/corporate-social-responsibility.php)

Traditionally in the United States, CSR has been defined much more in terms of a philanthropic model. Companies make profits, unhindered except by fulfilling their duty to pay taxes. Then they donate a certain share of the profits to charitable causes. It is seen as tainting the act for the company to receive any benefit from the giving.

The European model is much more focused on operating the core business in a socially responsible way, complemented by investment in communities for solid business case reasons. This model is, according to Baker, more sustainable because:

1. Social responsibility becomes an integral part of the wealth creation process - which if managed properly should enhance the competitiveness of business and maximise the value of wealth creation to society.
2. When times get hard, there is the incentive to practice CSR more and better - if it is a philanthropic exercise which is peripheral to the main business, it will always be the first thing to go when push comes to shove (www.mallenbaker.net/scr/definition.php).

In October 2011 the European Commission published a new policy on corporate social responsibility. The new policy puts forward an action agenda for the period 2011-2014 covering 8 areas:

1. Enhancing the visibility of CSR and disseminating good practices: this includes the creation of a European award, and the establishment of sector-based platforms for enterprises and stakeholders to make commitments and jointly monitor progress.
2. Improving and tracking levels of trust in business: the Commission will launch a public debate on the role and potential of enterprises, and organize surveys on citizen trust in business.
3. Improving self- and co-regulation processes: the Commission proposes to develop a short protocol to guide the development of future self- and co-regulation initiatives.
4. Enhancing market reward for CSR: this means leveraging EU policies in the fields of consumption, investment and public procurement in order to promote market reward for responsible business conduct.
5. Improving company disclosure of social and environmental information: the new policy confirms the Commission's intention to bring forward a new legislative proposal on this issue.
6. Further integrating CSR into education, training and research: the Commission will provide further support for education and training in the field of CSR, and explore opportunities for funding more research.
7. Emphasizing the importance of national and sub-national CSR policies: the Commission invites EU Member States to present or update their own plans for the promotion of CSR by mid 2012.
8. Better aligning European and global approaches to CSR:
 - the Commission highlights the OECD Guidelines for Multinational Enterprises,
 - the 10 principles of the UN Global Compact,
 - the UN Guiding Principles on Business and Human Rights,
 - the ILO Tri-partite Declaration of Principles on Multinational Enterprises and Social Policy,
 - the ISO 26000 Guidance Standard on Social Responsibility.

A report on the implementation of this action agenda should be published in time for a review meeting scheduled for mid 2014 (European Commission, 2011, A renewed EU strategy 2011-14 for Corporate Social Responsibility).

4. APPROACHES TO SOCIAL RESPONSIBILITY

As is told, differences in organization structure, culture and ethics can lead companies and their managers to take different views on what their responsibility is towards their stakeholders and their environment, at whole. According to Gareth R. Jones and Jennifer M. George, there are four basic approaches to social responsibility. The strength of companies' commitment to social responsibility can range from low to high, which is illustrated in figure 1.

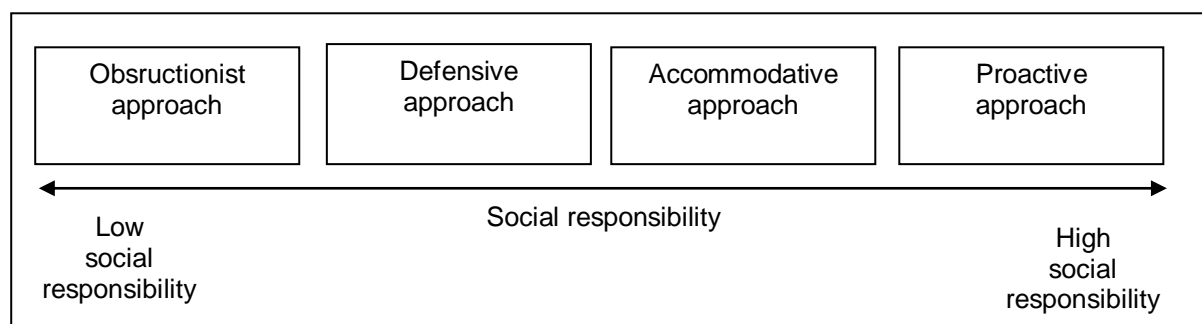


Figure 2. Four Approaches to Social Responsibility (Gareth & Jennifer, 2008, p. 155).

At the low end of the range is an obstructionist approach, in which companies and their managers choose not to behave in a socially responsible way. Instead of social responsibility behave, they choose to behave unethically and illegally.

A defensive approach indicates at least a commitment to ethical behavior. Defensive companies and their managers stay within the low and abide strictly with legal requirements but make not attempt to exercise social responsibility beyond what the low dictates - thus they can and often do act unethically.

An accommodative approach is an acknowledgment of the need to support social responsibility. Accommodative companies and their managers agree that organizational members ought to behave legally and ethically and they try to balance the interests of different stakeholders as the need arises. Companies and their managers taking a proactive approach actively embrace the need to behave in socially responsible ways. They go out of their way to learn about the needs of different stakeholders groups and are willing to utilize organizational resources to promote the interests of all stakeholders (Gareth & Jennifer, 2008, p. 156).

Strategic corporate social responsibility perspective

A more recent approach to corporate social responsibility is strategic corporate social responsibility perspective. Strategic corporate social responsibility perspective is a three-criterion model of CSR that can help managers focus on social areas where there is the highest possibility of creating shared value for the business and society. In other words, it argues that three fundamental criteria can guide managers. The first criterion takes an "inside out" approach. It means that managers can look inside the company at issues that are more rather than less important as a function of the company's strategy and business activities. The second criterion takes an "outside in" approach, by which it means that managers can look outside the company at issues that the company has an impact on. The third criterion takes an "outside out" approach which means that managers should look at social issues in general, in terms of the extent to which they are problematic. However, the strategic corporate social responsibility approach tries to address the balancing act managers have to engage in when it comes to responding to the concerns of all the firm's stakeholders. It does not advocate looking at all social issues but rather assessing those that come into focus as a function of the first two criteria (Hitt, Black & Porter, 2009, pp. 55-57).

„A strategic approach to CSR is increasingly important to the competitiveness of enterprises. It can bring benefits in terms of risk management, cost savings, access to capital, customer relationships, human resource management, and innovation capacity. By addressing their social responsibility enterprises can build long-term employee, consumer and citizen trust as a basis for sustainable business models. Higher levels of trust in turn help to create an environment in which enterprises can innovate and grow“ (European Commission, 2011, A renewed EU strategy 2011-14 for Corporate Social Responsibility).

6. CONCLUSION

Business activity affects all aspects of people's business and lives, so the way each company manages and solves everyday business problems shows its attitude about its stance on social responsibility. Ethical organizational cultures encourage organizational members to behave in a socially responsible way. Responsible business conduct is especially important when private sector operators provide public services. Helping to mitigate the social effects of the current economic crisis, including job losses, is part of the social responsibility of enterprises. Corporate social responsibility offers a set of values on which to build a more cohesive society and on which to base the transition to a sustainable economic system (European Commission, 2011, A renewed EU strategy 2011-14 for Corporate Social Responsibility). If companies and their managers behave in a socially responsible manner, then they can have several advantages. First, socially responsible manner, helps a company to build a good reputation that can enhance profitability and build stockholder wealth. A second major reason for companies to act socially responsibly toward employees, customers, and society is that in a capitalist system companies, as well as the government, have to bear the costs of protecting their stakeholders, providing health care and income, paying taxes, and so on. So if all companies in a society act socially responsibly, the quality of life as a whole increases (Gareth & Jennifer, 2008, pp. 156-157).

As a specific process of harmonizing relations between company and their stakeholders and society overall, CSR has the important role in the social and economic environment, more and more. It can be safely said that corporate social responsibility becomes a kind of imperative of the contemporary business.

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MANAGEMENT IN EDUCATION – EDUCATIONAL BENEFITS FACTOR OF SOCIO-ECONOMIC DEVELOPMENT IN SERBIA

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Abstract: *This paper is an attempt to highlight the issues of constantly expanding and growing educational needs and their corresponding trends and changes, an attempt to emphasize the importance of management in education and the impact of education on socio-economic development of Serbia. Implementation of management principles in education is a fundamental prerequisite for internal and external efficiency of education system, with significant implications on the socio-economic development of Serbia, which is primarily determined by the general level of education. The desired outcome of implementing scientific research results to educational uses is the change in individuals, as well as the acquisition of practical skills and abilities. In the history of Serbia, education has always contributed to the inner rise of the Serbian people and was a strong factor in its overall development and spiritual liberation.*

Keywords: *education, science, socio-economic development, management*

1. INTRODUCTION

Research work, analysis and interpretation of the results of the research, as well as of other, similar research works, contributed to recognition, definition and understanding of the indisputable contribution of management in education to the development of science and education (educational programs' offer) and of their influence on the positive socio-economic changes and overall development of the Republic of Serbia.

Generally speaking, the entire world is changing, and science and education are the key factor of this change. New discoveries help discover new horizons and demands, new engagement in the implementation of change.

Successful socio-economic development is achieved through knowledge, and knowledge is acquired through education. Thus, numerous questions are opened that need to be answered in the process of development of education, and education thus acquires attributes of one of the main factors of social development.

Karavidic (2006) point out that "The education is a sound basis and safe foundation of each properly organized state and it is a measure of progress of individual societies" (p. 8).

Economic development rates are to a significant extent defined by the available offer of educated work force.

Answers to many challenges, time in which we are living, inevitably unavoidably comprises of dealing with the basic questions, such as the following:

- Possible contribution that the education may provide to the socio-economic changes and its assistance in development strengthening;
- Potential contribution of education, and especially of teaching and research, to the organization of modern society and their greater involvement in actions aimed at poverty reduction, strengthening of the basic principles of civil society and development of other levels and forms of education;
- Answer that the education can provide to the changes in the area of work and civil culture that on its part should to provide answers to the challenges (which implies strengthening of academic and professional qualifications, as well as of the civil and personal qualities).

The following can be concluded from the above questions: What is and what should be the role of education in the society today and in the society in the future?

2. MANAGEMENT IN EDUCATION AND SOCIO-ECONOMIC DEVELOPMENT

To dig into the ideas about education is to perceive origins of problems that are nowadays important issues in the development of education and its contribution to the socio-economic development.

We may despair, introduce savings measures by closing down smaller schools, think about changing the network of schools and continue to lose quality staff in education...

This would imply opening door for defeat by surrendering to despair, reducing competencies and scientific and educational potentials and their contribution to socio-economic development through reductions of expenditures, neglecting aspects in which we have traditionally proved to the best, surrendering quality and industrious experts to other countries...

Wouldn't it be better to increase investments in human resources and implementation of a new doctrine and management application in education? The aim for the educational institutions is to position themselves as responsible and organized institutions that follow modern trends and satisfy the needs of their users in a quality manner (the needs of pupils, students, and of the society in general, too), by creating the culture of learning and by enhancing the values of human resources' capital as an expression of a wish for the future.

It is necessary to leave the door wide open for science and education to bring innovations, new curricula and initiatives with clearly controlled criteria for quality through implementation of management in education. In addition to this, national interest in respect of education must be expressed and defined, along with the regional, local and other interests of the society, and awareness must be built about the interactive liaisons between the socio-economic development and education. It is due to the future development of Serbia that the education must be given a chance in its search for a new identity, which primarily pertains to the change of the fully developed parasitical and subordinate mentality of education (its dependence on politics, economics, etc.), and the change of its mentality of "second class traveller in the train for the future". The historic contribution of education in creation of national structure that was necessary for the functioning of Serbian economy and society, national culture and elite and as a channel of social mobility must not be forgotten at that. Regardless of the level of destruction that the educational system has suffered so far, it is still of far better quality than everything else that can be found in Serbia today.

Education is the "central nervous system" of each society – educational, cultural chain that vibrates incessantly. In this chain, an educated and skilful manager should make an important link, in addition to the educators, teachers, professors and others.

Managerial skills can be generated only through a combination of theory and practice. It is generally known that a manager is required to possess capacity for innovativeness and management in planning, organization, coordination and control of task implementation of educational institutions.

Positions and opinions in respect of the characteristics that essentially characterize a manager differ. Regardless of whether it is about approaches according to which the experience acquired lies at the core of management, or about the skills acquired, or about a scientifically based discipline, an additional qualification is always present in the background of all of these positions: a special spirit lies at the core of management in education, a specific philosophy that requires a certain state of mind, a system of values, i.e. a specific standpoint in relation to the key questions about the behaviour in the course of operations and in relation to the operations of educational institutions.

The basic question is: how to keep idiosyncrasy and peculiar characteristics of one's personality and at the same time fit in the existing environment and changed circumstances?

Since management is never an entirely finished process, this very fact presents a special challenge for managers who should learn more, grow and develop their skills to achieve goals that are set quite high. Basic principles in business are especially prominent, such as the flexibility, accessibility in

communication, energy investment, need for understanding and establishing communication lines, team work development, creation of good and positive atmosphere, well thought-out public presentation.

In order to achieve a goal in this course of ideas and in order to overcome potential obstructions and barriers, the so-called 'bridges' are set up (freedom of thought, expression and communication). In management of education, information conveyance is of utmost importance. Information is a notice, announcement, a piece of data, but it additionally involves the organization, choice and creation of a certain job.

Usefulness of management in education and achievement of educational development goals are reflected in abandoning of principles of traditional static-functional principle of business activities of educational institutions and their focus on changeable and flexible organization of education that assumes different shapes with the changing demands of the socio-economic development. Development that strides towards the present, which implies harmonization of economic and overall social growth and development on one hand, and the quality of life, i.e. of the acceptable standard of living, on the other. Development that does not jeopardize the potentials of the future generations for satisfying their needs, i.e. the survival of the future generations.

Development implies innovation as a process in which new technologies are to be generated, a new way to do business, etc., and from the aspect of sociology, it implies that the great social and structural changes will additionally be created in the process of institutional transformation as well.

Successful development requires adequate knowledge, innovativeness, accountability, initiative and innovation, and a great deal of work. In addition to this, the new market reality demands flexibility and fast changes in education in compliance with the developmental needs.

Education level of the general population is an indispensable indicator of the achieved level of social development in each society. Higher level of education implies a higher level of ability to perform complex tasks that involve responsibility in a society and it also exert influence on all the areas of social life – economy, politics, culture, health care culture and social security. Education provides for permanent development of values.

Economic crisis intensifies interest for the place and role of science and education that are a treasury of valuable experiences adaptable to the present stage of development in Serbia, through intensive research in different area of activities, generating of ideas, as well as through the development of methods and techniques for problem solving in practice, which under the present conditions implies speed, optimum costs and innovativeness.

The necessary changes are primarily related to the changes in people's attitudes (in their motivation levels, knowledge, criteria, individual behaviour and group behaviour, capabilities and other personal characteristics).

The basic criterion for progress must be founded in the accumulation of acquired knowledge and education. Ability-based selection makes a social system become more rational and economical, since it does not allow the less capable ones to waste our time. Goals in education must be clearly specified. Once the goals and tasks are specified, adequate methods must be found, too, together with forms, means and organization of education. This can be achieved through constant professional improvement, following and selection of new scientific achievements and knowledge and necessary changes, through implementation of management in education.

Modernization of society and state and focus on the modern economic and technological development imply innovations in global goals of science and education in Serbia.

In order to set the development of Serbian society in motion towards a learned society, in addition to the formal education it is necessary to also develop readiness and capacity for continuous professional improvement and lifetime learning as a whole. In addition to a well structured formal system of education, it is also necessary to have an adequate system of institutions, organizational forms and programs that are not included in the formal system of education, through which the capacity for continuous, lifetime learning will be realized and nurtured, based on the premise that:

The manifestation of lifetime learning is an integral part of holistic education;

- A corrective of the regular educational system;
- An innovative mechanism of the educational system;
- A strong factor of economic development;
- It increases professional mobility.

This is based on facts that the mental abilities must be maintained, enriched and strengthened through self-motivated learning and self-education.

Revealing ignorance is only a means for spreading knowledge. People learn about the world by using their common sense, and their common sense motivates people to reach the treasures of knowledge that will enrich their personalities and minds by means of correcting their own minds and education.

Modern developmental tendencies in the countries with market economy have shown that science and education are at the very top of priorities of the global national strategies and policies of socio-economic and technological development and progress. It is about such social organizations that are based on knowledge in which science and education have the status of basic instruments of the entire socio-economic development, finding solutions to the basic social problems and production of social, economic and technological changes.

The best abstract of research into the scientific and educational benefits for socio-economic development lies in the change in individuals (characteristics and forms of behaviour of individuals) and in the changes in society. These changes can produce far-reaching consequences for economy and society, and even for the course of history. By summarizing the main findings about the influence of education to the socio-economic development and to the society as a whole, it has been concluded that the education:

- Significantly improves the knowledge levels, intellectual tendencies, and the similar;
- Helps people in finding their own identities and in their individual choice of lifestyle;
- To a great extent, education increases people's practical competencies, flexibility and tolerance in their capacities of citizens, workers, family members and consumers, and influences their choice of leisure-time activities, their health and their general abilities for coping with the problems in life.

The main influence that the education exerts is on the practical abilities, skills and generally applicable characteristics, such as: the verbal skills, essential knowledge, rational approach to problems, intellectual tolerance, future orientation, adaptability, self-esteem, and so on.

Changes in individuals that came as the result of the influence of science and education are transferred to their children and to future generations.

It is indisputable that the educated people exert influence on their social environments (on the predominant interests, values, attitudes, behaviour, etc.).

These effects can be manifested in different areas, including creativity, family planning, care about children, quality of schools, appreciation for arts, culture and learning, health care services, political participation, understanding of social issues, acceptance of social changes, as well as the sense of shared culture and social solidarity.

Science and education additionally serve to preserve cultural heritage and they enhance civilization.

Despite the fact that a convincing argument about the role and contribution of science and education to the socio-economic development has been proposed in the economic texts, the reason why education makes people become more productive remains relative, as well as the alleged effect of "spilling over" of education that can indirectly contribute to development.

It is obvious that the development process is linked not only to the growing levels of education, but also that the link between education, political and economic development is dubious under extreme conditions (political instability, corruption, violence, etc.).

In essence, relations among science, education, population growth and economic development are complex, and especially when directed towards the socio-psychological research works through transformation of values and attitudes that have direct implications on development.

Science and education in socio-economic development contribute to the capacity to transform individual attitudes and values from the "traditional" ones towards the "contemporary" ones, and thus by strengthening the rate of structural modernism in a society, they increase the rates of socio-economic development.

Another contribution highlights the role of literacy and improvement of communication in development. Many researchers have claimed that the written tradition is of essential importance for the origins of "formal rational thinking" in every society. Others point out that if development depends on efficacious dissemination of new information, the role of science and education in complex social systems in particular lies in their influence on costs of such information dissemination processes. This is above all manifested in facilitation of communication processes that are of vital importance for socio-economic development.

Although the research in social sciences has provided a series of convincing hypothesis pertaining to the "intervening variables" that serve to explain the relationship between science, education and socio-economic development, direct political implications of these researches in Serbia are in no way obvious (preliminary results of research works are used selectively to justify the educational policy for quite different and often political reasons).

However, broader terms of institutional transformation that are linked to the development imply that both the scientific and educational institutions (both the formal and informal ones) have to undergo adequate transformations in their functions. The balance is tipped towards the use of educational institutions that act as agents in the selection and division of individuals and groups that play different economic roles and take up positions in social structure. Thus, education becomes an independent variable in the process of social changes and as the structural differentiations grow, it can facilitate or even obstruct the development process. Concrete problem of measuring the influence of improvement of educational input on the economic output must be looked at in a broader historical, socio-economic and sociological perspective that attempts to explore the problem of relationship between science, education and development in the broadest sense.

Basically, the interactive relationship between the economic and educational dimensions is being highlighted, since the opinion that the educational basis is the prerequisite for sustainable development is broadly accepted throughout the world (the developed countries suggest the threshold of 30 to 40 per cents).

Science and education are the basis of socio-economic development, and vice versa, socio-economic development is the basis and function of education, since the development of society is above all conditioned by the level of development of science and technology that are before all the result of education. Similarly, we have ventured in "an unforgivable age". Rules are constantly changing, and the economic and social environment is changing with them. Changes in reality are faster than the spontaneous, reflex thought.

The main problem lies in the question of whether there is a politically articulated, convincing alternative to something better compared to the existing state and whether there are socio-cultural and political subjects that are sufficiently strong to achieve it. This is even more so since all the paradoxes of our society result from the antagonism of the real and promised socio-economic development.

The conflict and confusion among different goals of changes and means of their realization is very prominent and at the same time burdened with excess expectations for reduction of inequalities under the present conditions of life and life chances of people (Karavidic, 2006).

There can be no socio-economic development or way out of the crisis without a road to economic freedoms (creation of new values, road to entrepreneurship, business, etc.) where science and education play a significant role.

Reforms are concessions to spontaneity of organic development, natural tendencies in economy, and in a broader sense – freedom of creation.

Huge costs of inaction over a long term have come as a result of many trends that are nowadays unsustainable, as well as of wrong choices and erroneous solutions in relation to production, technology, infrastructure, agriculture, use of natural resources of Serbia, etc.

Political elite and missionary intelligentsia that are used to loans approved under favourable conditions, donations, sponsorships, etc., and they use the international economic crisis for their excuses.

Aimlessness, lack of one's own road of socio-economic development, inability to bridge the transition and socio-economic crisis have all been transformed into "the only way", regardless of whether the road to the EU is called 'reformist' or somewhat else.

On that road, science and education could become a bridge between the "outer world" and the "inner world", between the world "that is somewhere over there" and the world "that is here exactly". In science and education, questions are as important as the answers themselves. It is the place where generalizations must give way to concrete actions.

The process of change in the area of science and education has, so far, however, been impoverished in its content, and the quality of changes has been made completely uncertain, because the changes have been treated as the ultimate goal, and not as a road and means to arrive at a socially formulated aim. Social and economic environment has thus not been achieved to be a fertile soil for the realization of sound and reasonable reform in science and education that is adjusted to suit the needs of the socio-economic development of Serbia. The reason for this lies in the fact that the process of reforms in education has been embarked on with little knowledge and with even less practical experience, with purely theoretical assumptions of the great philosophers. Their complete blending in the social system has brought in question their other values that enhance and maintain society and that are a factor of its progress.

Kokovic (1994): "Science and education should not sink into the social life, but they should encourage creativity and reveal the reality of the social life" (p.83).

With the weakened state, new patterns of consciousness have been imposed, coupled with the appearance of know-it-all and omnipotent individuals and non-governmental organizations and their famous veteran activists and ideologists of civil society, attested "Bologna missionaries" and persons that are allegedly worried about or concerned with the change in the prevailing mindset of the Serbian people.

Avramovic (2010): "Non-governmental organizations with segmented and strictly functional organization bring in the spirit of special interests and fragmentary knowledge and skills in Serbian education" (p.27).

New post-modernist forms: trainings, educations, consultations, courses, workshops and the similar, that are quite often organized outside the Serbian borders, and the question of the real purpose of such type education remains, just as whether it serve to undermine the results, tradition and standing of the educational institutions.

The following question arises: What does our society do today to fight the grey economy, business logic and corruption in education? Almost nothing?

The policy of equal chances has been abandoned, and changes are being limited to the internal approach (of the Universities, faculties, schools, teachers, curricula and textbooks). The biggest confusion lies in the relation between the national and the global.

Karavidic (2010) point out that "In the practice so far, rationality of goals has been sacrificed to the rationality of means" (p. 97).

Discussion about education is movement on a broader social level the end goal of which is an invitation to a new understanding of the mission, role and function of education.

3. CONCLUSION

General conclusion is as follows: it is necessary to create a vital and creative society, which is versatile and harmoniously and integrally developed, ready and qualified to face very rapid and constant developmental changes.

Education is expected to produce workforce that will not simply be the people looking for a job, but people who are capable of becoming successful entrepreneurs and jobs' creators. In this process, elimination of shortcomings in management is of utmost importance.

Changes require activities within the educational process, that is, in everything that the educational system can make more efficient and effective, while at the same time liberating it from the unnecessary waste of energy.

It is indisputable that the socio-economic development in Serbia is a precondition for reforms of education, but it can hardly be considered a political priority as well, and also that the role of education as an instrument of socio-economic development will be highly changeable over time.

"Big problems that we face cannot be resolved on the level on which we have created them". (Albert Einstein)

In order to accommodate demands that characterize modern business activities of educational institutions and their contribution to the socio-economic development, the active directing concept – the management concept - is being used, which provides for the focus on goals, flexibility and control over achievement of educational results.

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ROLE AND IMPORTANCE OF MANAGEMENT IN HIGHER EDUCATION TODAY

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Abstract: *The author has estimated that the best way to show the role and importance of management in higher education is to present higher schools in the past and present. The Higher Education School of Professional Studies, established by the state and quite different from other organizational types of higher education institutions, has been chosen as a model example. Differences significantly reflect on the behavior, role and importance of management. The effects of novelties arising from the implementation of the Bologna Declaration and even a draft higher education strategy have also been taken into account. The obtained results and views are the outcome of studying former advanced schools in the past and analyzing results of vocational higher education schools today.*

Keywords: management, higher education school, national strategy, standards, accreditation

1. INTRODUCTION

In our educational system, higher education institutions can be organized as universities, higher education schools of academic studies, academies of professional studies, and higher education schools of professional studies (Narodna Skupština Republike Srbije, 2005), (Komisija za akreditaciju i proveru kvaliteta i Nacionalni savet za visoko obrazovanje 2010). All of them can be private or state-founded. Some of these organizational models already exist, others do not; some truly function, others just figuratively. Attitudes on the role and importance of management in them all probably do not differ much. However, as this claim is not firmly grounded, the discussion herein will only refer to the model of the higher education school of professional studies. This higher education profile in Serbia is mostly of technical character and within the technical and technological field, so the reasoning on the issue is determined in that direction.

From the year 2000, the practice of appointing directors in higher education schools, still called advanced schools at the time, was changed, so that they were not appointed by the minister of education. There were some concerns about how this will function or malfunction. In the beginning, school steering committees, and then school councils became decision makers, and school representatives are in the majority in them. This governmental decision was accepted as part of new democracy in the higher education. After the initial enchantment, it was realized that such a move imposes a lot of responsibility with regard to good governance upon employees, i.e. the management team in particular. This became the border line between two totally different management concepts: the old one with full state control and equal care, and the new one in which the state still keeps full control and decision making, but its participation in financing reduces. In the old arrangement, directors acted like state officials as they simply transmitted decisions and funds from the ministry. The new approach requires competent managers and a well-designed management system. Considering that the application of Bologna principles started in this environment (Narodna Skupština Republike Srbije, 2005), the role and importance of management have become even greater.

2. THEN

The forerunner of today's higher education schools of professional studies is advanced schools. They were founded by the state since the 1950s. The need for the establishment, development, changes and everything else was exclusively within the jurisdiction of the state. All students were budget-funded students, and schools received funding under the Decree of the government (which is unfortunately still applied). The funds were fully received and directed as intended: salaries, equipment and maintenance. Good managers were the directors close to the source of funding and decision-making. Other criteria regarding abilities were not particularly valued. It was typical for this long period that salaries in education were not in top income bracket. A doctorate was not required for the vocational professorship, hence a

small number of vocational professors had the title as their interest in obtaining a doctorate was small. A number of schools even did not have appropriate offices for the staff so they prepared and worked mainly at home. This lethargy seemed like a closed circle, and in such a framework there was no will nor space for any serious management. There was only a director who could not even be particularly successful or unsuccessful. This condition could be compared with the present situation in primary and secondary schools.

3. NOW

The present story goes within a circular cycle that roughly has the following flow: you have to be accredited –you accredit for what you want – for that you must meet certain standards – for the standards you need personnel, equipment and space – you must have financial means – funding is provided through good enrolment – it requires attractive study programmes. Additionally, the enrolment number of students from the accreditation is usually much larger than the number of budget students receiving funding from the state, which is insufficient for the simplest reproduction. Now it is possible to see the reason why the government gave up the appointment of directors - it actually expects from the management team to take care of the school and independently provide funds for quality work and development. However, it remains the founder and owner of the school and completely controls the entire operation. Thus, a normal, even good life is ensured by good management that should fulfill the primary task: enroll the number of students anticipated in the accreditation since it is the only way to enter the magical circular cycle, remain in it and function. If there is a university in your vicinity with similar academic study programmes, but with a large number of budget places, as well as private colleges where perhaps exams are more easily passed, then all this is not easy.

As mentioned, this paper refers to the higher education schools of professional studies where the system of management including its role and importance is completely different than in university colleges (the current situation at a higher level, more budget students, the existence of funded research projects, etc.). In private colleges the situation is again quite different in relation to all the state educational institutions.

The accreditation of study programmes is the most critical moment in the course of decision making of the executives. They must select the number and type of study programmes that will ensure good enrollment fulfilling at the same time all requirements regarding standards set by the National Council. Particularly unfavorable is the validity of the acquired accreditation limited to just five years, which means a constant and exclusively successful management. The second cycle of accreditation of higher education schools of professional studies has just been completed in Serbia. Valuable experiences have been gained and the differences concerning the two schools, of today and yesterday, are obvious and clearly indicate the need for a successful management today (Ružić Dimitrijević & Nikolić, 2010). In that process, a competent school should be built, which means a school without boundaries, with enlarged environment and cooperation with the outside world. And these are exactly the responsibilities of management executives that must create the idea and realize it till the end to the implementation. This is normal because only the management with new challenges ahead is the real one.

4. BASIC MANAGEMENT REQUIREMENTS IN HIGHER EDUCATION

What is expected from the managerial structure is to set objectives at the beginning of each year, so that it becomes the guiding idea in its behavior during the year and through the realization of all tasks. The development of management from the hated former 'slave-driver' to the modern co-operative management has resulted in changing its functions or tasks. Essentially, the development rout goes from an emphasis on the function of ordering to the emphasis on the function of motivation. It is logical that the functions and objectives of management have changed over time (Đorđević, 2006). Some of the objectives specific to management in recent times are the following:

- **Total revenue increasing**, but the increase cannot be realized by raising the cost of some services including tuition fees. The quality of higher education funding is provided by the quality of financing sources, financial planning and transparency in the use of financial resources, which leads to financial stability in the long run. The management must have long provided funds necessary for the implementation of the educational and scientific process, scientific research, artistic and professional activities. The long-term financial stability is ensured through continuous successful operation and existence, accreditation of a large number of attractive study programmes, and profitable and substantial cooperation with industry (Nikolić, 2007). These schools receive funding for their activities from the following sources:

1. Funds provided by the founder;
 2. Tuition fees from the self-financed students are the largest part of the revenue;
 3. Funding of scientific research and professional work that is scarce;
 4. Projects and contracts related to the realization of teaching, research and consultancy services;
 5. Charges for commercial and other services.
- **Development and introduction of the quality system** in all areas (Kamberović, 1998) to facilitate the managerial and organizational work of the executive team. The quality of the management in the higher education institution and the quality of non-teaching support are provided by establishing authorities and responsibilities of executive bodies and non-teaching support units, and by permanent monitoring and verification of their course of work and, naturally, by the assessment of performance concerning the management structure.
 - **Definition of new programmes, new ways of teaching, etc.** aiming to develop all elements of the system. This can include the introduction of a distance learning system, specialist studies, master studies, studies outside the headquarters of the institution, etc.
 - **Intensive and continuous work to improve student enrolment** in all study programmes through various promotional methods.
 - **Promotion of lab work**, making the school labs available to the surrounding community and economic systems and development of new laboratories.
 - **Continuous evaluation and improvement of the quality of teaching** in order to increase enrollment, particularly of high-quality students. The quality of the teaching process is provided through interactive teaching, including examples in teaching, professional work of teachers and staff, making curricula for all courses and their implementation, as well as through monitoring the quality of teaching and taking necessary measures in cases where it is found that the quality of teaching is inadequate. The teaching process is significantly improved compared to the previous period, in terms of teachers' engagement and understanding of new directions. Employing a large number of young associates, allowing work in small student groups, is only one possible solution. The quality of the study programme is provided through monitoring and verification of its objectives, structure, student workload, and by constantly updating the content and collecting information about the quality of programmes from relevant organizations in the region. Objectives and outcomes of study programmes are constantly analyzed and their compliance is monitored. Corrections and updates of the content in accordance with new developments and technologies are continuous (Nacionalni savet za visoko obrazovanje, 2006).
 - **Continuous improvement of working conditions** of teachers and students through the modernization of equipment and space.
 - **Participation in public tenders** for projects in order to provide additional funding and development of scientific, professional and research activities.
 - **Special attention is to be paid to the improvement and development of teaching and non-teaching staff** through cooperation with foreign countries, industry, participation in scientific conferences, specialization and training, as well as through organizing seminars and issuing own publications. A higher education institution must work on encouraging, providing conditions, monitoring and checking the results of scientific research, artistic and professional work and their involvement in the educational process, and, by establishing their unity, coordinate them with the strategic goals of the institution and national and European goals and standards of higher education. The obtained knowledge is then included in the existing teaching process, and the institution publishes results of its work.

The above requirements are just a few of those that are set as objectives in the new system of management and executive activities. Obviously, these requirements could have been set earlier, but definitely it was not the case. All of the requirements aim to increase employees' standards, the quality of services in education, and to improve the business itself.

5. STANDARDS ISO 9001 AND TQM AS MODELS OF THE SYSTEM OF QUALITY MANAGEMENT

As mentioned earlier, one of the goals typical of management is the development and introduction of management systems in all fields, including education, in order to facilitate the steering and organizational work of managers.

The quality of management of a higher education institution is covered by many standards. One of the fundamental principles underpinning the policy of quality of higher education schools is the worldwide standard ISO 9001, which is a revised series of standards ISO 9000 from 1987. The implementation of ISO 9000 series of standards is the first and most important step toward the process of continual quality improvement in education and acquisition of confidence in the market (Gemović, 2006).

The main intention of implementing ISO 9000 series of standards is to achieve the best financial results and competitive performance in the market. These standards do not prescribe how every single institution or school should work, but defines the underlying principles and provides a basis for the improvement of quality. There are several elements that are an integral part of all standards, which most users do not use in full: improvement of management, change of management style at all levels, process improvement, establishing a connection between direct management and improvement activities, equipment maintenance, continuous professional development of personnel, and reducing the size of documentation (Gemović, 2006). The Standing orders on integrated management system (Poslovnik integrisanog sistema menadžmenta) in higher education schools is the basic document of the quality management system

Beside the introduction of the five-year accreditation cycle, the reform of higher education has introduced the obligation of external quality control for higher education institutions, which, among other things, includes self-evaluation and quality assessment of study programmes, teaching process and working conditions. Process of self-evaluation of teaching quality must be continuous and needs to include perpetual improvements of the quality management system, as shown in Figure 1. Schools that have implemented a quality management system perform the self-evaluation much easier. The main goal is to identify omissions, discrepancies, weaknesses and potential errors in the system or results. Systematic approach to the self-evaluation ensures adequate planning of the process improvement.

The highest executive body in the higher education school is responsible for quality management. Quality management is that aspect of the overall management function that establishes and implements the quality policy. Quality policy defines the objectives related to key elements of quality, such as convenience for usage, performance, safety and reliability. The quality system consists of an organizational structure, responsibilities, procedures, processes and resources for implementing quality management. The main purpose of this system should be directed to the prevention of deviations between the planned and the realized, rather than detecting them after creation. The management of the higher education school is particularly responsible for the introduction, development, implementation and maintenance of the quality system in the institution.

Management is increasingly pointing to the fact that the quality should be the outcome of the management process. Applying the principles of quality management in all aspects of the business will result in the emergence of the concept of Total Quality Management (TQM) whose main goal is based on a continuous improvement. Such an approach is necessary to achieve a competitive advantage in modern environment. These results can clearly be measured through economic and financial indicators. Through the ISO 9001 standard, which more strictly prescribes requirements that any organization, including schools, must satisfy, the principles of TQM leave much more freedom here, but they set much broader requirements to users. It can be said that the standard ISO 9001 is a set of requirements that schools must meet to be somewhat closer to the concept of TQM. The concept of TQM is, in principle, based on the use of human resources and management skills to achieve the desired goal. This is why in the process of improving, the quality and the capacity of the management are essential (Gemović, 2006).

Top executives should lead, encourage and promote activities related to the quality management. This implies that quality is not something special, something that can be extracted, but it must be included in all business activities. For the continuous quality improvement, there are a variety of techniques. The role of the top management of the school, the involvement of all employees and long-term efforts to educate employees are irreplaceable in this process.

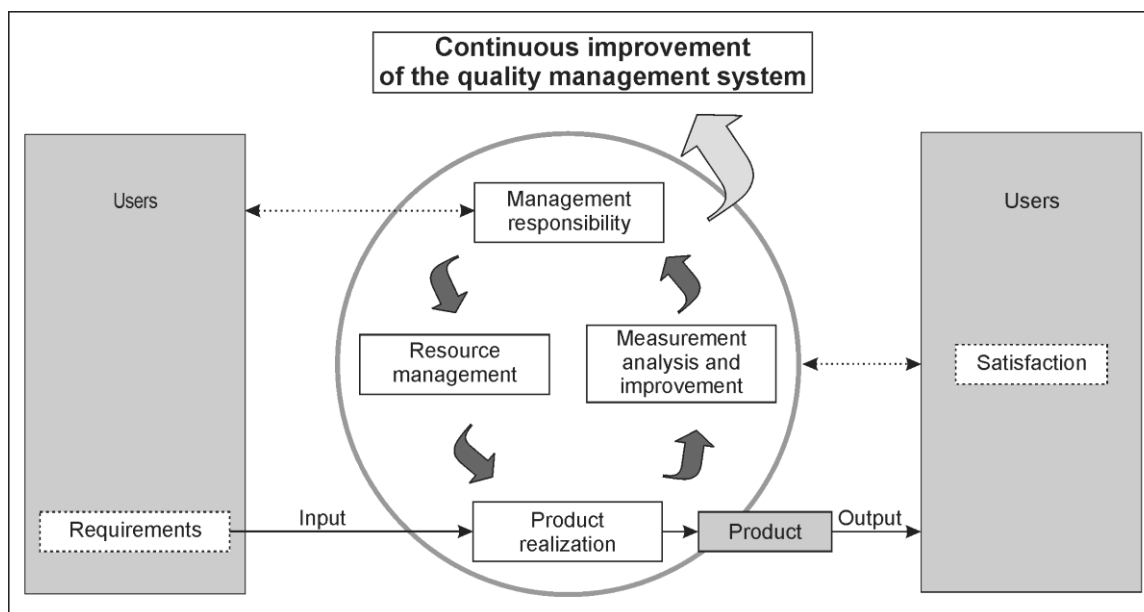


Figure 1: Model of Quality Management System according to ISO 9001

6. CURRENT STATE ANALYSIS

The entire change of policy and environment in Serbia has introduced significant changes in the role and work of management, whereas in higher education the changing of the law in accordance with the Bologna declaration has led to even greater changes and introduced completely new categories of management and leadership in education (Nikolić, 2007).

The difference between private and public institutions of higher education should be pointed out, since there are examples of the private institutions in Serbia that are top business at the moment, very profitable, as opposed to the state-owned ones that carry the prefix of unprofitability. These two types of educational institutions have two totally different management systems.

Also, there are differences between faculties (colleges) and higher education schools. The former exist in the law as legal entities outside the university, but in Serbia the state ones are still part of the university, existing as legal entities although by the law that right applies only to their university. At the same time, the state higher education schools are now only schools of professional studies and exist independently as legal entities. The system of management in all the above subjects differs a lot.

Leadership is undoubtedly one of the basic principles of TQM, quality management and management in general. Only organization led by trained leaders with a special sense of leadership and dealing with people can be successful in today's market. This is the first and fundamental prerequisite for the efficient functioning of an integrated management system. Through the requirements of all international standards that define specific segments of the integrated management system this prerequisite is clearly defined. The support of top management and not only support but also an active leadership are the basic and necessary condition of functioning of the management of any kind (Gemović, 2006).

Higher education school management in today's open world market conditions requires highly educated executives, i.e. managers. This education includes knowledge of economic principles in the business world, effective use of the latest information technology, foreign languages, a highly developed culture of communication, negotiation skills and acquired and innate qualities of leaders (Pokrajac & Tomić, 2011).

The management of higher education institutions is assigned to evaluate the performance of faculty, including their own, based on the assessment of students, and teaching and non-teaching staff, which is a novelty that is difficult to accept, but it is clear this is the only way to achieve true quality in their work. Thus, each institution of higher education is required to conduct self-evaluation in the five year period between the two accreditations (Nacionalni savet za visoko obrazovanje, 2006). That process evaluates study programmes, teaching performance and working conditions by using defined procedures of the quality management system.

On the bases of the policy and development objectives, as well as the needs and requirements of society and the recommendations and work policy of the ministry, the management directs the work of teachers and establishes the level of results to be obtained.

Although it may seem strange it is not true that the power of the management in an authoritarian system was higher than today. Today's system gives the management a great influence on the educational system through the above mentioned tools, such as the influence of students, non-teaching staff and teachers.

The latest development strategy of education, which is currently in public discussion, contains a number of novelties that put new challenges in front of the school management (Ministarstvo prosvete i nauke, 2012). Let us mention just two of them.

The first is that schools can decide independently on their income. At first glance it looks very tempting. However, what is to be expected behind this is a more liberal attitude from the state and less concern about schools in financial terms. So, schools will even more rely on their own work and be particularly dependent on the success of the management.

Another innovation is the possibility of vocational higher education schools to introduce master studies. This would surely increase their competitiveness in the market but it would require considerable engagement, starting with good ideas to the fulfillment of the requirements for their implementation. Among the requirements the major ones are those dealing with the teaching staff, its quality, equipment and space.

If we perform a SWOT analysis (Pokrajac & Tomić, 2011) of the altered role of management in higher education, the findings based on the previous discussion show the following:

- Strengths and advantages (**S** – *Strengths*) that the management in higher education got through the higher education reforms are in its greater independence of decision making in achieving business goals.
- Weaknesses (**W** – *Weaknesses*) may occur due to poor communication among employees. A substantial number of employees in higher education have difficulties to accept the new system of work, which requires greater involvement of teachers throughout the year and a new relationship in which the student becomes a client. Consequently, many teachers just formally work after the Bologna system, and in fact stick to the old system that favours campaign studying and allows professors to occasionally "visit" the school only at teaching times.
- Options and Opportunities (**O** – *Opportunities*) are in improving the business by monitoring interests of prospective students, by starting attractive study programmes and introducing new methods of learning. In order to achieve this, it is necessary to invest in staff training and modern equipment, as well as in the cooperation with similar institutions at home and abroad. Many programmes of cooperation supported by the state provide participation in joint projects and exchanges of students and professors.
- Threats (**T** – *Threats*) may occur due to poor economic conditions in society that does not give opportunities to achieve the desired results, and the state intervention/assistance are missing, or even worse, the government, collecting political points, intervenes in favour of unwarranted student demands at the expense of higher education institutions.

7. CONCLUSION

In the former advanced school there was a state of lethargy, because the system was fully covered by the care of the ministry. The price of that sluggishness was a relatively low salary. No management (good or bad) could not substantially improve nor ruin those relationships. There was no sign modern management, because the directors were essentially government officials merely carrying out its decisions and instructions.

New higher education schools are much more independent and the greater role of management is now crucial to running of the school. Some of the basic elements of that independence in existence, work and decision making are the following:

- reduced state funding and the opportunity to generate significant own income;
- the process of forming new study programmes through accreditation;

- short, five-year validity duration of accreditation;
- introduction of the quality system and continuous monitoring, assessment and control of processes;
- development of the staff and programmes;
- a new process of studying – Bologna process;
- new dimensions in the proposal of the education strategy until 2020; and
- other issues emphasized in the goals.

The above mentioned activities require a lot of work, good work organization, team involvement, substantial resources and highly qualified and professional managers and experts.

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AN APPROACH TO THE IMPLEMENTATION OF LEADERSHIP AND MANAGEMENT THEORIES FOR IMPROVING EDUCATIONAL-SCIENCE ACTIVITY IN THE DEPARTMENT OF TACTICS

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Abstract: *This paper applies a theory of leadership and management to improve educational and scientific activities of the Department of Tactics of the Military Academy. The Department of Tactics is structurally organized into two sections: the Section of the Army and the Section of Air Force and Air Defense. The department is functionally organized according to the level of education. Levels of education on which the Department of Tactics implements educational and scientific activities are: Graduate Studies (Bachelor), Basic Command and Staff Course, Command and Staff Course and Reserve Officers School. At certain periods during the school year, it is necessary to effectuate a greater number of classes and a number of additional obligations, which leads to increased stress and fatigue in the teachers. Therefore, it is necessary to apply some techniques and procedures from the theory of leadership and management. The theory of leadership and management helps department members to effectively and efficiently cope with themselves, people, resources, activities and information. This is the most important reason for writing this paper. The main objectives of the study are the application of the theory of leadership and management, and finding specific solutions for improving educational and scientific activities of the Department of Tactics. The basic methods used in this study were content analysis, inductive-deductive method, statistical method, analysis and synthesis and testing techniques. The research findings are related to the increased strain on teachers on one hand, and on the other hand, to the methods and techniques of leadership and management for overcoming this problem and improving educational and scientific activities of the Department of Tactics. By studying the theory of leadership and management and analyzing educational and scientific activities of the Department of Tactics, we have had new findings that point to the possibility of the leadership and management theory application in accordance with the methodology of the Institute of Leadership and Management (Institute of Leadership & Management) Meritum International. The article could be of use to departments and other institutions dealing with educational and scientific research activities.*

Keywords: *Department of Tactics, leadership, management, enhancement, theory.*

1. INTRODUCTION

Educational and scientific activity at the Department of Tactics involves the participation of the Department members in planning, organizing and implementing teaching in the field of tactics, participation in certain projects and specific scientific-expert conferences of national and international importance. Members of the department are engaged in the realization of certain exercises and other activities. Also, due to organizational changes and the retirement of certain members of the department, there is a fluctuation of personnel in the departments. To a certain degree, these specifics have affected the work of the Department of Tactics. Educational and scientific activity of the Department of Tactics can be improved by using the theory of leadership and management. This study uses the theory of leadership and management by methodology of the Institute of Leadership & Management Meritum International. Also, the role of organization and the manager, the subject of improving the situation in the Department of Tactics by means of SWOT analysis, and suggestions for improving educational and scientific activities of the Department of Tactics by The TOWS MATRIXS analysis were analyzed.

2. ORGANIZATION AND MANAGER ROLE

Each member of the Department needs to know the organizational structure of their organization and the connection between their internal organization with the main organization. In this particular case, the Military Academy is organizationally connected with the Ministry of Defense, and is functionally connected with the University of Defense. The Military Academy is structurally organized in the Secretariat, Dean's Office and National Defense School. Military Academy may be organized functionally: by level of education – Graduate Studies, Basic Command and Staff Course, Command and Staff Course, Reserve Officers School, and in accordance with received tasks (e.g. implementation of joint exercises). The organizational structure of the Military Academy is shown in Figure 1

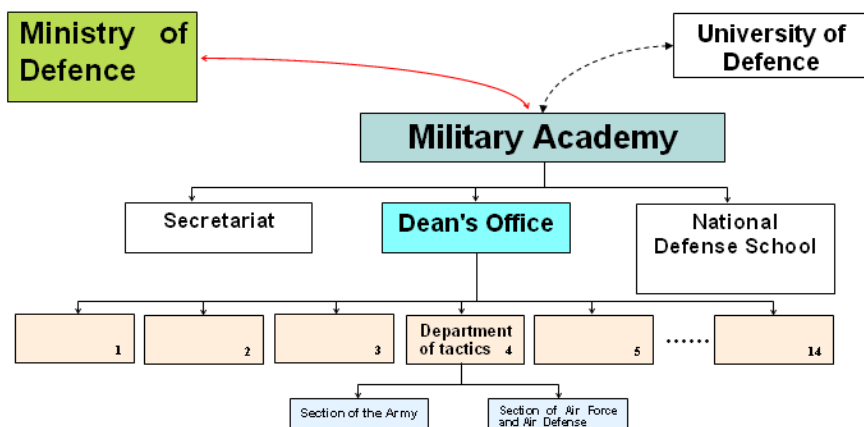


Figure 1: Organizational structure of the Military Academy

2.1. The purpose of the organization

The Department of Tactics, in accordance with the mission of the Military Academy, is principally engaged in performing tasks in the field of educational and scientific research.

The major tasks of the Department of Tactics are:

- planning, organizing and conducting teaching, exercises and special forms of teaching from the master object,
- control and monitoring of teaching, examinations and other tasks,
- planning, organizing and implementing professional military training for members of the Department,
- planning and implementation of scientific research projects in the stem area of interest to the Serbian Army,
- maintaining and improving the material base,
- conducting the prescribed teaching documents.

In addition, the Department is the carrier of the planning, organization and implementation of joint (complex) exercises, and participant in certain meetings of national and international importance.

In accordance with the organization's purpose of each department member (from Head of Department to teachers) need to analyze own continuous professional development until the arrival of the department, and to make continuous professional development plan for the next period. Continuous professional development plan may include a period of one academic year to many years.

2.2. The organizational structure of the Department of tactics

Head of Department commands and manages the Department of Tactics. It is an officer of the rank of Colonel with a PhD or completed General Staff School. The current Department organization predicts the existence of two Sections. Each of the Sections is the responsibility of an officer of the rank of Colonel with completed General Staff School or a PhD. Scheme of organization of the Department is shown in Figure 2.

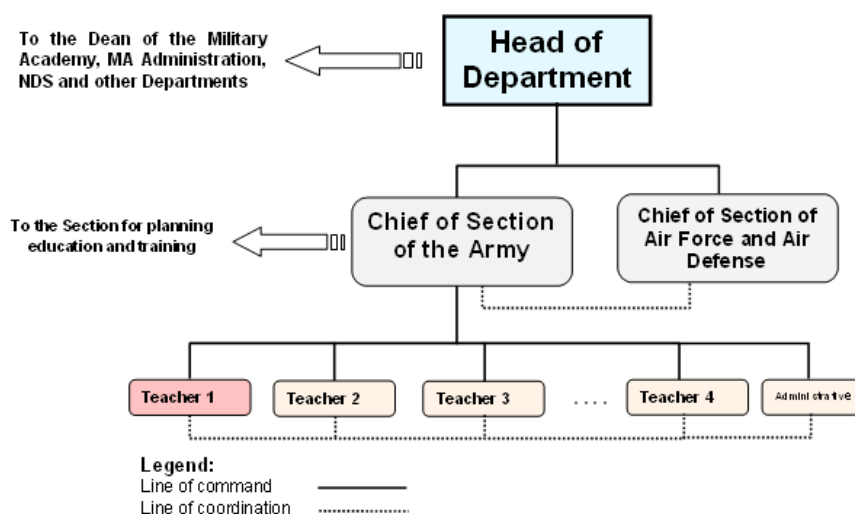


Figure 2: Scheme of organization of the Department of tactics

Head of Department receives orders from the Vice Dean of the Military Academy, gets assignments and to whom he is responsible for the Department. He cooperates with other departments, National Defense School and the Secretariat of the Military Academy, all in order to successfully complete common tasks. Chiefs of Sections are subordinated to Head of Department, and they are responsible for planning, organizing and conducting teaching in their sections.

2.3. Analysis of manager role and functions

Teachers, Heads of Sections and Head of Department of Tactics should analyze their own manager roles and functions. The analysis should include:

- responsibility for the implementation of the teaching process in its field,
- cooperation with certain officers for the planning and organization of teaching,
- studying of literature for the realization of objects in the field,
- participation in certain scientific and professional conferences of national and international importance,
- current way of organizing life and work at the Department.

2.4. The Management and Leadership styles

Continuity of command within the Department of Tactics involves delegating responsibility. Head of Department may delegate a part of the responsibility to Chiefs of Sections and to teachers. Therefore, all members of the Department are in the position to use different leadership and management styles. The most commonly used is a combined leadership style based on a democratic-style amended by authoritarian style. The authoritarian style of leadership is applied exclusively when required by the system of command and military subordination, and there is enough time for making a decision. They should strive to create an atmosphere of fair interpersonal relationships, mutual respect and professional attitude towards work. They should give a personal example in work to associates, to exercise good communication, develop initiative and creativity, a remarks amount fair with a proper respecting of associates personality. This style of leadership has proven quite effective in work so far¹.

3. SUBJECT OF IMPROVEMENT

The subject of improvement relates to the situation and why it must be improved. It should show the effects of the current situation on other organizational units of the Military Academy (interested parties - stakeholders) and details of current goals or target groups and the monitoring and control procedures that are currently used.

¹ Above conclusion is reached on base of work results and on base of interviews with Heads of Sections and teachers in the Department at morning reporting during the period from 01.09. to 30.12.2012.

3.1. The situation which is improving

Educational and scientific activity in the Department of Tactics is implemented with increased efforts and without major problems. Teaching is carried out at four different levels of schooling: Graduate Studies, Basic Command and Staff Course, Command and Staff Course, Reserve Officers School. In addition to class lectures, teachers from the Department of tactics are involved in the development of primary literature and the specific scientific and professional conferences of national and international importance. During the implementation of educational and scientific activities the following problems occur:

- inability of full teaching realization,
- recruitment of teachers outside the teaching process,
- lack of communication between members of Department and the Generas Councils,
- great strain of teachers.

The situation in the Department of tactics was analyzed using SWOT method and is shown in Figure 3.

Strength (S): <ul style="list-style-type: none"> - education (1 PhD, 2 General Staff School, 3 MSc, 4 Command and Staff Course, 1 spec); - experience in the implementation of the teaching process (great, teachers implement lessons from 3 to 15 years); - experience in military service (great, four teachers with more than 15 years of experience in the troops, two teachers have less than 10 years of service in the troops); - participation in conferences of national and international importance (5 teachers from the Department actively participates in conferences); and - family status (all members of the department, except one, are married and have children) 	Opportunities (O): <ul style="list-style-type: none"> - possibilities of improvement in scientific and professional view (education in the country and abroad); - possibility of promotion to a higher rank (3 places are the rank of colonel and 9 places are the rank of lieutenant-colonel); - opportunity to participate in scientific and professional conferences and certain scientific discussions; - possibility of writing professional literature (each member of the Department is involved in the production of certain textbooks and military lexicon).
Weaknesses (W): <ul style="list-style-type: none"> - lack of technical equipment (it is necessary to provide the necessary number of computers and equipment); - inability to increase the number of places in the department (a new organization, can not be changed in the near future); - Separation of insufficient financial resources for the development of literature - (in the year of 2011 granted funds for textbooks only); - insufficient sharing of experiences with the commanders and command in the Serbian Army; - a certain number of members of the department should be retired in the near future; - incapacity to implement all planned courses in given time. 	Threats (T): <ul style="list-style-type: none"> - great burden and fatigue of teachers; - reduce of quality of the implementation of the teaching process (not enough time to monitor trends in armed conflict); - disapproval of the required amount of money to create professional literature and obtaining of the necessary resources; - lack of communication between Department and units; - inability to change organizational structure and to expand Department of tactics; - obsolescence of certain technical literature; - routine implementation of the educational process and transition to monotony;

Figure 3: SWOT analysis of the Department of tactics

3.2. Effects on stakeholders

The effects of the interested parties can be seen through stakeholder analysis of the Department of Tactics. Stakeholder analysis should include: identification and classification of stakeholders, identification of stakeholders' interests, determining the possible stakeholders' impact, definition of key stakeholders and ways of gaining support of key stakeholders.

Identification and classification of stakeholders include: primary stakeholders, secondary stakeholders, key, internal and external stakeholders.

The primary stakeholders include: Training and doctrine department, Military Academy Secretariat, Dean's Office, Military Academy Logistics, cadets and officers.

Secondary stakeholders are: Training Command, Army Command, Air force and Defense Command, Faculties of the University of Belgrade (BU Faculties).

Key stakeholders are: Department of Organization, Dean's Office, Department of Tactics, teachers, cadets and officers attending higher levels of education.

Internal stakeholders are: Military Academy Secretariat, Military Academy Logistics, cadets, teachers and non-teaching staff engaged in the learning process.

External stakeholders are: Training and Doctrine Department, Strategic Planning Department, Commands, BU Faculties.

3.3. Current targets

Head of the Department of Tactics, Chiefs of Sections and all teachers need to recognize the goals that will influence the improvement of educational and scientific work in the department for a certain period of time. The goals should be operational through tasks, implementing the terms of execution. Objectives may include: forming a team to create the organizational structure of the Department of Tactics, legally regulate engagement of external associates in the Department of Tactics, legally regulating the hiring of teachers from the Department of Tactics to realize the joint exercises, participation of the Department of Tactics in the development of curricula at all levels of education, preparation of documents for the implementation of curricula, preparation of teaching material basis, participation of Department members for the development of teaching literature and at conferences of national and international level, an analysis of the teaching contents and additional forms of teaching in the school year.

3.4. The existing procedures for monitoring and control

Basic procedure for monitoring and control to achieve the objectives are:

- personal participation of Chiefs of Sections in teams for creating the organizational structure of the Department of tactics
- development of organizational structure in accordance with legal provisions taking into account the overall workload of teachers,
- submission of daily reports to Head of Department on teaching and extracurricular activities,
- control of compliance of the Department's organization suggestion in accordance with the Statute, the Law on Education and Labor Law,
- support and control of the development of teaching realization plan for the next school year,
- control of development and submission of material providing,
- control of development and submission of proposals for the participation of the Department members on scientific and professional conferences,

CONTROL OF THE DEVELOPMENT OF THE ANALYSIS OF TEACHING.4. SUGGESTIONS FOR IMPROVEMENT

Based on the opinions of teachers from the Department of Tactics² and the analysis of teachers' stress we come to the conclusion that teachers are overworked. Accordingly, it is necessary to change the organizational structure of the Department and shift from classical organizational structure to project oriented organization. In addition, it is necessary to test Department members to determine the role of teamwork³, create opportunities for personal improvement of Department members and for numerous participations in conferences, trade shows, receptions. It is also necessary to motivate the Department members on the basis of the following needs: to succeed, to have power, to self-actualize, to succeed and to belong.

Improving the situation described above through the Tows Matrixs of Department of tactics is shown in Figure 4.

² On the morning reports every teacher displays thinking about realization of educational and scientific process, with suggestions for improvement.

³ One possible test is the test for determining teamwork by Dr Meredith Belbin. Based on this test, it is possible to determine which members have the greatest propensity as: implementer, coordinator, modeler, the originator, the examiner resources, the supervisor-evaluator, team worker, complete refiner or specialist.

	Strength (S): <ul style="list-style-type: none"> education; experience in the implementation of the teaching process; experience in military service; participation in conferences of national and international importance and family status. 	Weaknesses (W): <ul style="list-style-type: none"> lack of technical equipment for the Department members; inability to increase the number of seats in the department; Separation of insufficient financial resources for the development of literature; insufficient sharing of experiences with the commanders and command in the Serbian Army; a certain number of members of the department should be retired in the near future and inability to implement all planned courses in given time.
Opportunities (O): <ul style="list-style-type: none"> possibilities of improvement in scientific and professional view; possibility of promotion to a higher rank; opportunity to participate in scientific and professional conferences and certain scientific discussions. possibility of writing technical literature. 	SO strategies: <ol style="list-style-type: none"> 1. Improvement of the educational process through personal development of department members; 2. Improving the educational process by exchanging educational experiences; 3. Improving the quality of the Department members by participating in the meetings; 4. Motivation of Department members by promotions to higher ranks; 5. Increasing the efficiency and effectiveness of the Department with good organization and preparation of technical literature. 	WO strategies: <ol style="list-style-type: none"> 1. Improving the quality of teaching using modern technical means; 2. Improving the quality of the educational process at a time when it is not possible to increase the formation; 3. Focus on creating the most important literature in terms of limited budget; 4. Use the most experienced officers for the implementation of the teaching process in the case of teacher's absence or retirement of certain members; 5. Use practical experience to produce literature.
Threats (T): <ul style="list-style-type: none"> great burden and fatigue of teachers; reduce of quality of the teaching process; disapproval of the required amount of money to create professional literature and obtaining of the necessary resources; lack of communication between Department and units; inability to change organizational structure and to expand Department of tactics; routine implementation of the educational process and transition to monotony and obsolescence of certain technical literature. 	ST strategies: <ol style="list-style-type: none"> 1. Invest more personal effort in the realization of the teaching process; 2. Ask for additional funding for the development of literature and the participation of certain members of the department at the symposium; 3. Find the best solution for motivating members of the Department - monetary funds, sports and recreational activities...; 4. Through the implementation of joint exercises improve communication with units. 	WT strategies: <ol style="list-style-type: none"> 1. If you do not have modern equipment use the existing and rely on the library of Military Academy; 2. Separate planning from execution; 3. Shape the work of the department and give more time to rest when the intensity of classes and extracurricular activities are lower; 4. Associate with members who are soon to retire to gain extra motivation for the most effective implementation of teaching.

Figure 4: The TOWS MATRIXS of Department of tactics

5. CONCLUSION

The Department of Tactics as an organizational unit of the Dean's Office realizes teaching at four different levels of schooling. In addition, members of the Department participate in scientific research and implementation of other activities. The situation in the Department is analyzed daily, monthly and annually. Every day is realized a morning refer with the Head of Department, monthly and annually prepare an analysis of teaching and extracurricular activities. An analysis of the situation in the Department concluded that in certain periods of time the workload of teachers is increased, which affects the implementation of scientific and educational activities in the department. This problem can be accessed in terms of leadership and management. Using theory of leadership and management by methodology of the Institute of Leadership & Management Meritum International, we analyzed the situation in the Department of Tactics, using the SWOT analysis and gave some suggestions for the improvement of educational and scientific activities through the Tows Matrixs analysis.

Further work on this issue is necessary in order to prevent the fluctuation of Department members, changes in organizational structure of the Department, education and training, design work, and motivation of the members of the Department.

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INFLUENCE OF SPA ENVIRONMENT ON THE SELECTION OF STUDY

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Abstract: *Visiting spas for the reasons of both physical and mental health concern and treatment of various diseases has existed ever since the prehistoric times. Spas have been growing into cultivated oases of greenery and tranquility. Their natural landscapes are supported by cherished environment, parks and promenades. Recreational and touristic content of spas most often comprises modern accommodation facilities, playgrounds, parks and swimming pools. Besides recreation, the reason for visiting spas can be learning about culture and cultural and historical heritage of the place where the spa is situated, enjoying the glory of nature, visiting various events organized in spas and their surroundings. Spas are also places for organizing various conventions, seminars and other large-scale gatherings. They are also beneficial for sport team preparation. The present study analyzes the aspect of positive 'exploitation' of a spa's opportunities from the educational point of view. The analysis of the gained findings shows a beneficial effect of spa environment on young people and emphasises opportunities for their successful education in this specific surroundings. The valid results are obtained by means of surveys and comparative analysis.*

Keywords: *spa environment, tourism, education, communication, organization*

1. INTRODUCTION

Starting from the strategic advantage of the Republic of Serbia, ground and surface waters, wealth of thermal springs and traditional spas, established by the Tourism Development Strategy of the Republic of Serbia ("Official Gazette of RS", No. 91/06), have been marked as great and unused potential.

Exactly the lack of sufficiently qualified hotel and tourist managers and staff in new tourism occupations has been given as the main deficiency in the development of tourism by the same Strategy.

WTTC(World Travel and Tourism Council) predicts that by 2015 the number of employees in tourism will be 269.5 million people (compared to 221.5 million in 2005) making it 8.9% of total world employment or 1 out of 11 possible jobs.

The Republic of Serbia has chosen to build its competitiveness in tourism upon human and natural potentials, in long term, especially regarding ground and surface waters, rich archaeological and architectural heritage, with emphasis on the monasteries, historical sites, spiritual creativity, as well as festivals and other occasions and events, which can provide Serbia the opportunity to present its own lifestyle.

Investments in the tourism sector of the Republic of Serbia, in the period up to 2015, based on detailed projection of the growth of accommodation capacities, according to the clusters established by the strategy: Vojvodina, Belgrade region, West Serbia and East Serbia have been estimated at around four billion euros, most of which have been intended for the development of West Serbia, in the amount of 1,567.8 million euros or 38.8% of total investments in tourism of the Republic of Serbia.

2. VRNJCI SPA AS A TOURIST CENTER "FACE AND REVERSE"

The attractiveness of tourist destinations can be defined as a set of elements such as geographical location, climatic conditions, natural environment, infrastructure, accommodation facilities, entertainment content and the like. Physically intangible things characterized as a tourist destination and other services is a set of feelings, beliefs, images and opinions that the individual has the ability to provide appropriate

destination satisfaction. Based on these factors we analyzed Vrnjci Spa as a new university center from the perspective of the before mentioned fundamental basic elements.

With a long tradition of tourist, health and cultural center, Vrnjci Spa has seven springs of natural, healing, hot and cold mineral water, where the center for treatment and rehabilitation - AQVAE ORCINAE was built back in the Roman Empire.

Archaeological sites, such as: pool and Roman spring of mineral water- FONS ROMANUS, also originate from this period. Uniqueness of Vrnjci Spa lies in the fact that there are numerous springs of mineral waters of different composition, temperature, radioactivity and healing properties in a relatively small area, as well as in the fact that these waters meet high scientific standards and are effective in treating many diseases.

There are also the medieval monuments in the vicinity of Vrnjci Spa, which are considered to be a real cultural treasure, and the most valuable of these, such as: Studenica, Zica, Djurdjevi Stupovi, Gradac, Sopocani and the first Serbian Archbishopric, represent the greatest heritage of Serbian spirituality and culture. In its immediate vicinity, there are also the most important winter sports centers: Kopaonik and Goc.

For these reasons, Vrnjci Spa and its surroundings are one of the most interesting tourist areas of Serbia, with extensive accompanying events, such as events in the field of fine arts, graphical art, sculptural art, film and musical art, literature and ongoing archaeological and historical settings.

On the other hand, looking at the population according to age groups, we can conclude that the normally low share of young population is still decreasing. Accordingly, it can be said that there are 115 inhabitants older than 65 years for 100 inhabitants aged up to 15. The dominant number of inhabitants falls into the category of the working age population, which can be considered as a significant development potential. In the educational structure of the population aged 15 years and over, in the area of Vrnjci Spa, completed high school is the most common form of education for both sexes (43% of inhabitants), primary education is in the second place (23%, mostly the older part of the population), while 10% (2.326) of the population of the municipality have university and higher degree. It is important to mention that almost 50% of the population of the municipality have primary and lower education, which undoubtedly requires greater engagement in education of the population, through additional training, retraining and continuing education programs. Having in mind that intensive education reform in this field is carried out in Europe, in order to raise the overall level of service quality and offers of tourist centers, it is logical to improve the system of staff education in the field of hospitality and tourism in the educational system of Serbia.

3. EDUCATION IN SPA ENVIRONMENT

Starting from the above facts and the development directions established by the law and strategic development documents, the University of Kragujevac and the holders of executive and legislative authority of local government of Vrnjci Spa have jointly assessed that there is a need to establish a higher education institution that will educate staff in the field of hospitality and tourism. In March 2010, the Council of the University of Kragujevac has passed the Decision on Accepting the Initiative and Signing the Protocol on Joint Activities on Establishment of the Faculty of Hotel Management and Tourism. With this document, the Municipality of Vrnjci Spa and the University of Kragujevac have agreed that the mutual goal of the Municipality of Vrnjci Spa, as a tourist center of Serbia, and the University of Kragujevac, as a provider of higher education, scientific and spiritual development of macro-region of Sumadija and West Serbia, is to achieve plans of their own strategic development, by education of lacking highly qualified staff of educational profiles that are necessary for the development of tourism, not only in Vrnjci Spa, but on the whole territory of the Republic of Serbia, by establishing the Faculty of Hotel Management and Tourism, based in Vrnjci Spa, and which will be part of the University of Kragujevac.

The Faculty of Hotel Management and Tourism was opened in 2011 and it filled the planned capacity in the first year of its existence, by enrolling 100 students in the first year of studies. The interest in this, although a new and novel faculty, was great. For the meantime when the Faculty is largely planning the 2012/13 school year, with interest steadily deepens, and the administration of the Faculty staff is trying to solve the upcoming "positive" problems brought a new entry in the summer 2012th. Knowing the approximate structure of the first generation students of the Faculty of Hotel Management and Tourism in Vrnjci Spa, we started the analysis taking into consideration the reasons of enrollment to the study at the Faculty, as well as the impact of environment on the choice of spa tourism and hospitality studies.

4. CHOICE OF FACULTY AND SPA ENVIRONMENT – ANALYSIS OF RESULTS

The aim of our research was to analyze the reasons for enrollment as well the influence of spa environment on the study choice within the Faculty of Hotel Management and Tourism in Vrnjci Spa..

The research started from the assumption that the spa environment had a positive influence on the study choice of our respondents. Using a specially formulated questionnaire, we polled 65 students (around 70%) of the Faculty of Hotel Management and Tourism in Vrnjci Spa about their reasons for enrolling in these studies and came to interesting findings which we shall present in this paper.

Students of the first year at the Faculty of Hotel Management and Tourism in Vrnjci Spa are young people of an average age of 20. Females accounted for 67% of the surveyed students and 33% were male. Among them, the majority were those financially dependent on parents – 87%, while only a small number of them work and thus financially support themselves during the studies. This data does not differ greatly by comparison with the analysis of other faculties in other areas since higher education in our country is formulated in a manner that the students are practically completely disabled to work and study regularly. Observing this data and having knowledge of possibilities that the spa environment provides to the students who are studying to work in tourism, we believe that the future organization of studies should enable all interested students to work in the field of their education. Thus, the students would also gain practical knowledge beside the improvement of their financial status. Nowadays, however, they are enabled to work only during lecture breaks in the summer when Vrnjci Spa has the most tourists.

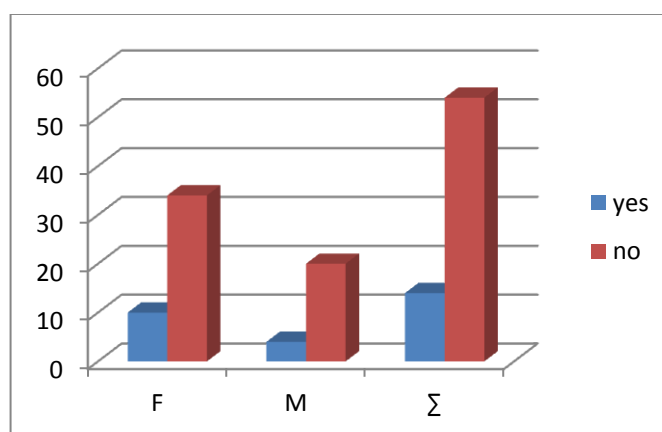


Chart 1. Distribution of respondents according to whether they are residents of Vrnjacka Banja

It is interesting that a large number of students, as many as 79% of them, have come to Vrnjci Spa in order to enroll in this Faculty, and only 21% are locals (**Chart 1**). This is the manner in which the number of young people is increased throughout the year, and especially from October to June when normally fewer tourists visit Vrnjci Spa. Also, the total number of young people living in Vrnjci Spa is increasing, which all implies the increased number of cultural events for young people (parties, concerts, cinema screenings) that otherwise do not occur in Vrnjci Spa in the mentioned time of year. Residents who rent apartments fill accommodations with the students of the Faculty of Hotel Management and Tourism even during the months when it was not the case in previous years, which improved the financial status and standard of the locals throughout the weaker tourist months.

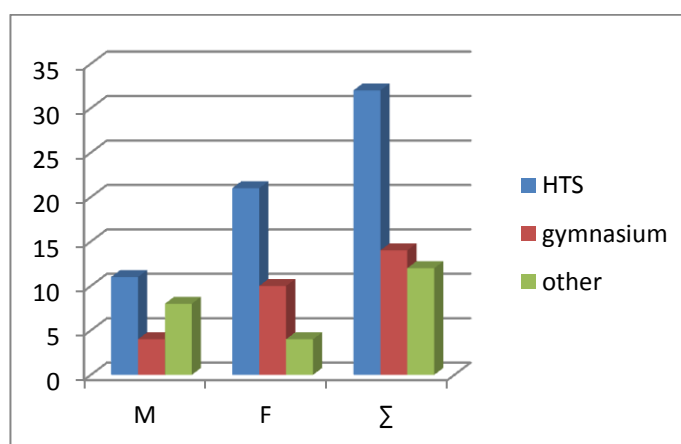


Chart 2. Distribution of respondents according to previously completed high school

Among the students of the Faculty of Hotel Management and Tourism, the highest number comprises those with a degree from the Hospitality and Tourism School, which is also an expected finding since this Faculty is a logical continuation of such secondary education. Detailed distribution of respondents per completed school is provided in the chart (**Chart 2**).

Students who believe their secondary education had influence on the faculty choice make 40% and 21% would not enroll in this Faculty if it were in some other area. This data indicates the fact that the spa environment received a very positive evaluation from higher education beneficiaries.

Regarding the contents of sports activities, the respondents deem that they were not important for them when choosing the studies and neither were the cultural events. They assess the entertainment events, however, as important and this finding is quite expected considering the fact that young people are in question. It is interesting that they assess the peacefulness of Vrnjci Spa as an important part of the environment for studying (**Chart 3**).

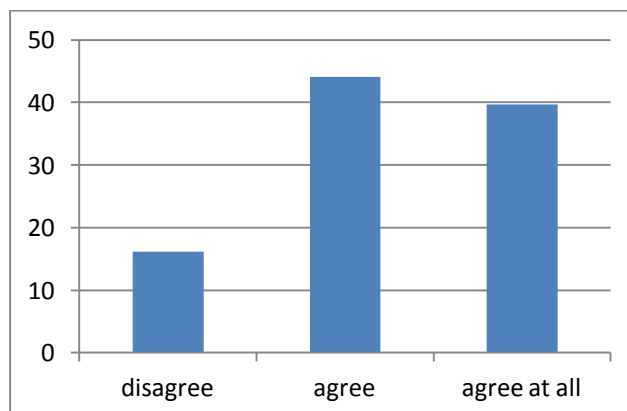


Chart 3. Distribution of respondents according to how they evaluate the peacefulness of Vrnjacka Banja as an advantage of study environment

Also, the role of parks and gardens in Vrnjci Spa has a high percentage of positive influence on their student life. Since this spa is widely known exactly for these characteristics, they were also recognized as important by the higher education beneficiaries, which is an extremely important finding. Natural resources could certainly be exploited better and we assume that they are a factor toward the development of a better study environment in the spas of Serbia.

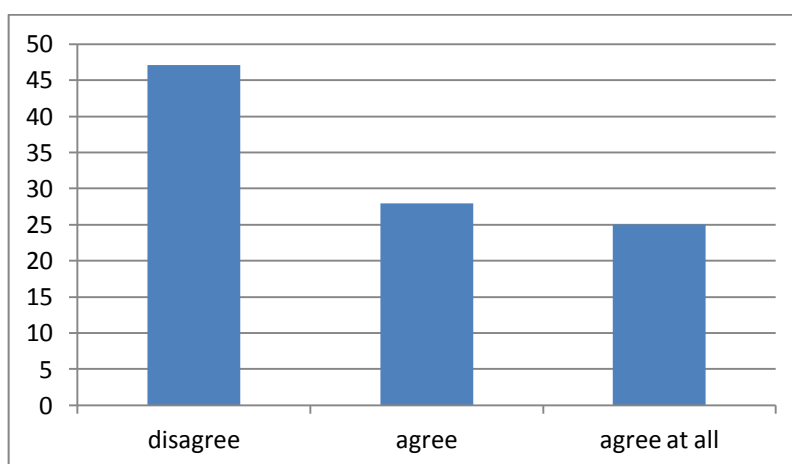


Chart 4. Distribution of respondents according to the importance of low off-study costs as a factor for choosing the study environment

Considering the generally poor financial situation, we assumed that the lower cost of rental apartments and cheaper living conditions would have a positive influence on the choice of study place. However, the respondents do not find this factor particularly important (**Chart 4**). Certainly those respondents who financially support themselves assess this segment as somewhat more important than those respondents who are financially dependent on parents during their studies, as expected.

5. CONCLUSION

Based on the analysis and results of the research, we may conclude that the spa environment is favorable for studying, especially if observed from the perspective of hotel management and tourism studies. Only a portion of data is provided in this paper which discusses the environment, and certainly some other time there shall be more on the spa environment from the perspective of conducting practice and satisfaction of students with such a specific, and for our standards, new study environment.

Plans to open a faculty of medicine and some other departments of University of Kragujevac faculties in Vrnjci Spa could favorably influence the development of that municipality, rejuvenation of population and reduced departure of young people to other places and cities in the region. We think there are environments that are not necessarily urban, i.e. city, which could become bases for certain faculties depending on the nature of higher education institutions.

Possibilities provided for studying by such an environment may be a significant potential, naturally without diminishing the significance and importance of university centers existing in our tradition.

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ATTITUDES AND EXPECTATIONS OF THE UNEMPLOYED IN TRANSITION CIRCUMSTANCES IN SERBIA

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Abstract: *Social disturbances are always an associated notion of transitory changes. What is a decisive factor for this process to move towards the right path? On the one hand, leading role is played by development policy and economic strategy, but on the other hand, each individual must be engaged in finding opportunities and personal improvement in order to find his own place in the business world. The changes and job opportunities are most easily adopted by highly educated youth. Finding a job in the new circumstances is a big issue for both the middle aged and less qualified employees.*

Keywords: *transition, human resources, organization, commercial development, economic development, employment, stress*

1. INTRODUCTION

The beginning of this century is featured by a more intense globalization process and completion of transition process, but also by a world economical crisis that shook the entire economic order, introducing new economic leaders (China, India, Brasil...)

The basic assumption of the complete social-economic transition is the privatisation process aimed to create economic conditions for free enterprising activities of individuals.

Actual economic movements in transition period have an immediate effect on the conditions and movements in all spheres of life. For the last 15 years, commercial conditions have been featured by: large downfall of industrial production, reduction of foreign exchange, lack of significant investment activities, general insolvency of commerce. These adverse movements have brought the changes in the field of employment and employment rate: reduction of recorded employment, accelerated growth of open unemployment, high skill-wise and qualification-wise structure of the unemployed with a tendency of growth above average in the total unemployment, high „hidden“ unemployment, high underground employment and a large number of the employed in insolvent companies. The problem is a huge time discrepancy between the following two activities: redundancy activities in the companies and creating condition for re-employment at other or similar job positions.

2. PARTICULARITIES OF TRANSITION CHANGES IN SERBIA

One of the toughest issues escalating in transition process is unemployment. It is known that Serbia inherited abt 30% over-employment from the previous (socialist) society. This problem escalated in the privatisation process. Reformers assured that this problem would be present for only a few years, that it would be eased by social programmes, that it would finally be eliminated once new small and medium enterprises are founded and that Serbia would be then faced with the lack of manpower.

Transition and employment potentials – typical attitudes of the unemployed

It is a fact that those looking for a job must change their habits. On the other hand, state and institutional authorities must create a strategy to resolve the employment issue in the new circumstances.

Who is affected in transition period?

Most of the Serbian citizen will remember the transition as a period when a job was either easy to loose or hard to get. Those citizen are certainly the immediate victims of transition processes and they experience the most drastic consequences.

In reality, everyone is affected in transition process. In fact, this is the period when the fact that no one is secure in terms of reliable and full time employment must be accepted. Self-governing system, which had

been dominant in our society both formally for a long time and even longer through acquired habits, guaranteed relatively quick and secure employment. It also guaranteed a privileged role of the employees in occupational disputes. Unfortunately, it was frequently economically unjustified. It is a fact that these commitments made us enter the transition processes with redundancies in most of our enterprises. Having changed to market method of doing business, the circumstances have been fully changed. New employers stick mainly to economic rather than social motives.

Noone has got a job secured. Employment growingly depends and will depend on the employers' needs and interests. One should not forget that these needs and interests are subject to frequent and often radical changes.

What should be done when there is no secure job?

There is no recipe to help anyone find a job easily and reliably – it is just a delusion.

One should not wait but look for a job. Although a state of full employment is an ideal for each society and government, although there are specialized departments acting as employment mediators (first of all, Employment Service), a success in looking for a job mostly depends on the person searching for it. Different State authorities assign certain assets in order to incite employment. However, the problem of unemployment is hereby solved only on a general rather than individual level. Furthermore, when the number of job positions available is small and the number of the people competing for the job is large, an individual can only rely on the services rendered by Employment Service.

Job search is an active rather than a passive process. It was duly noticed in the Employment Service – now they organize trainings for an active job search. Such opportunity should be utilized as this kind of training is rendered free of charge.

I am only interested in a full time job. The delusion of being employed at a single company „until retirement“ is still present with a big number of our citizen. The sooner it is realized that each job position is a „temporary“ one, the sooner the unemployment issue will be resolved.

For example, during the year 2006, out of the total number of the employed 68,4% is employed part time while 31,6% is full time employed. That is, employers mostly decide to apply this kind of employment. If an individual decides to work part time, he must take into account that the quality of his work is the factor determining whether the employer will offer him a job again. The employers' logic is primarily based on interest which is possible to be accomplished only with the help of good employees.

I am only interested in the public job. Despite delays in meeting the given deadlines, privatisation process has moved far forward and is close to the end. Anyway, many people consider public jobs more attractive. How many state owned companies are there? The answer is – less and less each day.

In spite of the fact that privatisation is one of the topics being discussed most, there is still a lot of citizen taking previously socially owned companies as public ones, although these were acquired by private individuals quite some time ago. It particularly applies to successful companies, i.e. those which are attractive for employment.

Simply, it is much more likely to get a job at a private company than at the state owned one, regardless of what it involves. „State owned“ is in majority, at least it will be reduced to public sector. Those looking for a job must know that it is burdened with redundancies. It is a matter of days when a necessary cut will be made here.

I have got my diploma. Majority of investors, especially those coming from abroad, organize their own training courses for the recruits. Many of them are not interested in what will be presented to them as formal education. They are only interested in actual skills, i.e. what and how much an individual is capable of doing. If one wants either to get a job or to keep it, one must be ready to permanently improve own skills. If an individual has proven own skills and knowledge at the previous job position with similar tasks, it is still not a crucial recommendation. Foreign investors, in particular, introduce a different organization, comprehension of working habits and alike. They know well that our country has deteriorated in terms of technology over the last decades; thus the individual skills achieved with such technology will not be very helpful.

There are no vast differences even with those looking for a job for the first time. A diploma acquired at school will not consequently bring a job opportunity; it primarily implies a capability that the knowledge acquired will be applied to a concrete job position. There is a delusion of foreign investors insisting on young manpower and they are almost exclusive in such opinion. The reason of this way of thinking is their attitude towards the socialist working habits of the elder, i.e. of those having been working in socialism. At the same time, the fact that Yugoslav commerce was functioning on different principles than those from real-socialism countries is often neglected.

This is the issue that must be dealt with by both the State authorities and all those involved in solving the problem of employment, since the most affected age group of the unemployed is the one starting from 45 years of age and more. Such delusion should be eliminated, i.e. it is necessary to assure the foreigners that the connection between youth and experience is the best in our circumstances. All this must be further followed by incentives for employment of this population.

Employment Service renders help in this domain by organizing various kinds of trainings and re-trainings. Apart from this one, there are other services involved in this job.

I can only accept a job in my town. Apart from professional, new circumstances involve other kinds of adjustments. In order to make a detailed analysis, it turned out that there is a number of job positions available for the skill profiles included in the unemployment record.

The problem is that the free job positions are out of our town. We have to change our habits in this sense as well, as we have to be much more ready to, for example, change the residence if the job position assigned is really necessary and if our existence depends on it. It is a common notion in a major part of the world. People travel to get a better job for hundreds and thousand of miles. Of course, this may involve certain either emotional or cultural disturbances. One should always consider what implies harder consequences – above mentioned or the life without a job and means for existence.

I am not capable of having my own business. The solution to the unemployment problem does not mean that everyone should run own business. The true is that not everyone was born as a businessman. It is an option that should be seriously considered in case someone has lost a job. It is experienced that the majority of those that had obtained severances spent their money on either a real estate or consumables purchases. The function of severance pays is completely different - they were paid out in order for someone to permanently support own existence rather than temporary increase the standard. It can be said that the severances were low in some companies and thereby insufficient to be taken into account for running a business on one's own. Anyway, they enabled joint ventures with those found in the same position. Further, beside a large number of unfavourable loans, there are some loans that are really incentive and beneficial for those starting to run own business. These are mainly the loans approved by republic, regional or municipal authorities. Apart from granting these favourable loans, these authorities are liable to form departments rendering counselling service to the runners of the own business, especially to those from the Employment Service record.

I am loyal to my company. Corporate loyalty is certainly a praise-worth feature of an employee. But, what happens when a company is not „loyal” to you? A whole army of people in this country was and is still working for low, irregular or literally no wages. To stay at such job position is maybe a good decision, especially if it is taken into account that it is hard to get a job these days. But, it is a bad decision for sure if there is another more favourable possibility, particularly if the loyalty motives are the non-economic ones. Very often, loyalty is based on the motives referring to friendship at work, habits or justifications such as „I know everything here” „I have spent the entire career here”. Job is a matter of economy rather than emotions or anything similar. That is, if a company is in a bad position, it is not a sin to look for another job. It does not necessarily mean one have to quit immediately. We still think that an advantage during employment is given to the unemployed. It is wrong.

Employment Service have changed their working method so that they have recorded a significant number of those, already employed, looking for a job. All people searching for a job are equal regardless of their current status.

If i pull some strings, i will get a job. This used to be the shortest way to get a job but it is not the case today. The reason for that is the change of circumstances referring to the change of ownership structure.

Employer invested his capital in the business and he has the full right to judge who is going to work for him. In private companies, the best „strings“ are skills and abilities. In public sector, there are redundancies so that „pulling strings“ is just a waste of time.

The delusion like: „I am not going to work for a stranger“ or „ Private owners exploit workers“.... are still present. Some of these delusions have some ground in reality but it is a delusion to make the rule out of individual cases.

Getting a job primarily depends on the person searching for a job. But, it does not mean that others are relieved from solving this problem. On the contrary, it is a serious issue of both the government and local authorities. The problem may be solved only by a series of measures leading to concrete results – new job positions. Further, trade unions must play a more active role in this process, particularly as far as the people with interrupted careers are concerned. Such role must be rather creative than just critical. On this job, a high level of partnership is required. Although the latest indicators hint positive tendencies in the employment sector, it should be taken into account that each figure and statistical data represent concrete human beings with a large problem to support their own existence. Therefore, nobody is allowed to be slow in this process; therefore, we all need to be partners in this.

3. CONCLUSION

One should not wait but look for a job. Although full employment is an ideal for both the society and the State, although there are specialized mediate services for employment, the success in finding a job mostly depends on the one searching for it. A job search is an active process.

Delusions on being employed at a single company „until retirement“ is still present with a large number of the employed in Serbia. The sooner it is realized that each job is a temporary one, the sooner the unemployment problem will be solved.

Although privatisation process has moved far forward and is close to its end, public jobs are still considered the most attractive.

It is not enough just to have a diploma. Majority of investors, those coming from abroad in particular, organize their own training courses for the recruits. They are only interested in actual skills, i.e. what and how much an individual is really capable of doing. If one wants either to get a job or to keep it, one must be ready to permanently improve own skills.

New circumstances typical for transition involve other kinds of adjustments, apart from professional. Habbits must be changed, i.e. one must be flexible to, for example, change the residence in order to find an adequate job influencing the existence of an individual and his family. Remaining loyal to a company in spite of low and irregular wages is justified only if it is borne in mind that it is hard to get a job nowadays. Getting a job by „pulling some strings“ used to be the fastest shortcut once upon a time, but it is less and less present today.

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MANAGER TRAINING WITH THE PURPOSE OF INCREASING THE EFFICIENCY OF ROAD TRANSPORT COMPANIES

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Abstract: A constant demand for increased efficiency forces road transport companies to promptly find new technical and technological solutions that will make transport organizations more efficient. Modern technology in road transport, or, in other words, new technical and technological solutions have to follow highly professional and permanent education, aligned with standards and regulations on the global level. The paper deals with the problems and difficulties that arise in organizations due to lack of training of the managers who are responsible for efficient transport, organization and control of vehicles and drivers. The idea of the authors is to point out a need for training of managers, who have the key role in the effective realization of transport services, and providing education to staff, which is an investment and not a cost for transportation companies. Professional training programs for the employed in road transport, which the IRU Academy in Geneva conducted through its Accredited Training Institutes, provide educational opportunity for all participants in the transport process. Continuous training enables human resources function to have highly professional managers who are able to meet all the requirements dictated by modern transport.

Keywords: manager training, road transport companies, professional competence, CPC

1. INTRODUCTION

All scholars are agreed on that human being is the most important factor for scientific, technological and social progress, and that staff are a key resource of the organization. Human resources are the main wealth and potential, not just for one organization, but also for the entire state (Hewlett, 2002). Human resources are more important than natural resources (Richardson & Thompson, 1999). Even countries that do not have natural resources, can achieve a high level of economic development, if they have the appropriate human resources. Bearing in mind that in contemporary theory, the term staff means trained, educated and trained professional staff, organized in order to meet the personal and socio-economic interests and needs, and not just the highly educated professionals and managerial staff of companies (Merriam, 2001). Analogous to the strong influence of the degree of social development, human resources is a fundamental prerequisite for successful development of the individual organization (Mihajlović & Ristić, 2011). Therefore, the growth and development of enterprises depends of the formation of adequate staffing levels and its efficient use. Due to such a great importance of human factors in the company, investments in staff is far more attractive compared to the investment in physical capital (Nerdrum & Erikson, 2001).

Modern business of transport company requires alignment of the management to organizational resources with a variety of changes in the current environment, both nationally and internationally. New technology in traffic requires new knowledge and high level of expertise and specialization of personnel in that area. According to the estimates made by the European Union, more staff will be working in transport, but there will be a need for capable personnel to solve the problems at all levels: researchers, planners, designers, constructors, in the logistic chain conveyors, traffic experts in the cities, and particularly successful managers. Assumption is that in the future development of traffic the most critical component will be the staff, because in the most countries, the traffic is studied sporadically at the universities. Only recently has been increased the number of courses in the field of transport. It is also estimated that an advantage in the development will have those areas that have developed infrastructure and the ability to train staff. In that sense, the training of highly educated transport personnel involves multidisciplinary profession.

The staff must have knowledge in management, logistics, haulage forwarding, road safety, traffic engineering, marketing, ecology, computer science and language courses. The quality of personnel can be provided only by planned improvement of current and new staff with adequate education, that is, the proper management of human resources. The way we manage the stuff highly depends the business

efficiency of transport company and its future development. Personnel policy defines, among other things, the profile of staff necessary for the transport organization, the way they are recruited the way we are motivate and stimulate them and especially education because of the permanent changes that occurs and in the terms of technology and regulatory aspects. Modern business practices, and anticipating trends, indicate that the success and survival in the market will achieve only organizations that are constantly improve and adapt to the environment (Pfeffer & Sutton, 1999). The dynamic development of science and technology requires the development of a dynamic organization and all its components. Transport companies that accept such a business philosophy must adequately provide the training and changes in their own staffing structure. In other words, they must have a modern approach to planning and development of staff, that is reflected in the permanent education and training of new and current employees.

2. TRAINING OF MANAGER TO IMPROVE PROFESSIONAL COMPETENCE IN THE ROAD TRANSPORT COMPANY

The general trend in Europe is moving towards a knowledge society that is acquired and maintained through continuing education and training. Certainly, training is essential because it allows employees to adapt to new technological and legal solutions. It should include all employees to increase their contribution to the realization organization goals. Training is a complex task that refers specifically to an organization where to be found that knowledge and to what extent they will be presented to users. Good practice is achieved if the train managers who can effectively communicate their knowledge and skills to other employees through continuous learning process. This is especially important for organizations conducting business in an international environment where there are constant technological and organizational changes. For the adoption and implementation of international standards that regulate the organization's business managers need to have diverse and multidisciplinary knowledge necessary to effectively operate at the international level. In order for organizations to be successful in this business is a new approach to training employees, which means that training is the task and obligation that is being undertaken and whose implementation control (Perović, 2007). Past practice shows that the trained individual in non-trained environment does not produce the expected results and that training will never be at a higher level of training that employees need to exercise it. This fact implies the need for training should be organized for groups, where on joint discussions by all participants familiarize themselves with newspapers, methods and procedures.

Road transport of passengers and cargo is by nature a transnational area, and most segments of the transportation is defined at the international level with conventions, agreements, directives and regulations with the goal of efficient and safe transport organization. Regulation allows to road transport companies an efficient and safe transportation from one side, but on the other requires constant adaptation to new technological and legal solutions. Constant changes that occur at the international level will result in the necessary knowledge and skills they need to have before all others, managers of transportation and all other participants in the implementation of transport. Successful organization of transport is only possible through improving the quality of work through continuous investment in education and training in order to introduce and implement legislation and the latest technological solutions in road transport.

Such an approach allows:

- Implementation of international standards
- Engaging in international flaws
- Competition in the market
- Greater productivity
- Monitoring the ecological requirements of the modern world
- Improving image of profession.

Training as a mechanism of positive adjustment of road transport companies to all the changes that occur in the environment on one side is necessary because there are constant changes dictated by international regulations, while on the other side, it is a real need because it allows for the efficient operations of the company in the transport market that is growing and develops. Because the overwhelming influence of human factors on the safety of road users, these training have been increasingly imposed as a necessity regardless of the law. Therefore it is necessary to constantly professional development of all road users in order to raise the level of traffic safety, increase the competitiveness and raising productivity of companies in road transport.

The data shows that professional driver is the most professions today. The needs for professional drivers in the market of the European Union are 100000 professional drivers per year. Approximately 9 million people work in European transport sector. In road transport works more than 50% of all employees in transport sector and road transport achieved 20% of the European Union's GDP.

An important element of European regulations which relates to the road transport company is Directive 1071/2009/EC. This Directive acknowledges interest of road passenger and cargo carriers, mutual recognition of diplomas and evidence of formal qualifications. The Certificate of Professional Competence (CPC) in international and national transport for road haulage provides right to freedom of transport activity. Directive 1071/2009/EC has a significant impact on road transport of passengers and cargo. This Directive defines basic concepts, conditions relating to the requirement of professional competence, conditions necessary for perform activity in road transport and conditions necessary about financial position of transport company. It means the efficient and stable control system in the transport company, the good reputation, the financial capability and the necessary competence. The necessary competence can be achieved by the Certificate of Professional Competence in international and national transport for road haulage.

Need for education transport managers derived from the volume of work they perform:

- To monitor various activities inside the department as well as the safe transportation of products and services from the company to the scheduled delivery location (to control complete transportation operations of the company)
- Resolve issues surrounding product delays, customer and shipper complaints, and employee misconduct
- Cooperation with government agencies to look into accidents involving the company's transportation vehicles
- Supervises all transportation personnel and their daily operations - this include hiring and training qualified staff, setting policies and safety procedures for workers to maintain while working, conducting training sessions and mandatory meetings, and assisting with scheduling and payroll activities
- Conducts routine maintenance checks on all vehicles and equipment
- Analyze and develop plans to improve the transportation department's budget to purchase new vehicles and equipment, as well as discuss and consent to contracts with various suppliers

3. CPC MANAGER PROGRAMME

Professional competence today is a prerequisite for ensuring a competitive advantage to companies active on local and international markets. Establishing and managing a successful road transport company is becoming increasingly difficult in light of the multitude of complex International and National goods and passenger transport legislation currently in place. With today's increasing awareness of security and environmental challenges, road transport professionals must comply with existing and anticipated regulations, and be familiar with the latest technologies that address these key issues. In the face of these challenges, the road transport training industry needs an exemplary framework for capacity-building to enhance its professionalism, efficiency, effectiveness and accountability. The CPC Manager programme has been developed with a strong focus on these priorities. Going beyond compliance with the sole criteria of compliancy, it aims at providing professionals with the knowledge and skills to perform in an environment in constant evolvement.

The IRU Academy has established training standards for the Certificate of Professional Competence in international and national transport for road haulage on the basis of EU Regulation EC/2009/1071, international legal instruments and best practices. The IRU Academy CPC standards are completely compatible with EU legislation and add value by providing comprehensive standards and information, ensuring that training institutes, accredited as corresponding to these standards, maintain the highest quality of training and, through an international network of training institutes, best training practices.

The IRU Academy standards have been organized so as to offer maximum flexibility. Training institutes can devise a single training programme to cover all the requirements for both road haulage and road passenger transport operations, for national and international traffic. This course is geared towards transport operators and other employees in order to comply with "access to the profession" requirements. The programme also suits the needs of managers and other staff who would like to improve their career prospects and develop their management skills and transport knowledge as well as to entrepreneurs and operators who would like to start their own transport enterprise. The IRU Academy course standards have

been developed to allow maximum flexibility to the Accredited Training Institutes (ATI) to adapt their training programmes to meet national needs, regulations and specific features.

Rico Training Centre is Accredited Training Centre of IRU Academy from Geneva for professional training of employees in road traffic through the following training programs:

- CPC manager programme
- CPC professional driver programme
- ADR programme (for drivers and manipulators)
- Digital tahcograph programme
- Safe Loading and Cargo Securing

However, all Accredited Training Institute CPC programmes must cover the following subjects:

- International standards, Conventions and national regulations in the field of passenger and haulage transport
- Road safety and technical standards
- Economic and financial subjects
- Legal issues concerning employment and commercial law
- Health

It is left to individual training institutes to deliver the programme and modify its sequence according to local needs, methodologies and pedagogical approaches. Additionally, where and when applicable, relevant national legal provisions have to be included in the programme.

Rico Training Centre has adapted its lesson plan to the current national legislation and put into plan all relevant national legal acts in the field of CPC programme for professional education personnel in road transport.

4. CONCLUSION

Implementation of new technical solutions in road transport is only possible through the permanent education of employees in this area, based on European experiences. Professional development and preparation of employees is necessary, because of all the adjustments and changes dictated by the requirements of current and dynamic regulation in road transport. This paper has presented the integration of European solutions of organization of international and national transport. The paper is particularly based on the CPC program managers that educate managers for the successful organization of haulage and passenger transportation. The program allows the manager to enforce all safety procedures and rules and all applicable standards and regulations. Because the prevailing influence of human factors on the safety of road users, the training are necessary regardless of the Law. Therefore, it is necessary permanent professional development of all road users in order to raise the level of traffic safety, increase the competitiveness and raising the productivity of businesses in the road transport.

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TRAINING AND ENABLING THE POPULATION FOR PERSONAL AND MUTUAL PROTECTION

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Abstract: *The paper elaborates on the problem of population education for personal and mutual protection as an elementary requirement for reducing the consequences of weather disasters and other accidents. In accordance with a legislation category, every citizen (especially the youth in elementary and secondary education) should be educated in order to obtain knowledge on dangers from accidents and the ways of protection from them. The aim of the paper is to point out the importance of education of the whole population as a preventive measure for lowering risks in extraordinary situations. The paper uses the methods defined in law and bylaw acts for the analysis of the documents. The obtained results of the research are devastating, since they indicate that the regulations of the Emergency Management Law have not been carried out even three years after their enactment and that training has not been effected, which directly increases risks in case of extraordinary situations. The paper should encourage the subjects of the civil defense who are responsible for this area to prescribe a curriculum for training the population and start educating them. The paper can serve as a starting point for planning and organizing education and preparation of the population for acting in extraordinary situations and is directed towards the Ministry of Education and Science, the Ministry of Interior, the Ministry of Human and Minority Rights, Public Administration and Local Self-Government*

Key words: *education, emergency management, curriculum*

1. INTRODUCTION

The Emergency Management Law (hereinafter: Law) [1] presents a starting document for planning and organizing the education of the population. The Act 119 of the Law defines that “in order to gain necessary knowledge of personal and mutual protection, the citizens are trained and enabled for preventive protection and rescue. The training is done during the elementary and secondary education in order to gain knowledge of dangers from natural and other accidents and protect from them, in accordance with the special law and appropriate programme.” The smaller part of the population, as well as the members of the headquarters and units of the civil protection, is trained for executing the tasks of the civil protection by the Ministry of Interior, through the courses, seminars, trainings, exercises and mock mobilizations.

The Act 15 of the Law gives the jurisdiction the units of local self-government to organize, develop and lead the personal and collective protection, train and enable the commissioner, the deputy commissioner and the units of general purpose and to form, organize and supply the units of general civil protection. In addition to that, the local self-government is, under the Local Self-Government Law [2], obliged to organize protection from weather disasters, other major disasters and fire, and create the conditions for reducing and removing their consequences.

The Acts 16 and 17 of the Law oblige the companies and other legal entities to plan and provide the means for organizing, supplying, enabling and training the units of civil protection they form, to organize and prepare personal, mutual and collective protection, and to conduct the means and tasks of civil protection of their employees, material and other goods.

Personal, mutual and collective protection is defined by the Acts 8 and 52 of the Law. **Personal, mutual and collective protection** is the most wholesale form of preparing and organized participation of the population in protection and rescue that includes the means and actions of their immediate protection and rescue in business and living buildings, other objects and places where they live and work.

In order to accomplish personal, mutual and collective protection, the state bodies, the apparatus of autonomous province and the units of local self-government, the companies and other legal entities

provide and maintain the necessary means and equipment for personal, mutual and collective protection and train their employees in civil protection. The citizens and owners of buildings provide and maintain the necessary means and equipment for personal, mutual and collective protection. Further regulations concerning obligatory and equipment for personal, mutual and collective protection were brought by the Government.

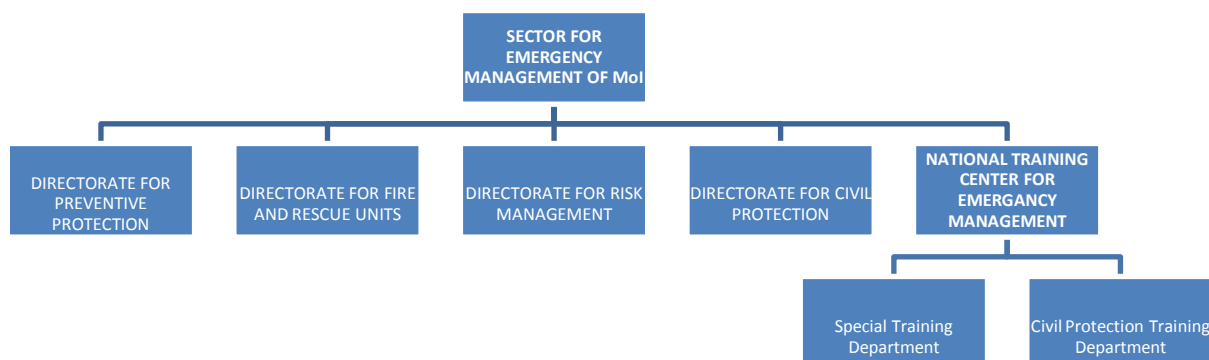
2. THE LEVELS OF TRAINING

Considering the training and enabling the citizens – on all levels of organizing and preparing the population for civil defence – for the needs of active involvement in the Protection and Rescue System of the Republic of Serbia, one can conditionally talk of several levels of training and commitment of the civil subjects on that plan (scheme 2).

The highest level of training is organized and conducted by the **Ministry of Interior** (hereinafter: Ministry) via its Sector for Emergency Management and National Training Center for Emergency Management (scheme 1) which includes the Specialist Training Department and the Civil Protection Training Department.

The aim of the National Training Center for Emergency Management is the standardization and enhancement of the protection and rescue training, in accordance with the Law and the European standards.

Scheme 1: The position of the National Training Center in the Sector for Emergency Management



Source: author

The task of the National Training Center for Emergency Management is the basic training and enabling all the members of the protection and rescue system:

1. employees of the Sector for Emergency Management,
2. headquarters for emergency management (state, province, district, town and municipality headquarter for emergency management),
3. specialized units of civil protection,
4. apparatus of the companies,
5. other legal entities important for protection and rescue,
6. **citizens**, in order to gain necessary knowledge of personal and collective protection, and
7. foreign citizens who can be trained in accordance with the regulations and bilateral and multilateral contracts.

The higher levels of training for protection and rescue are conducted, as entrusted tasks, in *the humanitarian centre*, a legal entity founded in accordance with the agreement between the Governments of the Republic of Serbia and the Government of the Russian Federation concerning the cooperation in the area of humanitarian reaction in extraordinary situations and emergency management, prevention of weather disasters and technogenic accidents and removal of their consequences ("Official Gazette of Republic of Serbia", no. 10/10 – International Contracts) [5]. Only foreign citizens can be trained in the humanitarian center.

The law prescribes the Minister of Interior passes the further regulations concerning the methods of education, curriculum and standards for teaching devices and equipment for training the members of the civil protection. However, after two and a half years since passing of the Law, the curriculum has not yet been established, the training of the population has not started, the units of the civil protection are still not formed, which decelerates the training and enabling process of all the subjects of the defence and their implementation in the system of defence.

The next level of training is performed on the level of **units of local self-government** (municipality and town). Local self-governments organize and conduct training and enabling of the commissioner, the deputy commissioner of the civil protection and the units of general purpose that are formed, organized and supplied for their territory. They also develop, lead and train the organizations and citizens in the personal and collective protection. So far, no measures have been initiated to start training the citizens according to the place of their life and work.

In addition to that, the units of local self-governments have, based on the Local Self-Government Law and Act 15 of the Law, passed the resolution on organizing and functioning of civil protection on the territory of a municipality or a town. It defines:

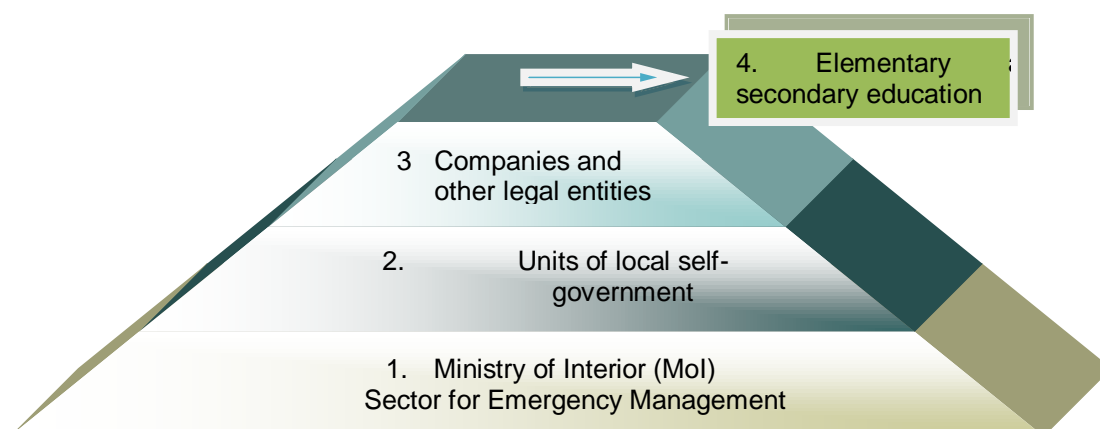
- organization and functioning of civil protection on the territory of a municipality or a town,
- duties of town organs in protection and rescue and in producing an evaluation of endangerment and plan of protection and rescue in extraordinary situations,
- constitution of Emergency Management Headquarters,
- appointment of the commissioner and the deputy commissioner of the civil protection in populated areas,
- formation of civil protection units for general purposes,
- determining enabled legal entities for protection and rescue, and
- financing and other issues concerning civil protection.

Different services execute professional, planned and organized tasks of protection and rescue: in Sombor, it is the Agricultural Department; in Vranje, it is appointed body of the City Administration; for the Nova Crnja municipality and the city of Zrenjanin, it is the especially formed Municipal Service for Protection and Rescue, etc. Every unit of local self-government also defined *the personal and collective protection training*, according to the place of life and work. Those who own buildings and houses are obliged to, for the purposes of personal protection and rescue and for the protection and rescue of the members of their household, provide and possess in working condition the means and equipment, as required by the regulation of obligatory means and equipment for personal and collective protection against weather disasters and other accidents [3].

In cooperation with the Emergency Management Department and the Commissioner for Civil Protection, they are also obliged to prepare the regulations and other publications that are to conduct the education of the population concerning the procedures in possible or occurring situation, in particular the education of the population on the reactions in earthquakes, floods and fire.

A special position in the level of local self-government is held by the commissioners and deputy commissioners in the areas where they initiate special measures in order to include the citizens in conducting the means and tasks of the civil protection and personal and collective protection, and manages the civil protection units of general purpose. They also provide special instructions to the citizens who live in the endangered areas and conduct all operative means for rescuing the endangered citizens.

Scheme 2: The levels of the personal and collective protection training



Source: author

The third level of training is conducted with **the companies and other legal entities** [1, 4] that plan and provide the means for organizing, supplying, enabling and training of the units of civil protection (that they form); they *organize and prepare personal, mutual and collective protection*; they conduct the means and tasks of civil protection of their employees and the material and other goods.

In addition to that, all companies that include protection of more people are obliged to plan, organize and conduct the measures and tasks of the civil protection of their employees and the material and other goods.

Humanitarian organizations and associations participate in the preparing and conducting the tasks concerning the protection and rescue connected to their normal activity. The Red Cross of Serbia performs the training of the citizens and the units of civil protection in giving first aid, in accordance with the public authorization and by established curriculum and criteria.

The fourth level of training is conducted in **the elementary and secondary schools**. Its purpose is gaining knowledge of the dangers from natural and other disasters and how to protect from them, in accordance with a special law and appropriate curriculum. On the basis of the Law, the Minister of Education and Science was obliged to prescribe a way of training in the elementary and secondary education, which has not been done yet.

3. ANALYSIS OF THE CONDITION OF PERSONAL AND MUTUAL PROTECTION

Reaching the level of organization and preparedness with the population for personal and mutual protection completely depends not only on the reached level of the civil protection's development, but on the general and special conditions in certain areas where people live and work (general condition of live and work, endangerment from accidents caused by the weather and other elements, material, cadre and other possibilities, etc.). Personal and mutual protection cannot be more or less successfully developed if not connected to the other elements of the civil protection and the existing general and special conditions in certain areas.

Personal and mutual protection is the most widespread element of the civil protection which includes all capable citizens (the element of widespread), regardless of gender and age. The effects of the severe economic crisis are seriously reflecting on the general state and mood of the whole population, and on the development of personal and mutual protection as well.

It is not enough to merely reach the level of this element's development. The state in most areas is concerning, yet there is no suitable and comprehensive response by the citizens – except in individual cases – when it is necessary. After the more severe weather disasters and other accidents, it would be desirable to review, analyze and determine the behavior of the citizens in case where the mutual help and protection was, at some point, the only possibility to help the individuals in danger (catastrophic earthquakes and floods, fires on wider areas, severe precipitation, low temperature, etc.). It is certainly

necessary to determine the responsibility, if present, of the carrier of the population's preparations for personal and mutual protection.

Personal and mutual protection (training and enabling the citizens, organizing a network of commissioners of civil protection and units for general purposes, etc.) does not receive the necessary attention, so the level of preparedness of this element of civil protection is the lowest when compared to the other elements of civil protection. It must not be forgotten that organizing and preparing personal and mutual protection is the hardest task and what seems to be important to many carriers of the preparations is that the results cannot be shown as they are not visible.

The current condition and the reached level of preparedness of the personal and mutual protection indicate that the moment has finally come to, first, realize the importance and the role of personal and mutual protection in population's surviving in case of weather disasters and other major accidents, including wars, and then to take actions to overcome all past attempts that brought us to this absurd state where personal and mutual protection is, according to preparedness in the most cases, the least important element of the civil protection.

When one considers the fact that a very small fraction of the population was supplied with protective masks in the 1990s (their expiration date has passed as well), that the number of build shelters is below the minimum and that those present are in a very bad condition, that a network of commissioners of civil protection has not yet been established in all areas (not to mention their preparedness), that the units of specialized and general purposes are in the forming phase (their forming is expected to be completed by the end of 2012), that the most citizens are not trained and enabled for the tasks of protection and rescue – it is easy to established the state and reached level of development of personal and mutual protection. In other words, the participation in the tasks of protection and rescue is left to the citizens and is most commonly without the consequences for those responsible for conducting the necessary preparation of the population.

Conducting **the solidarity actions** should be added to the all mentioned difficulties and weaknesses in organizing, preparing and fulfilling personal and mutual protection. There are no general criteria which should, in more difficult cases, automatically act in order to provide additional means for first aid to the endangered and for healing the emerged consequences. The current condition of the fund for this sort of help is obviously not sufficient to cover all the needs in difficult situations. Due to that, solidarity with the endangered still usually depends on those individuals, bodies, organizations and communities that can, with no hidden agenda, sympathize and help those in trouble.

This state of personal and mutual protection should certainly concern, first of all, the carriers of the population's preparations, but also the organs in charge from the municipalities and town's and their executive bodies which are the most responsible for solving the problems of development of the certain areas in accordance with the Law and passed Acts. The development of personal and mutual protection is regarded only when an accident occurs. In those situations, material and financial resources are sufficient.

A question must be raised: **Where are we** in the area of personal and mutual protection? Unfortunately, it can be said that we are still „at the beginning“ and that we have not yet begun applying the Acts of the Law. Some of the problems include:

- the most important issue during the preparations must be enabling for personal and mutual protection,
- for conducting the training, it is necessary to provide professional lecturers and teaching material and aids, as well as the systematic monitoring and popularization of the population's preparation for protection via the means of public informing,
- the population *must* be provided with the most necessary means of protection,
- measures should be initiated to supply the people with the means for personal protection, and all the other subjects with the means for mutual protection,
- provide the most necessary means for extinguishing initial fire in buildings, etc.

The issue of responsibility for those who do not comply with the Law has not been designated yet, so what is accomplished in preparing the population for personal and mutual protection is basically nothing, since the reached level and results of development of personal and mutual protection do not satisfy, and the state of preparedness of this element of civil protection is worrying in most areas.

Another question that is raised is: **How to continue?** In searching for the answer, one must start with the fact that the training in personal and mutual protection has not started yet; with the noticed objective problems in the society and subjective weaknesses; with the fact that the future organizing and preparing of personal and mutual protection must be based on a realistically set goals and planning and higher responsibility of all carriers of the protection tasks.

Personal and mutual protection can seem spontaneous, uncontrolled and disorganized. The actions of personal and mutual protection should be organized in cases of severe destructions with consequences on a broad area and when endangerment of high number of people appears simultaneously. Due to that, in all areas where people work and live it is necessary to appoint an appropriate number of commissioners of civil protection and their deputies who must be enabled to organize and direct personal and mutual protection and rescuing of working individuals. The basic precondition for successful performance of this function is complete knowledge of this element of the civil protection – training.

During the further development of personal and mutual protection, the carriers of preparations, in addition to enabling the citizens, have to advocate and provide organization of complete network of commissioners of civil protection and forming the unit for general purposes in all areas where it has not yet been done. That would enable simultaneous and more successful conducting the actions of personal and mutual protection and rescuing the citizens on all endangered areas at the same time.

It is necessary to precisely determine the rights and jurisdiction of the commissioners of civil protection and their deputies regarding management, directing and acting in the area of personal and mutual protection of the population.

4. CONCLUSION

No appropriate solutions for enabling the population has been suggested yet, as it includes two very important aspects – training and supplying, which, besides good organization, requires considerable material and financial means. The need has to be defined, and the priorities determined. In accordance with the possibilities, the financial means for realization of the training should be planned. Another major issues has not been solved – how can unemployed citizens, pensioners and parents of underage children acquire the means for personal and collective protection that are defined by the Government? One of the possible solutions is funding from the mutual funds that are issued for the needs of the defence system by the Emergency Management Fund [6].

Equally important problem is how to regulate, organize and conduct the training of the population, from the issue of who needs to attend to the continual attendance, not to mention all the other difficulties that arise in the process of conducting training: securing appropriate cadre, needed teaching aids and manuals, premises and heating, schedule, costs of transportation of the citizens and possible feeding, evidence and monitoring the training, etc.

The issue of training is too serious to be neglected, but, the way it is handled now is not satisfying. The conditions must be provided in order to scientifically research the problem, seek the solution and the answers for its resolving.

For starters, one should foresee informing and providing necessary instructions to the population via radio and television, daily and other newspapers, stating short and clear notices, handing out short printed reminders and manuals, etc. That would significantly affect preparation of the population for personal and mutual protection. It is clear that the Higher Technical School of Professional Studies in Novi Sad holds its place in that organization.

It has to be noted that the planned tasks can be executed only by engaging professional, capable, certainly younger and ambitious cadre. Unfortunately, in many areas, these tasks are done by people who lack appropriate qualifications or are semiskilled, yet they do their jobs for a long period of time and do it as a routine with no innovation. Again, Higher Technical School of Professional Studies in Novi Sad seeks its role with its study programme: Civil protection and rescue in extraordinary situations.

Of course, all suggestions are critically evaluated and verified, but the fact is that this is the last moment to take radical measures in this area if we wish well to the citizens of the Republic of Serbia.

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A STATISTICAL APPROACH TO EFFICIENCY OF ELEMENTARY SCHOOL EDUCATION IN SERBIA

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Abstract: *The evaluation of school effectiveness has long been an elaborated issue over the past few decades. Throughout the educational process, three breaking points occur: the first - finishing elementary school, the second – finishing high school, and the third – graduating from college/university. Elementary school is compulsory for all children in most countries throughout the world. In accordance with this, the first breaking point is the most important one to evaluate. The rank of effectiveness of elementary schools can be compared by using the average grades received in the last three years of elementary school and final high school enrolment tests (the sublimation of knowledge from elementary school in mathematics and the student's respective native languages). In this paper, the statistical I-distance method is thoroughly explained and has been applied to 100 elementary schools in Belgrade in order to rank them by effectiveness.*

Keywords: *elementary school education, elementary school effectiveness, I-distance, ranking, statistical methods.*

1. INTRODUCTION

Since elementary schools are very often cited as being the most crucial component of education (Bekleyen, 2010), it is of great concern whether elementary schools are effective (Petty & Green, 2007). In contemporary literature, there have been several attempts to evaluate school effectiveness (Kyriakides & Tsangaridou, 2008; Kyriakides & Creemers, 2008a; Kyriakides & Creemers, 2008b; D'Haenens, Van Damme & Onghenab, 2010; Botha 2010). The degree of knowledge adopted during students' eight-year long elementary education and the level of knowledge represented on entrance examinations can be used to rank elementary schools, based on the results of their students.

While educators often identify socioeconomic status (SES) as a significant factor in predicting academic achievement or other measures of student performance, researchers are examining whether the diversity of a school or lack thereof may also play a role (Clayton, 2011). Thereafter, a quantitative assessment of how much one school is better or worse than another can be made. Schools which are able to identify their weaknesses and take actions to improve their policy on aspects associated with teaching and their school learning environment (SLE) are able to improve their effectiveness status (Creemers & Kyriakides, 2010).

In this research paper, I-distance will be thoroughly explained and applied in order to rank Belgrade elementary schools by their effectiveness. After elaborating Ivanovic distance in section 2, section 3 shall present and discuss the results of this research project and, finally, section 4 shall summarize the key contributions and the idea for following researches.

2. THE I-DISTANCE METHODOLOGY

In order to create a synthesized indicator of elementary school effectiveness, selected variables are incorporated into the analysis through use of the statistical I-distance method; one which has been utilized by Ivanovic (1977). Various authors used this method of ranking in numerous publications (Dobrota, Jeremic & Markovic, 2012; Jeremic, Bulajic, Martic & Radojicic, 2011a; Jeremic, Vukmirovic, Radojicic & Djokovic A, 2011b; Milenkovic N, Jeremic V, Djokovic A. & Dobrota M, 2011; Radojicic, Isljamovic, Petrovic & Jeremic, 2012).

I-distance is a metric distance in an n -dimensional space. Ivanovic had originally devised this method to rank countries according to their level of socio-economic development based on several indicators (Ivanovic 1973a, Ivanovic & Fanchette 1973b). In this research paper, five indicators were considered and the problem was how to use them in order to calculate a single synthetic indicator, which would thereafter represent the rank.

For a selected set of variables $X^T = X_1, X_2, \dots, X_k$ chosen to characterize the entities, the I-distance between the two entities $e_r = (x_{1r}, x_{2r}, \dots, x_{kr})$ and $e_s = (x_{1s}, x_{2s}, \dots, x_{ks})$ is defined as

$$D(r, s) = \sum_{i=1}^k \frac{|d_i(r, s)|}{\sigma_i} \prod_{j=1}^{i-1} (1 - r_{ji.12\dots j-1}^2)$$

where $d_i(r, s)$ is the distance between the values of variable X_i for e_r and e_s e.g. the discriminate effect

$$d_i(r, s) = x_{ir} - x_{is}, \quad i \in 1, \dots, k$$

σ_i the standard deviation of X_i and $r_{ji.12\dots j-1}$ is the partial coefficient of the correlation between X_i and X_j , ($j < i$).

The construction of the I-distance is iterative; it is calculated through the following steps:

- Calculate the value of the discriminate effect of the variable X_1 (the most significant variable, that provides the largest amount of information on the ranked phenomena)
- Add the value of the discriminate effect of X_2 which is not covered by X_1
- Add the value of the discriminate effect of X_3 which is not covered by X_1 and X_2
- Repeat the procedure for all variables. (Mihailovic et al. 2009).

Sometimes, it is not possible to achieve the same sign mark for all variables in all sets, and, as a result, a negative correlation coefficient and a negative coefficient of partial correlation may occur. (This makes the use of the square I-distance even more desirable (Al-Lagilli, Jeremic V, Seke, Jeremic D & Radojicic, 2011). The square I-distance is given as:

$$D^2(r, s) = \sum_{i=1}^k \frac{d_i^2(r, s)}{\sigma_i^2} \prod_{j=1}^{i-1} (1 - r_{ji.12\dots j-1}^2)$$

The entity with the minimal value for each indicator or a fictive maximal or average values entity can be set up as the referent entity. The ranking of entities in the set is based on the calculated distance from the referent entity.

3. RESULTS AND ANALYSIS

Overall, 12,137 students from 100 elementary schools in Belgrade were analysed in this study. The data examined refers to the end of the 2010-2011 school year. For each student, the following information was gathered: the grade point averages (minimum 1, maximum 5) of the school's students in the sixth, seventh and eighth grades and their scores on their math and Serbian (i.e. native) language tests (minimum 0, maximum 20 – for both tests). In accordance with this grading system, only a total maximum of 60 points is achievable in one's elementary school marks (the sum of GPAs for the 6th, 7th, 8th grades, multiplied by 4). However a maximum of 40 points can be obtained from tests (20 points multiplied by two (math and

Serbian language test)). This data was used to calculate I^2 -distance for each school. To achieve this aim, a special SPSS plug-in was developed and implemented into SPSS 20 software. The results achieved by the I^2 -distance ranking method for evaluating efficiency of elementary school are presented in Table 1.

Table 1. The Results of the I^2 -distance Method, I^2 -distance Value, and difference between ranks

School name	Test points	Total points	I^2 distance	I^2 rang	Total points rank	Difference I^2 -distance rank versus total points rank
Drinka Pavlovic	32.819	87.7846	96.84	1	1	0
Kralj Petar I	31.93	86.7768	95.42	2	2	0
Kralj Aleksandar I Karadjordjevic	33.593	86.7642	87.81	3	3	0
Janko Veselinovic	32.535	86.0038	84.44	4	5	1
Starina Novak	31.382	85.0696	82.02	5	7	2
Vladislav Ribnikar	33.144	86.3724	80.68	6	4	-2
20. oktobar	34.009	85.9638	78.74	7	6	-1
Laza Kostic	31.01	83.4784	71.79	8	13	5
Lazar Savatic	33	84.762	71.66	9	8	-1
Borislav Pekic	31.407	83.5966	71.18	10	11	1
Jelena Cetkovic	32.03	83.58	69.13	11	12	1
Svetozar Markovic	32.428	84.2332	68.27	12	10	-2
Jovan Miodragovic	33.53	84.4244	67.79	13	9	-4
Jovan Sterija Popovic	31.327	82.9382	67.23	14	18	4
Ljuba Nenadovic	29.701	81.787	67.07	15	30	15
Cirilo i Metodije	31.834	83.2512	66.62	16	15	-1
Nadezda Petrovic	30.348	82.1664	66.37	17	27	10
Milos Crnjanski	31.389	83.2918	66.27	19	14	-5
Mihailo Petrovic Alas	31.88	83.1308	66.27	18	16	-2
Majka Jugovica	32.019	83.1286	64.78	20	17	-3
Ujedinjene nacije	31.174	82.304	64.01	21	25	4
Svetozar Miletic	30.4	82.0216	63.02	22	28	6
Josif Pancic	31.713	82.841	62.7	23	19	-4
Gornja Varos	30.142	81.6732	62.4	24	33	9
Stefan Nemanja	29.46	81.1392	61.9	25	35	10
Ivan Gundulic	31.666	82.3684	61.51	26	24	-2
Banovic Strahinja	31.112	82.5396	61.37	27	21	-6
Veselin Maslesa	30.956	81.9636	60.77	28	29	1
Braca Baruh	29.958	81.0896	60.32	29	36	7
Rade Koncar	32.248	82.398	59.92	30	23	-7

The results are not surprising considering the fact that ranks of top three schools remained unchanged and that in most cases there is not a major difference between I^2 -distance rank and total points rank. Drinka Pavlovic and Kralj Petar I tops the list and we may say that these schools provide high level of education. Students from these two schools have excellent average marks in last three years of schooling. Entrance tests results from math and native language of these students are extremely high. This data set was further examined and a correlation coefficient of each indicator with the I^2 -distance value was determined. The results are presented in Table 2 (using the Pearson correlation test).

Table 2. The Correlation between I^2 -distance and Input Indicators

<i>Indicator</i>	<i>r</i>
1. Average marks in the 7 th grade	0.902**
2. Average marks in the 6 th grade	0.846**
3. Average marks in the 8 th grade	0.772**
4. Scored points on math test	0.706**
5. Scored points on Serbian (native) language test	0.684**

** $p < 0.01$

The three most important indicators are the grade point averages of the school's students in the sixth, seventh and eighth grade. As can be seen, the most significant variable is average mark in the 7th grade, $r=0.902$, $p<0.01$. As expected, average mark in the 8th grade is the least significant indicator of first three, since the eighth grade teachers usually have lower evaluation criteria. Scores on math and Serbian language tests are on 4th and 5th place, which means that these two indicators provide lower information about elementary school effectiveness. That is not surprising, regarding the fact that first three variables are presenting the result of three-years-long work, while test results do not necessarily need to represent the right level of knowledge of elementary students. The fear of making mistakes may cause the lack of concentration in that moment, which can result lower scores on math and Serbian language tests.

Furthermore, research results show that students achieved better performance on Serbian language test (15,207) then on mathematics test (14,334). One reason for a smaller gap in math performance is due to the rigidity of mathematics instruction (Ferguson, 2003). Teacher expectations for students were less of a factor because of the more prescribed way in which math is taught when compared to Serbian language. Elementary school teachers are a vital tool for this human development, because of the considerable amount of interaction and discussion between children that they involve (Cave 2011).

Various significance of indicators caused changes in ranking between I^2 -distance rank and total points rank. Ljuba Nenadovic, Nadezda Petrovic and Stefan Nemanja are schools that moved towards in list because elementary students in these schools have better grades in last three years of schooling. They are above schools whose students have better results on scores on math and Serbian language tests because of explained and elaborated level of importance of these five indicators.

4. CONCLUSION

Establishing a successful scholastic system is of great importance for any country, considering the fact that knowledge is essential for humankind. The aim of this paper was to rank elementary schools in Belgrade by their effectiveness. The analysis presented here may be able to provide a proper framework for the evaluation of elementary school education. One possibility would be a national program for the continual evaluation of schools. This program could be easily applied and implemented throughout the entire country and re-evaluated each year in order to determine whether Serbian elementary school education is on the right track.

Yet another point of view to efficiency of elementary schools is to determine the interrelationships between elementary school education and secondary school entrance exams. Due to different teachers' demanding standards, we would have to define some kind of measure of correlation between students' average marks in elementary school and the points they scored on their secondary school entrance test. That measure would be able demonstrate schools that suffer from irreconcilable inconsistencies. These are schools where students have excellent average marks but perform poorly on entrance tests (lower standards in grading students), as well as schools where students have lower marks but perform excellently on entrance tests (higher standards in grading students). In a line with this, it is necessary to implement some kind of input-output analyse in order to determine the relationship between average marks and entrance exams, but that will be explained and elaborated in following researches.

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A CRITICAL ASSESSMENT OF INTERNATIONAL UNIVERSITY RANKING SYSTEM

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Abstract: *Our paper aims to present new ideas in evaluating Shanghai University's Academic Ranking of World Universities (ARWU). An issue frequently put forth in various publications is that the Shanghai rankings are sensitive to the relative weight they attribute to each variable. As a possible remedy for this issue, the statistical I-distance method is proposed to be used. Based on a sample containing 94 higher education institutions which are placed on the ARWU Top 100 during 2007-2010, the statistical I-distance method was performed. We present the obtained results and propose a modification of relative weight attributed to each variable.*

Keywords: *ranking of universities, the I-distance method, ARWU, statistical methods, ranking criteria*

1. INTRODUCTION

The issue of ranking higher education institutions (HEI) has drawn much attention as of late. Many different stakeholders, especially students, use rankings as an indicator of a university's reputation and performance (Agasisti & Perez-Esparrells, 2010; Bowman & Bastedo, 2011; Hien, 2010; Stolz, et al., 2010; Dehon, et al., 2010; Jeremic, et al., 2011a; Torres-Salinas, et al., 2011). Almost certainly, the most cited ranking list is the Academic Ranking of World Universities (ARWU) which has been the focus of researchers since its first creation in 2003 (Aguillo, et al., 2010). The Shanghai (ARWU, 2010) ranking is based on six different criteria and aims to measure academic performance. Within each category, the best performing university is given a score of 100 and becomes the benchmark against which the scores of all other universities are to be measured. Universities are then ranked according to the overall score they obtain, which is simply a weighted average of their individual category scores (Dehon, et al., 2010). The variables "Alumni" and "Award" measure the number of Nobel prizes and Field medals won by a university's alumni ("Alumni") or faculty members who worked at an institution at the time of winning the prizes ("Award"). The next three variables, "HiCi", "N&S" and "PUB" reflect their researchers output. "HiCi" is the number of highly cited researchers of the institution, "N&S" is the number of articles published in "Nature" and "Science" journals, and "PUB" is the number of articles indexed in the Science Citation Index Expanded and the Social Science Citation Index. The sixth and final variable, "PCP", is a weighted average of all the scores obtained from the previous five categories, divided by the number of current full-time equivalent academic staff members. The variables "Award", "HiCi", "N&S" and "PUB" each make up 20% of the final score, while "Alumni" and "PCP" are each given a slightly lower weight of 10% (Dehon, et al., 2010; Jeremic, et al., 2011a; Docampo, 2008; Docampo, 2011; Docampo, 2012).

Yet, almost immediately after the release of its first ranking, the ARWU attracted a great deal of criticism (van Raan, 2005a,b; Liu & Cheng, 2005; Liu, et al., 2005; Billaut, et al., 2010). In this paper, an attempt shall be made to investigate how relative weight of variables influences the University ranks. This potential weakness in ranking shall be examined by applying the statistical I-distance method to data provided by the ARWU's rankings for the 94 HEI which are placed in Top 100 for each of the years (2007-2010).

2. I-DISTANCE METHOD

Quite frequently, the ranking of specific marks is done in such a way that it can seriously affect the process of taking exams, entering competitions, UN participation, medicine selection and many other areas (Ivanovic, 1973; Ivanovic & Fanchette, 1973; Jeremic & Radojicic, 2010; Al-Lagilli, et al., 2011). I-distance is a metric distance in an n-dimensional space. It was originally proposed and defined by B. Ivanovic, and has appeared in various publications since 1963 (Ivanovic, 1977). Ivanovic devised this method to rank countries according to their level of development on the basis of several indicators; many socio-economic development indicators had been considered and the problem was how to use all of them in order to calculate a single synthetic indicator which would thereafter represent the rank.

For a selected set of variables $X^T = (X_1, X_2, \dots, X_k)$ chosen to characterize the entities, the I-distance between the two entities $e_r = (x_{1r}, x_{2r}, \dots, x_{kr})$ and $e_s = (x_{1s}, x_{2s}, \dots, x_{ks})$ is defined as

$$D(r, s) = \sum_{i=1}^k \frac{|d_i(r, s)|}{\sigma_i} \prod_{j=1}^{i-1} (1 - r_{ji.12\dots j-1}) \quad (1)$$

where $d_i(r, s)$ is the distance between the values of variable X_i for e_r and e_s , e.g. the discriminate effect,

$$d_i(r, s) = x_{ir} - x_{is}, i \in \{1, \dots, k\} \quad (2)$$

σ_i the standard deviation of X_i , and $r_{ji.12\dots j-1}$ is a partial coefficient of the correlation between X_i and X_j , ($j < i$), (Ivanovic, 1973; Jeremic, et al., 2011b).

The construction of the I-distance is iterative; it is calculated through the following steps:

- Calculate the value of the discriminate effect of the variable X_1 (the most significant variable, that which provides the largest amount of information on the phenomena that are to be ranked)
- Add the value of the discriminate effect of X_2 which is not covered by X_1
- Add the value of the discriminate effect of X_3 which is not covered by X_1 and X_2
- Repeat the procedure for all variables (Mihailovic, et al., 2009; Jeremic, et al., 2011c).

In order to rank the entities (in this case, Universities), it is necessary to have one entity fixed as a referent in the observing set using the I-distance methodology (Radojicic, et al., 2012; Knezevic, et al., 2012). The entity with the minimal value for each indicator or a fictive minimal, maximal or average value entity all may be utilized as the referent entity, as the ranking of the entities in the set is based on the calculated distance from the referent entity (Jeremic, et al., 2011d).

3. RESULTS OF THE I-DISTANCE METHOD

The results achieved by means of the I-distance method are shown in Table 1.

Table 1: Results of the I-distance method, the I-distance value and rank for the period 2007-2010

HEI	I-distance 2010 rank	I-distance 2010	I-distance 2009 rank	I-distance 2009	I-distance 2008 rank	I-distance 2008	I-distance 2007 rank	I-distance 2007
Arizona State Univ - Tempe	71	2.37	71	2.155	94	0.884	79	1.937
Australian Natl Univ	60	2.652	58	2.493	70	1.908	49	2.726
Boston Univ	70	2.397	67	2.229	84	1.577	72	2.168
Brown Univ	57	2.716	59	2.491	73	1.832	61	2.435
California Inst Tech	5	7.414	5	7.333	6	5.840	3	7.673
Carnegie Mellon Univ	83	2.032	83	1.888	46	2.518	86	1.629
Case Western Reserve Univ	94	1.66	91	1.683	37	2.664	76	2.045
Columbia Univ	7	6.282	7	6.146	5	6.462	7	6.166
Cornell Univ	13	5.661	11	5.525	12	4.510	11	5.371
Duke Univ	30	3.944	29	3.82	47	2.504	25	4.105
Ecole Normale Super Paris	76	2.25	70	2.18	19	3.689	91	1.566
Harvard University	1	12.197	1	11.56	1	9.907	1	11.131
Hebrew Univ Jerusalem	75	2.256	64	2.287	42	2.539	65	2.263
Imperial Coll London	27	4.269	26	3.969	35	2.810	24	4.135
Indiana University Bloomington	90	1.829	88	1.712	86	1.427	85	1.631
Johns Hopkins Univ	18	5.237	19	4.849	13	4.288	18	4.8

Karolinska Inst Stockholm	55	2.736	62	2.32	43	2.529	80	1.922
King's Coll London	78	2.168	84	1.886	79	1.731	88	1.62
Kyoto Univ	25	4.424	25	3.983	20	3.674	28	3.857
Massachusetts Inst Tech (MIT)	3	8.2	4	7.606	4	6.780	5	7.265
McGill Univ	61	2.638	66	2.26	50	2.426	58	2.558
McMaster Univ	91	1.784	94	1.557	83	1.616	93	1.519
Michigan State Univ	87	1.946	86	1.776	87	1.396	75	2.065
Moscow State Univ	81	2.066	90	1.696	23	3.587	94	1.49
New York Univ	33	3.793	34	3.355	28	3.184	34	3.348
Northwestern Univ	32	3.842	33	3.587	44	2.526	31	3.513
Ohio State Univ - Columbus	63	2.548	74	2.122	74	1.810	68	2.21
Osaka Univ	54	2.779	56	2.528	80	1.714	45	2.831
Pennsylvania State Univ - Univ Park	37	3.395	36	3.175	69	1.913	37	3.25
Princeton Univ	10	5.849	10	5.562	9	5.507	12	5.269
Purdue Univ - West Lafayette	69	2.422	69	2.191	71	1.894	77	2.004
Rice Univ	93	1.714	92	1.655	78	1.751	82	1.877
Rockefeller Univ	34	3.711	30	3.793	41	2.558	29	3.794
Rutgers State Univ - New Brunswick	58	2.688	60	2.417	75	1.793	47	2.771
Stanford Univ	4	7.998	3	7.74	10	5.467	2	7.677
Stockholm Univ	79	2.105	85	1.845	59	2.189	92	1.53
Swiss Fed Inst Tech - Zurich	23	4.728	21	4.476	17	3.723	27	3.986
Tech Univ Munich	65	2.477	68	2.206	29	3.160	67	2.221
Texas A&M Univ - Coll Station	84	2.021	77	2	93	0.894	78	1.984
Tohoku Univ	73	2.319	73	2.126	68	1.922	62	2.394
Tokyo Univ	14	5.588	16	4.905	15	3.769	14	5.159
Univ Arizona	48	3.019	45	2.786	91	1.101	42	2.97
Univ Basel	86	1.953	82	1.891	64	2.049	73	2.119
Univ Birmingham	92	1.755	93	1.613	66	1.973	89	1.602
Univ Bonn	88	1.897	81	1.899	77	1.751	90	1.575
Univ Bristol	56	2.735	53	2.635	81	1.654	59	2.525
Univ British Columbia	35	3.488	37	3.171	45	2.518	35	3.29
Univ California - Berkeley	2	8.366	2	7.876	3	6.793	4	7.663
Univ California - Davis	52	2.789	43	2.83	89	1.264	38	3.127
Univ California - Irvine	41	3.146	51	2.673	88	1.315	52	2.697
Univ California - Los Angeles	11	5.724	13	5.401	22	3.592	13	5.163
Univ California - San Diego	12	5.674	12	5.426	31	3.075	10	5.459
Univ California - San Francisco	19	5.181	17	4.859	61	2.137	15	5.109
Univ California - Santa Barbara	31	3.922	35	3.203	85	1.448	36	3.275
Univ Cambridge	6	7.411	6	7.143	2	7.818	6	7.066
Univ Chicago	16	5.476	14	5.219	7	5.839	16	5.039
Univ Coll London	20	4.941	20	4.648	24	3.532	23	4.252
Univ Colorado - Boulder	36	3.469	32	3.63	57	2.230	33	3.452
Univ Copenhagen	43	3.122	48	2.772	36	2.713	54	2.648
Univ Edinburgh	39	3.225	39	2.955	55	2.251	41	2.981
Univ Florida	68	2.438	65	2.275	60	2.152	57	2.618
Univ Goettingen	77	2.198	87	1.763	40	2.578	87	1.628
Univ Heidelberg	62	2.604	61	2.367	65	2.007	64	2.273
Univ Illinois - Urbana Champaign	26	4.277	27	3.938	21	3.634	30	3.713

Univ Leiden	74	2.305	80	1.958	62	2.095	74	2.076
Univ Manchester	42	3.123	40	2.953	39	2.608	46	2.813
Univ Maryland - Coll Park	40	3.179	41	2.885	48	2.488	40	2.999
Univ Melbourne	64	2.528	79	1.971	76	1.763	81	1.917
Univ Michigan - Ann Arbor	21	4.852	23	4.258	16	3.743	21	4.306
Univ Minnesota - Twin Cities	28	4.088	31	3.709	27	3.232	32	3.489
Univ Munich	47	3.02	52	2.639	33	2.922	50	2.716
Univ North Carolina - Chapel Hill	45	3.086	44	2.815	67	1.937	48	2.764
Univ Nottingham	89	1.87	89	1.712	82	1.646	84	1.684
Univ Oslo	85	1.96	75	2.022	52	2.279	83	1.829
Univ Oxford	8	6.144	9	5.786	8	5.551	9	5.654
Univ Paris 06	38	3.344	38	2.962	30	3.158	44	2.92
Univ Paris 11	53	2.781	55	2.586	32	2.950	66	2.246
Univ Pennsylvania	17	5.275	18	4.852	18	3.698	19	4.533
Univ Pittsburgh - Pittsburgh	59	2.679	57	2.521	53	2.279	56	2.623
Univ Rochester	72	2.33	78	1.994	49	2.470	70	2.204
Univ Sheffield	80	2.086	72	2.14	63	2.093	60	2.497
Univ Southern California	51	2.79	50	2.705	90	1.243	63	2.333
Univ Texas - Austin	44	3.096	47	2.78	58	2.193	51	2.714
Univ Texas Southwestern Med Center	50	2.875	49	2.761	51	2.393	39	3.123
Univ Toronto	24	4.57	28	3.858	26	3.242	22	4.305
Univ Utah	82	2.045	63	2.292	92	1.029	71	2.2
Univ Utrecht	46	3.062	42	2.877	38	2.653	43	2.938
Univ Washington - Seattle	15	5.544	15	4.987	25	3.433	17	4.824
Univ Wisconsin - Madison	22	4.738	22	4.422	14	3.937	20	4.459
Univ Zurich	49	2.965	46	2.785	72	1.837	55	2.648
Uppsala Univ	67	2.448	76	2.011	56	2.243	69	2.208
Vanderbilt Univ	66	2.466	54	2.596	54	2.252	53	2.662
Washington Univ - St. Louis	29	4.077	24	4.029	34	2.877	26	4.103
Yale Univ	9	6.135	8	5.913	11	4.896	8	5.914

As can be seen from Table 1, Harvard University tops the I-distance method list for all 4 years. The correlation between the ranks obtained by the I-distance method for 2007-2010 data is presented in Table 2. As we can see, the year 2007 has the lowest correlations, but still all of them are statistically significant ($p < 0.01$).

Table 2: Correlation between ranks 2007-2010

	Rank 2010	Rank 2009	Rank 2008	Rank 2007
Rank 2010	1			
Rank 2009	0.984**	1		
Rank 2008	0.961**	0.974**	1	
Rank 2007	0.711**	0.694**	0.670**	1

** $p < 0.01$

This data set has been further examined and the correlation coefficients of each variable with the I-distance values have been determined. This is crucial, as it provides information on how significant each of the six input variables is. The results shown in Table 3 demonstrate that the most significant variable for the calculated I-distance values for the 2007-2010 is Score on N&S. By all means this is the most important variable and thus it has to be awarded with the highest relative weight. Score on HiCi, Award, PCP and Alumni are almost equally important. It should be mentioned that in ARWU methodology Alumni and PCP are weighted with 10%, far less than other four variables (20%). Our result clearly indicates that

this must be corrected in following iterations of ARWU rankings. Finally, Score on PUB is the least important variable and thus it's 20% ARWU weighting factor must be dramatically reduced.

Table 3. The Correlation between Input Variables and I-distance Values for 2007-2010

	Correlations			
	I-distance 2010	I-distance 2009	I-distance 2008	I-distance 2007
Score on Award	0.828	0.788	0.840	0.749
Score on Alumni	0.808	0.706	0.948	0.678
Score on N&S	0.976	0.973	0.778	0.979
Score on HiCi	0.908	0.872	0.679	0.882
Score on PUB	0.604	0.651	0.508	0.679
Score on PCP	0.818	0.776	0.748	0.825

4. CONCLUSION

With a growing worldwide interest in university rankings, the academic world is becoming ever more concerned with the assessment of higher education. These rankings are very often used as a marketing tool for universities to show their educational or research excellence (Jeremic, et al., 2011a). This is precisely the reason why it is exceptionally important to provide rankings as accurate as possible. As a remedy to this issue, the analysis presented here has stressed potential weaknesses in the ARWU rankings in regard to the fact that changing the relative weight placed upon each of the six factors significantly alters the ranking. The I-distance method clearly has shown that certain variables are far more important than others for the ranking process. These findings should be incorporated into future research as being weight placed on each variable is crucial for the ranking process. With all of the evidence presented in this paper, it is essential to encourage the debate on how to determine criteria to best conduct and analyse universities' rankings (Leydesdorff & Shin, 2011). Furthermore, this could contribute to the emerging efforts to map regions of academic excellence and scientific output (Bornmann & Leydesdorff, 2011; Bornmann & Waltman, 2011).

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PROFESSOR AS A LEADER IN HIGHER EDUCATION AND HIS ETHICAL PROFILE

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Abstract: *Leadership is an important function of management which helps to maximize efficiency and to achieve organizational goals. Leadership and management are of great importance for the survival, development and progress in every field of human organizations and especially in education. The ideal situation would be the one in which management and leadership functions are in synergy. But given the specific system of higher education, this situation is impossible to be achieved. Therefore, the role and importance of a professor as a leader emerges to the fore. However, in the conditions of moral confusion in modern transitional societies, professors-unethical leaders also appear. The management institutions of higher education and their staff are faced with the task to quickly detect and eliminate cases of unethical behavior, and especially cases of unethical leadership. In this context, the authors of this paper made one more effort in the direction of pointing to moral deviant phenomena and their control in the higher education institutions.*

Keywords: management, teacher leadership, ethical leader, unethical leaders.

INTRODUCTION

The education system as a subsystem of a social system is a fundamental factor in the effective and permanent consumption of knowledge of the individual. In the educational process, a key factor for the quality of education is teaching staff which is responsible for their own development and transfer of knowledge to students. Today many factors globally affect the future of education, so that continuing education as a permanent activity sets new demands of society, educational institutions and individuals. Therefore, management education should focus on the application of knowledge to make relevant educational needs, and education should not only be focused on learning as a concept, but should include knowledge about the processes that need to initiate and to apply further development. Leadership, as a function of management, is a process of staff orientation, which influences and motivates them to implement the tasks and achieve goals of higher education institutions.

In modern terms of education there is great competition for getting a higher education institution which may recognize the leader that can engage and, by his influence, trying to maximize the performance of employees and in the same time, rationally to realize its goals. The leadership position of professor in higher education institutions are seen in the creation, organization and successful tasks realization. But the question is: How does the professor act as a leader in its modern environment in many complex situations that are imposed not only by institution, but also by the society.

MANAGEMENT AND LEADERSHIP

To manage means to lead, to run. Manager is a man who manages and leader is somebody who leads. But manager leads and leader manages. Regarding management and leadership, there is a difference, as evidenced by the very words with English translations, but also may not drawn strict limits. Management is seen as a process and describes the management of certain activities, enterprises or systems in order to achieve efficiently the objectives and it includes functions of planning, of organizing, leading and control. Management studies the management of such complex processes and phenomena related to the effective execution of specific tasks and jobs.

An interesting interpretation of the differences between management and leadership gives Maxwell, J., Saying that "the management is process which ensures the implementation of programs and goals of the organization, while leadership deals with creating a vision and motivating people. People do not want to be managed, they want to be guided". But both are necessary for the successful functioning of higher education institutions because there is a synergy between leadership and management. According to Kotelnikov, V., this synergy between leadership and management is reflected in empowerment, achievement, teamwork, innovation and effectiveness of expression.

SYNERGY BETWEEN MANAGEMENT AND LEADERSHIP ROLES		
LEADERS	RESULT OF SINERGY	MANAGERS
Provide vision	Empowerment	Provide resources
Pursue oportunities	Achievements	Reduce risks
Inspire	Teamwork	Coordinate
Lead improvisation	Jazz of Innovation	Providing structure
Do right things	Effectiveness	Do things right

Resource: http://1000advices.com/guru/leadership-management_synergy_vk.html

Regarding higher education institutions, management is always the bearer of authoritarianism, with the power of governments above him and with him, who manage organizations, systems, and who has a power of leadership based on expertise and knowledge that produce ideas and initiatives for progress and improvement of education.

In aim to promote higher education, progressive university institutions are investing in human resources, particularly in the teaching staff. Being a leader in higher education, the educational institution means to have high quality in education, because education is the key matter in creating the conditions and circumstances in which a man finds himself and shapes his personality for the whole life. During the education he pursues his desires, goals, but the realization of these goals is affected by various exogenous factors such as parents, schools, university, which set and guides the direction of the education of the individual. Every person during his life has some idols, or leaders.

There is very much literature written about leadership, so we can say that this term is meant primarily to influence the process of a particular group of people to achieve a particular goal and leader is person who efficiently realizes this process. If we start from Maxwell definition that "the key to success in any business lies in our ability to lead other people and If we form people with this ability, then we get a definition of leadership in higher education because the key to success in higher education institutions lies in the ability of professors who with their skills, knowledge, and personal example markedly affect behavior, thoughts and emotions of other people - his followers.

EDUCATION LEADER - ETHICAL, UNETHICAL

Ethics is the science of morality, and morality is an objective social phenomenon which regulates the behavior of members of a community and includes the regulation of interpersonal relationships with ethical (moral) standards, or putting it more simply-the relationships among people and relationships between individuals and other people in the society prescribed with certain rules and norms. The ethical morality step is required at any level and any subsystem of social organization, but especially and significantly in the field of education. Professor in higher education, his social position and his social role is an example of predisposed leader.

To become a „de facto“leader, his personality should adorn the moral qualities that will serve as role models for their students, which means to have authority. Authority is achieved by positive moral attitudes and qualities, as well as positive attitudes towards work. In this context, the professor is an ethical leader who has influence on ethical values and behavior that comply with social rules and norms, and rules and norms of the institution where he works. His positive attitude towards himself and his followers provides

opportunities for promotion, training and open to positive and negative feedback, recognizing of contributions of others, providing information and having moral standards that emphasize more the interests of groups, organizations and society.

Professors - ethical leaders have an inner vision of long-term goals of educational institutions. They are able to properly consider and choose the ways and means to achieve these goals. Also they are visionaries with a vision that reaches far into the future. Their effective communication with staff members and his followers affect motivation and lead them forward to achieve pre-planned and selected targets.

Leadership requires, above all, a unique and purposeful actions and achieving a unique and important role. This explains a curious paradox: leadership rarely comes only from power, instead it aims to create their own power. (Lester R. Bitell, 1997). Leadership implies an unequal distribution of power between leaders and followers. And followers have power because they can affect the activity of groups in different ways, but certainly the leader has more power than their followers.

Regarding unethical leaders, it must be said that they have the power, but they use their power for their own purposes. These are the people who control their followers and manipulate them, do what is best for themselves and not for the organization, provide only information that is favorable to them, and their moral standards are such that their own interests before the interests of all others. In the following table the differences between ethical and unethical leaders are given.

ETHICAL LEADER	UNETHICAL LEADER
Use power to serve the others.	They use power to dominate or manipulate others for personal gain.
Allow followers to contribute to the development of mission.	They are the only creators of vision, which is used to fulfill their personal goals
Engage in two-way communication and want to learn other people's views on key issues.	Engaged in one-way communication and are not open to others' suggestions.
They are open to feedback and willing to learn from criticism.	They have a pronounced ego, feel their attention and admiration of sycophants and avoid sincere feedbacks.
They want his followers to think and question the status quo, and that the views of leaders.	Do not want their followers to think, but just to uncritically accept the idea of leaders
They focus on training people they work with, to show them the believing in sharing credits with others.	They are insensitive and unresponsive to the needs and aspirations of followers
They follow personal principles that may be contrary to popular conceptions, and have three virtues: courage, sense of fairness or justice and integrity	They follow standards only if they meet their immediate interests, manipulate the impressions that other people thought that they act properly and use communication skills that led others to support their personal aspirations.

Resource: Chuck, W., Principles of Management, 2010

Education is a subsystem of a society system that undergoes a permanent change and innovation. In modern societies of the Balkan countries during the transition period created a serious situation of moral confusion. They leave the old moral values, without creation the news of it. During the pre-transitional time a person was evaluated and appreciated mostly by what he was and then by how much he had. Today the state of affairs is opposite. The man is evaluated by how much hi has, and after it, what he is. The race for money and power pushed people in the moral confusion, there is moral erosion, which leads to a moral deviance. Moral deviation in higher education can be divided into four groups: moral deviation of ruling itself, moral deviation by another person, moral deviation in relation to work and moral deviation of person in the narrow sense.

In this context, unethical leaders in higher education act manipulative with his colleagues and especially with students, they have a flippant approach to teaching, showing selfishness and selfishness which is

followed by calculations, speculations, careerism and corruption. The difference between ethical and unethical teachers is a "public secret". Their behavior is obvious to everyone and is usually expressed in the following moral deviations:

- exposure to the subject matter without a consistent concept,
- no accountability of the establishment and maintenance of interactivity with students,
- pushing and respect for uncritical students,
- pressure on the students to buy their books and additional literature,
- seeking sponsorships and other services from students,
- taking bribes from student for exam
- Abusing the position of teacher for sexual exploitation of students.

Thus, an unethical professor-leader is unfit to perform his profession. So he directly discredits higher education institution. These regressive and dysfunctional social processes entails the undermining of education as one of the most important and crucial public services. The question is: how to stand in the way of these deviant phenomena which leads to low-quality education and destroys the educational systems?

In this context, the following measures need to be introduced:

- Firstly, it is to intensify the management of higher education institutions, which must clearly and unambiguously struggle and make efforts towards promotion and support ethical behavior. Their speeches, promises, interviews and action should be constantly talking about the ethical values of the organization not only professors, but also, above all;
- second, the adoption of formal regulations (codes of ethics), the behavior of teaching staff, management and students in higher education institutions;
- giving a greater importance to the educational function of the teaching staff in relation to educational function;
- organizing seminars, round tables, debates, symposiums and other scientific forms of work which would be indicative of moral deviations in the work of teachers staff in the ways and methods of their elimination;
- public moral condemnation of the deviant behavior of professors and prohibition to carry out educational functions.

CONCLUSIONS

1. The key of success in higher education institutions lies in the quality of teaching staff. Seen from an ethical point of view, high-quality teachers is the one that has a high expertise and above all, high moral standards. These are the basic features which should be characterized by a teacher-leader in higher education. Management of higher education institutions need to recognize these teachers to work in favor and to engage a leadership that stimulates and motivates them to work in order to establish their leadership.

2. In contrast, the management and collective in the higher education institutions should openly condemn every morally deviant behavior of unethical leaders, and to take energetic measures for their elimination. Thus, the detection and sanctioning of unethical professor-leader is a long- term intellectual and academic contribution to the future of higher education and society in general.

3. In the elimination of morally deviant behavior a great significance have precisely defined rules and ethical principles. So the management of higher education institutions should work to define the acts of higher education institutions. First of all, one must adopt codes of ethics with clear and precise ethical standards. Then they should try to introduce the teaching staff and student with these standards and, finally, to be persistent to apply these standards in practice.

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ACADEMIC BURNOUT AMONG STUDENTS AT FACULTY OF ORGANIZATIONAL SCIENCES

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Abstract: *Burnout is a widely recognized syndrome of emotional exhaustion, depersonalization or cynicism and reduced personal accomplishment that occurs in a broad spectrum of occupations, and in students as well. The objective of this research was to investigate the risk of burnout among students and to analyze the relationship between gender and grade point average with three dimensions of burnout. Maslach Burnout Inventory – Student Survey, the most common instrument for measuring burnout, was used for this purpose as it was created and validated for student population. The research was conducted on a sample of 376 management and IT students in Serbia of the second to the final year of studies. The results show that 174 (46.3%) of the total sample of students are at risk of burnout, and 78 (20.7%) are at high risk of burnout. There is no significant correlation between gender and risk of burnout. There are higher percentages of students with low grade point average than students with high grade point average in both risk of burnout (54.4%) and high risk of burnout (26.6%) categories.*

Keywords: *risk of burnout, high risk of burnout, students, grade point average (GPA), Maslach Burnout Inventory – Student Survey (MBI – SS)*

1. INTRODUCTION

Burnout is a widely recognized term in theory and practice that caught the attention of researchers almost 40 years ago. First researchers in the field, Freudenberger (1975) and Maslach (1976), based their work on the assumption that burnout occurs due to interaction between providers and receivers in occupations providing services and care (Maslach, Schaufeli, & Leiter, 2001). Later research has shown that burnout relates to other professional activities and occupations as well (Leiter & Schaufeli, 1996). The concept has also been extended to undergraduate and graduate students since studying has some characteristics of a job and students experience pressures while fulfilling academic requirements (Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002).

Frequently used definition of burnout was offered by Maslach as “a psychological syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment” that occurs as a response to emotional and interpersonal stressors among individuals (Maslach & Goldberg, 1998). Burnout dimensions defined in such manner reflect the focus on occupations with extensive interactions with people, while slight term modifications - emotional exhaustion, cynicism (a distant attitude toward the job) and reduced professional efficiency, are more appropriate for other occupations (Maslach, Schaufeli, & Leiter, 2001). Emotional exhaustion is the first reaction to the stress of job demands and basic element of the syndrome. Exhausted individuals feel emotionally and physically drained up, and unable to recover. Depersonalization or cynicism reflects negative responses to work and people at work with cold and distant attitude. Final dimension, self evaluation component of burnout – reduced professional efficacy, is a state of ineffectiveness and loss of confidence in own abilities (Maslach & Leiter, 1997, pp. 17-18). All three dimensions respectively correspond to level of energy (e.g. feeling used up), attitude (e.g. being cynical), and self-evaluation (e.g. doubting personal abilities) (Schaufeli, 2003). Burnout dimensions are defined in the same manner for student population and they refer to feeling exhausted because of study demands, having a cynical and detached attitude toward studies, and feeling incompetent and inefficient as a student (Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002). Moneta conducted a study in which he explored the links between need for achievement, burnout, and intention to leave one's study program in undergraduate university students and concluded that burnout in educational settings has similar characteristics to those it has in occupational settings (Moneta, 2011).

The first scale for burnout - Maslach Burnout Inventory (MBI) - Human Service Survey was developed for a wide range of human service professionals (Maslach & Jackson, 1981). Evolution in burnout research

across different areas brought changes in the widely used scale and development of several modifications: MBI – Educators Survey (for workers in educational occupations), MBI - General Survey (for workers in occupations that are not entirely people-oriented) and MBI - Student Survey (for undergraduate and graduate students). The construct validity of MBI-SS has been acknowledged by previous researchers (Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002; Schaufeli & Salanova, 2007; Campos, Zucoloto, Bonafe, Jordani, & Maroco, 2011) and the criteria they used to validate the construct was the confirmatory factor analysis. Coefficients of internal consistency (Cronbach's alphas) have values above 0.70, signifying internal consistency, according to Schaufeli et al (2002). In these, previously mentioned research, MBI-SS was validated for following languages: English, Dutch, Spanish and Portuguese. Hu and Shaufeli validated Chinese (Hu & Shaufeli, 2009) version and Shin et al. verified that MBI-SS is appropriate for application on Korean students (Shin, Puig, Lee, Lee, & Lee, 2011).

A lot of studies of student burnout were conducted in the past. Perceived stress was positively correlated with all burnout dimensions (Divaris, Polychronopoulou, Taoufik, Katsaros, & Eliades, 2012). One of the studies investigated the association between gender and burnout subscales where the results showed that the risk of burnout is increasing with the year of study and that there is no significant correlation between gender and any of the subscales of burnout (Galán, Sanmartín, Polo, & Giner, 2011). Results of Adie & Wakefield (2011) suggested that burnout symptoms among students can be reduced by introducing autonomy supportive behaviors in order to facilitate engagement (Adie & Wakefield, 2011). To our knowledge, there were only few studies conducted in Serbia in the field of burnout. Most of them investigated risk of burnout in certain occupations: food industry (Arandelović, Ilić, & Jović, 2010), medical staff (Čurčić & Čurčić, 2009) and military (Dedić, 2005). There was only one study on a student population, with the aim to identify factors that might be associated with health related quality of life, including relationship with depression. Researchers concluded that among the factors that significantly influenced quality of life, depression was the most prominent (Pekmezovic, Popovic, Tepavcevic Kisic, Gazibara, & Paunic, 2011). With respect to previous research and shortage of scientific data for Serbia, the authors of this paper decided to explore three dimensions of burnout on a sample of management and IT students at Faculty of Organizational Sciences, using the MBI–SS construct and analyze the relationship between grade point average and gender with different burnout scales.

2. METHOD

Participants in this survey were 402 management and IT students from Faculty of Organizational Sciences, University of Belgrade in Serbia. Participation was voluntary and students were asked to fill the survey and provide socio-demographic and other characteristics of participants. Each student was assigned numerical code in order to ensure anonymity. From these students, 26 of them did not answer the entire questionnaire and were removed from the study. Convenient final sample of 376 students (93% response rate) consisted from equally distributed students of second to final year of studies. There were 159 male and 217 female participants.

Maslach Burnout Inventory – Student Survey was used for this purpose as it is most widely used construct for assessing burnout. The construct consists of 15 items that represent three scales: exhaustion (5 items), cynicism (4 items), and professional efficacy (6 items). Individual items are scored on a 7-point frequency rating scale ranging from 0 (never) to 6 (always) and students were asked to indicate how often they felt in a certain way (e.g. for exhaustion: "Studying or attending a class is really a strain for me"; for cynicism: "I doubt the significance of my academics"; and for professional efficacy: "I feel stimulated when I achieve my academic goals"). Questionnaires were distributed to participants during the winter term of 2011/12 academic year at the end of lectures. They were informed about the aim of the study, but were not given any particular details. The researchers were not present in the classrooms at the time of filling the questionnaires and they collected them after completion.

Reliability of MBI–SS was estimated through Cronbach alpha coefficient for internal consistency for all three dimensions of burnout. The coefficients were $\alpha=0.814$ for exhaustion, $\alpha=0.868$ for cynicism and $\alpha=0.773$ for efficacy. Since internal reliability is assumed for correlation coefficients greater than 0.7 (Cronbach, 1951), the results point out to a good internal consistency. Descriptive statistics was used to analyze the data (mean scores - M and standard deviation - SD). Afterwards, chi square test was used to identify differences in gender and GPA on the three dimensions of burnout and independence sample t-test was used to determine differences between two group means. Statistical significant results were assumed for $p<0.05$. SPSS version 20.0 was used for all analysis.

3. RESULTS AND DISCUSSION

The mean scores and standard deviation for three dimensions were calculated and they were 2.50 (1.08) for exhaustion, 1.05 (0.97) for cynicism and 3.92 (1.06) for professional efficacy. Scores for each subscale were organized in three groups: low, average and high, according to lower, medium and upper quartile of the score distribution (Galán, Sanmartín, Polo, & Giner, 2011). Therefore, lower and upper quartiles of all dimensions are: low exhaustion ≤ 1.83 , high exhaustion ≥ 3.17 ; low cynicism ≤ 0.33 , high cynicism ≥ 1.67 ; low efficacy ≤ 3.21 , high efficacy ≥ 4.67 . Our research defines burnout as a result of exhaustion, cynicism and efficacy, where high scores on exhaustion and cynicism and low scores on professional efficacy point towards student burnout.

Most researchers (Galán, Sanmartín, Polo, & Giner, 2011; Willcock, Daly, Tennant, & Allard, 2004; Santen, Holt, Kemp, & Hemphill, 2010) identified the existence of burnout risk through at least one subscale of burnout as a sufficient indicator. Taking into consideration Schaufeli et al. (2002), risk of burnout exists when there is a high score on emotional exhaustion or high score on cynicism or low score on efficacy, meaning that high or low score on one dimension is sufficient indicator for risk of burnout. (Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002). Furthermore, we wanted to identify students with high risk of burnout, and we formed an indicator for high risk of burnout. High risk of burnout represents high scores on emotional exhaustion and high scores on cynicism; or high scores on emotional exhaustion and low scores on efficacy; or high scores on cynicism and low scores on efficacy; or high scores on emotional exhaustion and high scores on cynicism and low scores on efficacy. Therefore, students were grouped into those with risk of burnout (with high/low scores on only one burnout dimension) and those with high risk of burnout (with high/low scores in two or three burnout dimensions).

Table 1 shows that 88 (23.4%) students had high score in exhaustion, 83 (22.1%) had high score in cynicism and 94 (25%) had low score in efficacy. Also, table 1 illustrates that 174 (46.3%) of total sample of students are at risk of burnout, and 78 (20.7%) are at high risk of burnout. There are no data regarding acceptable levels for risk of burnout, but it can be concluded that 46.3% is extremely high percentage, according to which almost every other student is at risk of burnout.

Table 1: Burnout dimensions and number of students at risk of burnout

Subscales	Students	
	Number	%
Exhaustion		
Low	106	28.2
Moderate	182	48.4
High	88	23.4
Cynicism		
Low	125	33.2
Moderate	168	44.7
High	83	22.1
Efficacy		
Low	94	25.0
Moderate	189	50.3
High	93	24.7
Risk of burnout^a	174	46.3
High risk of burnout^b	78	20.7

^a Burnout - high score on emotional exhaustion or high score on cynicism or low score on efficacy

^b Burnout - high score on emotional exhaustion and high score on cynicism; or high score on emotional exhaustion and low score on efficacy; or high score on cynicism and low score on efficacy; or high score on emotional exhaustion and high score cynicism and low score on efficacy

Table 2 shows that 34 (21.4%) out of 88 students who had high score in exhaustion were male and 54 (24.9%) were female. 42 (26.4%) out of 83 students who had high score in cynicism were male and 41 (18.9%) were female. There is no significant difference on a burnout subscale of exhaustion between genders neither in total sample nor in the high scored group. There are significant differences between gender on a cynicism and efficacy subscale. It is interesting that there are no differences between male and female students in a group of students with high risk of burnout.

Previous research showed conflicting results. Some of them showed that there is no significant correlation between gender and any of the subscales of burnout. (Galán, Sanmartín, Polo, & Giner, 2011; Bresó, Salanova, & Schaufeli, 2007). Others showed that there is a difference between genders on a different subscales of burnout (Willcock, Daly, Tennant, & Allard, 2004; Yang, 2004; Weckwerth & Flynn, 2006). Therefore the consensus of researchers on this issue does not exist.

Table 2: Differences in risk of burnout between male and female students

Subscales	Students		p
	Male	Female	
Exhaustion			
Mean (SD)	2.46 (1.06)	2.58 (1.10)	0.487
High score, no (%)	34 (21.4%)	54 (24.9%)	0.554
Cynicism			
Mean (SD)	1.22 (1.02)	0.93 (0.92)	0.004
High score, no (%)	42 (26.4%)	41 (18.9%)	0.004
Efficacy			
Mean (SD)	3.77 (1.11)	4.04 (1.01)	0.018
Low score, no (%)	51 (32.9%)	43 (19.8%)	0.025
Risk of burnout	81 (50.9%)	93 (42.9%)	0.120
High risk of burnout	37 (23.3%)	41 (18.9%)	0.301

For the purposes of this research, we defined low GPA as a grade below 8.00 and high GPA as grades 8.01 or higher (Lowest grade a student can get for passing the exam in Serbia is 6 and highest grade is 10). Table 3 shows that 38 (22.5%) out of 88 students who had high score in exhaustion had a low GPA and 50 (24.2%) had high GPA. 46 (27.2%) out of 83 students who had high score in cynicism had a low GPA and 37 (17.9%) had high GPA. 61 (36.1%) out of 94 students who had low score in efficacy and low GPA and 33 (15.9%) had high GPA. There is no significant difference on a burnout subscale of exhaustion between students with low or high GPA. There is a significant difference between students with low and high GPAs on a cynicism and efficacy subscales. Especially important is the influence of efficiency on a students' GPA for the total sample.

In some of the previous research authors found that students who had highest GPA scores and positive self-esteem didn't experience burnout (Jayoung, Puig, Kim, Shin, Lee, & Lee, 2010). In another research where MBI construct was used, GPA was significantly correlated with emotional exhaustion but not with depersonalization or personal accomplishment (Jacobs & Dodd, 2003). Considering the risk of burnout, it is shown that 54.4% of students with low GPA are at risk of burnout and 26.6% are at high risk of burnout. There is a significant influence of GPA on a risk of burnout and on high risk of burnout.

Table 3: Differences in risk of burnout between students with low and high GPA

Subscales	Students		p
	Low GPA	High GPA	
Exhaustion			
Mean (SD)	2.43 (1.13)	2.56 (1.04)	0.241
High score, no (%)	38 (22.5%)	50 (24.2%)	0.736
Cynicism			
Mean (SD)	1.17 (1.02)	0.96 (0.92)	0.032
High score, no (%)	46 (27.2%)	37 (17.9%)	0.05
Efficacy			
Mean (SD)	3.63 (1.04)	4.16 (1.01)	0.0001
Low score, no (%)	61 (36.1%)	33 (15.9%)	0.011
Risk of burnout	92 (54.4%)	82 (39.6%)	0.004
High risk of burnout	45 (26.6%)	33 (15.9%)	0.011

Detailed examinations of student GPAs found that students in risk of burnout have GPA of 8.11 and those that are not at risk have a GPA of 8.35. Therefore, there is a significant difference in GPAs between two groups of students ($t(374) = 2, 385, p = 0,005$). GPA of students with high risk of burnout is 8.04, while

those who are not in this group have a GPA of 8.29. There is a significant difference between these two groups as well ($t(374) = 2, 426, p = 0.016$).

4. CONCLUSIONS AND FUTURE RESEARCH

Main results from this study show that risk of burnout is widespread in management and IT students in Serbia. Almost 50% of participants are at risk and over 20% of them are at high risk of burnout. There were no differences found between genders. Grade point average was found to be important predictor of risk of burnout.

Data on several other demographic and other characteristics of students were gathered in the course of this research. Some of them were not considered in this paper, but might be significant for risk of burnout in student population. Therefore, authors of this paper will include current year of studies, field of studying (management or IT), source of financing (government budget or self-financing), employment status (unemployed, part-time workers and full-time workers), hometown, and amount of time dedicated to learning activities and class attendance in their future research. Since we concluded there is a significant difference in risk of burnout between students with high and low GPAs, it might be interesting to analyze the relationship between GPA and some other characteristic of students. Likewise it would be useful to conduct a national study on risk of burnout using the entire student population in Serbia, and not just management and IT students at Faculty of Organizational Sciences.

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DEBATE – METHOD OF LECTURING AT UNIVERSITY

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Abstract: Lecturers at the University of Belgrade, Faculty of Organizational Sciences seek to improve the teaching methods they use. This paper examines what set of skills is required in contemporary tuition and how debating skills correlate to them. It also analyzes current methods and paradigms used in tuition to expose the shortcomings of the contemporary approach to the development of tomorrow's workers.

Debating concept fundamentals, basic guidelines on logic and critical thinking are provided in this paper. We explain different formats that may be implemented. Also, comprehensive guidelines are given to lecturers in order to find debatable topics, research and organize discussion. We also include a debating manual in order to help students cope with challenges while performing a debate speech.

This paper seeks to empirically prove that debate advances students themselves, improves their engagement with the topics they encounter in the lectures, develops skills necessary in their future employment, increases their understanding of presented materials and enables the students to analyze the information in a more advanced way. For this purpose, initial research was conducted with students of the University of Belgrade, Faculty of Organizational Sciences. This research examines the differences between the previously described characteristics of students who have participated in the debates, those who have only listened to the debates and those who haven't attended the class when the debates happened. A brief summary of relevant international research in this field is provided.

This paper also provides a framework for further research that was planned to take place over the period of two years, encompassing current debaters, ex-debaters and students new to debate from the entire University and tracking their patterns of thought, their academic and professional success, skill development and overall progress. This framework was formulated in cooperation with The Association of Psychologists of Serbia.

The authors of this paper are aiming to prove that debating is a superior method of teaching, to provide a methodology for the introduction of debating in tuition, to explain the very basics of debate to students, and to provide a platform from which further research and activities are to be done in advancing towards all the previous goals.

Keywords: privacy, policy, social, networks, research, comparison

1. SHORTCOMINGS OF METHODS OF EDUCATION USED TODAY

When we talk about why it is necessary to improve the system of higher education in Serbia, one of the main often stated reasons is the inefficiency of this system. The proof of this claim lies in the fact that the average duration of the study is almost two times longer than it should be (Ministry of Education and Sport, 2005). In addition, about two-thirds of the students give up entirely on the studies: each year, on average, 33,000 students are enrolled, and only 12,000 graduates (Ministry of Education and Sport, 2003).

The roots of inefficiency in the system of education are very complex, and there is a significant, although unexplored, the impact of various "external" factors: socioeconomic status of students, the general state of society (in economic and social terms), the problems carried over from previous education (mainly secondary) and so on. However, the inefficiency of higher education is partly determined also by the "internal" factors, related to the organization of studies, the regime of the studies, insufficient compliance of curriculums with the exam criteria, the number and volume of study subjects, the mutual compatibility of

study subjects within the same study program, number of students and their readiness to follow the lessons, the number of teachers and their qualifications for teaching, and so on.

Part of these problems should have been solved by adequate implementation of the Law on Higher Education, which entered into force in September 2005, since it envisaged the change of the regime of studies, introduction of the ECTS credits, as well as the definition of the learning outcomes, which was supposed to change the very essence of the current system of education.

Misunderstanding of the essence of the educational process is reflected in the following:

- The teaching methods, within which the *ex cathedra* method is predominant;
- The focus is on the activity of teachers and not on the activity of students;
- The pressure both on teachers and on students is primarily to formally cover the study materials and not to "learn something";
- Often mismatch between what is taught in class and what is asked on the exam;
- Exams are performed in a limited number of ways – periodic tests, written or oral exams conducted through testing, resolving of assignments or oral / written reply to a combination of pre-designed questions - and therefore testing only a limited set of acquired competencies⁴

It is significant to note that, during their education, better part of the students will not acquire, among other things, required practical experience (i.e. how to apply the acquired knowledge in practice). There are only few cases in which the needs of the labor market and consultations with employers are considered during the creation of study programs. In addition, only few of the higher education institutions keep records of employment of its graduates.

Considerable uniformity in terms of teaching methods can also be detected. On most of the study programs, (i.e. in the vast majority of the classes), the only teaching method is *ex cathedra*. Too little room is left for discussion with students, and in the number of cases even for the students' questions related to clarifying the content of lectures. If the goal of higher education is merely for students to develop the ability for sitting and listening, with the eventual development of the ability to keep the notes, then the *ex cathedra* method is the right solution. However, it is impossible for students to develop various skills and abilities by using only one teaching method.

Learning outcomes are the essential element of the curriculum, but their formulation in practice is often reduced to mere satisfaction of forms prescribed by the Bologna Process or by the Law on Higher Education (Verheyde, 2006). However, learning outcomes harbor the potential for a fundamental change in the educational process. Such potential of the learning outcomes stems primarily from a new philosophy of education, which involves changing the focus of education from the process of lecturing / classes to the learning process.

If we agree with the fact that the student and the learning process (rather than the process of teaching) are in the focus of education and curriculum development, the first step in the development of a new kind of curriculum is a departure from the final outcome, i.e. from defining the competencies that a student should possess upon completion of the study program. And here we encounter a problem related to the very notion of competence. The term competencies usually include knowledge, skills and abilities that a person acquires or develops, and which are enabling that person to do something. Educational system in which the focus is on the student *inter alia* aims to provide that students are competent at the end of the educational process, i.e. that students will have certain knowledge, skills and abilities. Competencies in this sense represent a dynamic combination of knowledge and its application, attitudes and responsibilities that reflect the results of educational program.

There are different divisions of competencies. Below are divisions emerged within the Tuning project, with this division primarily dividing the competencies on general (or generic) and professional:

⁴ In accordance with the EU methodology, during 2005 and 2006 the Center for Education Policy AAEN carried out the regional Tuning project related to social and humanistic sciences, entitled "Regional alignment of curriculums - towards the European area of Higher Education."

- Generic competencies should be obtained by ones who finish a certain level of education regardless of science or industry you are dealing with (such as foreign language skills, knowledge application in practice, computer literacy)
- Subject specific competencies are identified for each subject or field of study and they are more specific.

The Tuning project defines three groups of generic competencies - instrumental, interpersonal and systemic. Instrumental competences, among others, include the ability to analyze and synthesize (Gonzales, 2005).

If, for example, the transitional nature of society and recent history of the region are taken into account, the competencies such as social responsibility and critical thinking and reading (developed through the debate as a teaching method) can also be considered as important.

A particular challenge in this regard is the change in attitude and mindset. This change is often considered as “mission impossible”, because the existing attitudes and mindsets are being developed over the long period of time, during which the system of higher education did not change in response to changes in the environment, or did change in a way that it was more isolated from the same environment. What is important to emphasize here is that a change in mindset and approach to higher education as such (as by the academic community and by the students, employers and society as a whole) can come only through broader change in the understanding of the role of education in general. In this context, it is a debate that allows the change in thinking and attitude towards all processes in the society – educational, political, social, economic and other.

2. CHALLENGES FACING EDUCATION TODAY

Information age has reshaped our society, changed the way we acquire information and changed the labour market in the span of a decade. The workplaces we are preparing our students to fill come with a broadband connection, and data has become the realm of hard drives, not humans. Workers are no longer asked to know everything, but to know how to find out quickly. These changes came about through couple of trends brought by the information age, we will examine a few.

Information overload. It is said that more information can be found on the pages of the NY Times than what was available to an average 19th century person during their whole lifetime. The amount of data available on the web is increasing exponentially. As with every information explosion, problems of managing all the new data arise. This means two things:

1. Workers are more productive if they know how to find good information quickly, then if you specialize them they will find out all the information on their own.
2. Once a worker is delegated to find out certain information, it is lucrative for him/her to know how to filter, organize and present that information to others.

The job of University professors is to prepare their students to be as productive and valuable as possible, hence the need to include education in developing these skills.

Persuasion science has advanced to the point where we are bombarded with messages trying to influence us into doing something. Marketing agencies try to sell us their products, paid experts try to convince us into their points of view, trained negotiators try to bully us into concessions at the negotiating table. This trend calls for several things:

1. Critical thinking is beneficial in the workplace. Critical thinkers will represent the company's interests better against competing interests.
2. Persuasion methods are beneficial once the tables turn, as the worker is able to acquire more concessions than the others can.
3. In everyday life, students versed in persuasion skills will be able to see through companies and people trying to influence them, and to preserve their own interests better.

Globalization has brought companies and workers on different continents under the influence of the same forces. The sub-prime mortgage loans bubble in America, and the global economic crisis that

followed it in 2008 are proof of this. This trend brings into light more qualities as beneficial to a today's worker:

1. Knowledge of the world problems, which provides opportunity to foresee those problems spreading locally, and then act accordingly, and
2. Communicating with members of drastically different cultures in a super-cultural context, which enables workers to understand and be understood when cooperating with companies from other cultural frameworks.

New media is quickly replacing the old as the provider of the information. Google, blogs, websites and wikis become the go-to places where people find information. However, most of this new media is agenda driven, not accountable. The trend has become so prevalent that some old media, such as television channels and some newspapers, are abandoning the mantra of objectivity and fact checking, for agenda pushing. Agenda driven media can continue to exist as long as there is no objective confrontation of conflicting agendas to the viewer. As that never happens, it is left to the viewer to cut through the agenda driven propaganda into the core of the issue, whether it is a citizen trying to vote, or an investor trying to find a suitable investment (Snider, 2011)

3. HOW DOES DEBATING AS A TEACHING METHOD RISE TO THE CHALLENGES OF TODAY'S EDUCATION?

Participation in academic debating creates numerous benefits for the students. Some of them we will outline here, as they respond to the exact requirements posed by the previous chapter.

Data analysis is an essential debating tool. Debaters must learn how to find the relevant information on the topic when they're researching possible motions for a tournament, analyze and save or remember their results. After debating for some time, debaters collect a lot of information, but they will always encounter new topics, where they will have to quickly utilize the data they know in a new problem.

Presentation of knowledge is required from debaters in a limited time frame. Debaters learn how to present vast amounts of knowledge briefly, effectively and to the point.

Critical thinking is forced onto debaters, and debaters quickly adopt it. Sides are randomly assigned in a debate, therefore debaters must know how to argue, analyze and assess opposing sides of any argument.

Knowledge of the world problems is necessary in the international debating scene, as the topics must be drawn from a pool of issues which are equally important to all the countries which are participating.

Finding the right information is important because facts count in debate. Most global debates have competing schools of thought, often with competing information. Debaters need to know how to weigh authorities, how to compare sources and spot when information is biased.

Intercultural communication is developed and trained in debate, as judges come from different cultural backgrounds, as well as the opposition teams. That means debaters train to be understood, as well as to understand.

Persuasion is a peripheral skill for debaters. In theory debates should be judged by completely objective judges. As this cannot be the case, advance debating classes cover persuasion methods as a manner of gaining that last bit of competitive edge (Snider, 2011).

4. OUTCOMES OF TEACHING THROUGH DEBATING AS A TEACHING METHOD IN UNIVERSITIES

4.1 International research

After properly defining the outcomes of learning, it is necessary to approach the development of methods of teaching and grading that will enable the fulfillment of those outcomes. Achieving well defined outcomes of learning involves students understanding the teaching as a process in which they question their understanding of concepts and processes and/or create new concepts and understand connections

between them. To make this possible, it is necessary for the lecturer's goal to be more than going over matter, but to accomplish "interactive" teaching, through debating to the topic which is planned to be taught by the curriculum. This chapter highlights the results of research that confirms the importance of introducing debate as a teaching method.

Heads of Urban Debating League in Minnesota found that students who have practiced debate had 36% better results in reading tests than before they had debate training, in addition to showing faster progress than the control group. All the debaters showed increased interest in the curriculum. 87 % of debaters analyzed information better than the control group. Joe Bellon (Bellon, 2000) explains the positive influence of debate training on academic performance was confirmed by Barfield (Barfield, 1989) who found significant increases in cumulative GPAs with students who had debate training. Debaters will also be favoured in certain professions, as proved for jobs in civil service by Pollock (Pollock, 1982), in the legal field by Church (Church, 1975), and educational administrators by Schroeder and Schroeder (Schroeder, 1995). Colbert and Biggers conclude that debate experience is highly valued in the business world and they find unequivocally that debate training will help students get a job.

Debate training requires application of knowledge from a wide array of social sciences, and this is why Robinson in 1956 describes debate as "introduction into social sciences" (Bellon, 2000). In addition to this, Semlak and Shields (Shields, 1997) determined that debaters are significantly better at analysis, delivery and organization of content.

One of the best researched benefits correlated to debate training is critical thinking. Students with debate training are significantly ahead of control group in regards to critical thinking scores (Brembeck, 1949). Colbert and Barfield confirm these conclusions in 1987. These studies were disputed on several grounds, so Allan et al. started a study to remedy the shortcomings. In 1995 they proved that students with debate participation were ahead of the group who listened to lectures on argumentation. A meta-analysis of studies in 1999 proved further the link between communication skills and critical thinking.

People with good communication skills are rated more highly by their peers, as was proved by Pollock (Pollock, 1982). Pollock also makes the connection of forensic activities with developing communication skills, as do Colbert and Biggers (Biggers, 1985) who conclude that debate training improves communication skills, as well as the skill of public speech.

High verbal skills are correlated with decrease in physical aggression by Boone and Montare (Bellon, 2000).

Once someone feels capable of responding verbally they feel less inclined to resort to physical force. On top of that debaters learn to respect the opposite side, because of protocol and because they might be in their spot in the next tournament. Debate training increases argumentativeness without increasing verbal aggression (Colbert, 1994).

Best learning happens when students are asked to organize information and think of alternatives, which is exactly what debating is about. In order to learn, students need to be immersed into an interactive experience that must be rich and real, there must be a personally relevant challenge, and there must be intense analysis in order to present the student with other options and approaches (Caine, 1991). Recommendations of Caine and Caine correlate to debate perfectly: interactive experience is provided through competition with fellow students, even if the grading system doesn't provide a challenge to the student, personal motivation to compete with peers does, and judge's feedback provides exactly the kind of analysis Caine and Caine call for.

In summation we can conclude that debating as a teaching method is supported by scholars who have researched effects of debating training on students, and the scholars who have researched the process of teaching recommend actions that debating fulfils (Bellon, 2000).

4.2. Research at the Faculty of Organizational Sciences

Students of the third year of the Faculty of organizational sciences, majoring Informational Technologies, can choose debating as an activity at their course of Legal Basis for Informational systems. They are introduced to debating for the first time ever in their schooling. They undergo a week of training by the

debaters in the faculty's debate club. The topic is given in advance, and they are prepared for that particular topic.

The goal of the research was to determine whether this method of teaching was successful. In order to measure successfulness certain criteria was set, some of which were how much knowledge of facts in regards to the topic the students attained, how do students cope with opposing opinions, how do they rate their knowledge of the topic, in which degree they felt interested in the topic, how skillful were they in argumenting their positions, and whether they supported this method of teaching.

Legal Basis for informational Systems is taken by some 180 students and they were the sample of the research. These were divided into three groups: **participants** in the debate, **audience** of the debate, and those who **did not attend** the debate. The research set out to determine differences in the quality of the way the topic in question was conveyed to students, through the criteria mentioned above.

Students were distributed a 12 question anonymous questionnaire on the classes that followed the debate. 120 students attended those classes, 60% of which did not attend, 36% were the audience and 4% were the participants in the debate. Debate in question was nationalization of the national telecommunication company.

Students supported debate as a teaching method. 80% of those who participated stated they gained something through debating, of which 60% could explain what it was they thought they gained. The remaining 20% did not have an attitude towards this question. Among the audience only 8% felt they've lost something, and among those were the ones who claimed they lost their time. No students felt disadvantaged because the topic wasn't covered in the traditional teaching method, and 68% claimed they gained something in debate. Those who could explain what they gained mostly claimed it was information on the topic. Majority of those who did not attend did not have a stance, but slightly more (6%) of them said they lamented the fact they did not attend the debate.

Students were asked to say whether they are for or against the sale of the company which was the topic of the debate, and then asked to explain why. Later in the text, the same mechanism was used again with a different issue that was discussed in the debate. Participants did significantly better than the other two groups, on average some 2 points out of 12 ahead of the other groups. The audience and those who did not attend were on par, differentiating only by a couple of tenths of a point per question. This signaled the need to introduce ways of including the audience into a more active role in the debates.

Even though the audience was no better than those who did not attend at explaining their stances, it did not stop them from rating their competence in the issue 0.7 points out of 12 higher on average than those who did not attend. Participants in the debate were even more self confident, on average rating themselves as a whole 4 points out of 12 more competent in the issue than the audience. This signified that debating as a method seemed understandable to students, even though, as we concluded previously they did not engage enough to actually advance their knowledge as audience.

We've discussed that one of proven benefits of debating is learning how to deal with opposing opinions. This research suggests that this trait needs to be nurtured over time, as the participants did not do better than the other group when it comes to displaying aggression towards people with different attitudes. Key group we identified as the problematic in this research were those students who, when asked what they think of those with different stances on the issue, and why might they think differently, replied in an insulting, derogatory manner, and attributed malicious attributes to the people who have opposing stances, not being able to imagine that someone might have a good reason to think differently than them. This group was 15% of those who did not attend, 9% of the audience, and 20% of the participants. The group was reshaped the most over the three categories of students was the group that said they had no interest in people who thought differently, nonexistent in the participants, but larger in the audience than those who did not attend. It seems that, once confronted with people who advocate a view opposed to theirs large portion of those who otherwise would not reply to this question skipped into stating "they don't care about those people category", however this cannot be proven by this research. What we can conclude is that there is no immediate benefit of debating when it comes to confronting people who think opposite to one self.

5. FUTURE GOALS

If there is one thing people who are involved in academic debate love, whether they're judges, debaters, or professors, it's to talk about how transformative experience debate is. Sharing enthusiasm among friends is not enough, and we must seek scientific proof in order to gain backing to introduce institutionalize debate in universities. Research on the Faculty of Organizational Sciences has shown that there are some benefits from introducing even a week of debate training into students curriculum. Further research needs to prove that constant debate training yields even greater benefits and mandates introduction of debate, either across the curriculum, or as an elective.

No research to date suggests what would be the optimal time frame for developing debating skills in an academic setting. It is suggested that debating should be an overreaching method for the entire curriculum, others suggest electives. These two should be rivaled. Comparisons with other methods of teaching should be made. Long term development of students who start debating in earlier years of studies should be researched in comparison to students of same faculties who don't pick up debate. There is no scientific evidence on how well debaters do once they begin their professional carriers, except for anecdotal evidence. The more information we obtain on these issues, the more compelling the case for introduction of debate into universities becomes.

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TEACHING ENGLISH AT A TERTIARY LEVEL IN EUROPE AND SERBIA – AN OVERVIEW AND COMPARISON

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Abstract: *The paper discusses and compares the current state of foreign (particularly English) language teaching at tertiary level education in the European Union and in our country, points to the similarities and differences between them, and draws our attention to some benefits, drawbacks, and problems. Comparison is made between teaching methodologies and approaches, numbers of contact hours and credits gained, and other relevant criteria. Several strategic documents issued by the EU and the European Commission are also mentioned in terms of their relevance for the issue in hand. The authors conclude by giving recommendations about possible ways of introducing innovations and thus improving foreign language teaching at Belgrade University based on the EU model, with the aim of increasing our students' chances of mobility and employment in an international environment.*

Keywords: *English for Special Purposes, Business English, Content and Language Integrated Learning, English for Academic Purposes, tertiary level education, EU language policies, language*

1. INTRODUCTION

One of the most important traits the European Union prides itself on is its multilingualism, as it brings the benefits of cultural, economic and social richness of the continent. With the aim of promoting language diversity, the European Union and the European Commission have issued a number of documents that point to the importance of language learning for improving the relationship and facilitating communication between EU member countries. The documents also emphasize the effects of shortages of foreign language skills on economy, and give a number of recommendations, including the strengthening of foreign language education at all levels, diversifying the range of languages taught and encouraging mobility, especially in tertiary level education. (http://ec.europa.eu/languages/documents/elan-sum_en.pdf).

Another important issue dealt with at the European Union is the consolidation of educational systems of its member countries, and the application of new, common educational policies and programs. Projects such as Erasmus (since 1987) and Tempus (since 1990), both established by the European Commission, aim at developing partnership between European universities and modernizing teaching methodologies and curricula and promoting student mobility, and in such a way indirectly promote multiculturalism, multilingualism and foreign language learning. In order to further enhance cooperation between European universities, EU Commission adopted a common European model of higher education that led to the signing of the Bologna declaration by 29 European countries (including our own) that pledged to reform and coordinate their educational systems to ensure global competitiveness of European universities (<http://ec.europa.eu/education/policies/educ/bologna/bologna.pdf>). Even though the Bologna declaration does not explicitly mention the importance of language learning (Fortanet – Gomez & Raisanen, 2008), the knowledge of languages is implicit in some of its main objectives, such as the mobility of students and teachers. Another document issued by the European Commission, entitled “Promoting Learning and Linguistic Diversity: An Action Plan 2004 – 2006”, urged universities to play a key role in promoting multilingualism (Fortanet – Gomez & Raisanen, 2008) and encouraged projects devoted to increasing language learning among first-cycle higher education students, one of which refers to the use of foreign languages as mediums of instruction, which is to be discussed later.

The fact that English is the most commonly learnt foreign language at European schools and universities does not surprise, having in mind that it has established itself as the language of science, technology and business over the past few decades. English taught at European universities has become increasingly specialized to cater to the specific situations and purposes (Fortanet – Gomez & Raisanen, 2008);

therefore, most of it belongs to the category of English for Specific Purposes (ESP) and several of its sub-categories that are to be defined in the following chapter.

2. DEFINING TERMINOLOGY – ESP, EAP, CLIL, BE

Before providing an overview of the current state of English language teaching at EU universities and comparing it with the state of affairs at Belgrade University, it is necessary to define the kinds of English that are most commonly taught.

English for Specific Purposes (ESP) is the area of English language teaching that caters for the needs of learners in specific disciplines other than arts and languages. ESP focuses on the language, terminology, grammar, and discourse used in the specific academic, professional and occupational domain, rather than on general English. ESP courses are generally aimed at tertiary level students and professionals who already possess some level of general English knowledge. The broad field of ESP includes many specialized sub-fields, such as English for Business Purposes/ Business English (EBP/ BE), English for Academic Purposes (EAP), English for Science and Technology (EST), English for Occupational Purposes (EOP), etc.

English for Academic Purposes (EAP) as a separate field of ESP has gained attention over the last few decades and became a part of curriculum at many European universities. It is generally defined as English language teaching tailored to the needs of students who plan to pursue a career in academic environment. The aim of EAP is to facilitate study or research in English language and the use of scientific materials that are predominantly written in English. EAP courses are based on demands of a particular academic discipline, but generally put an emphasis on teaching academic reading and writing, with the aim of developing academic literacy skills. These skills include conducting research, summarizing their findings, producing formal academic texts in a variety of academic genres (essays, reports, etc.), comparing, classifying, inferring, evaluating, etc.

English for Business Purposes/Business English is an area of ESP aimed at a special interest group of learners – either students or professionals (studying to be) involved in international business. It focuses on the English language skills necessary to communicate in an increasingly global business environment and encompasses a wide variety of topics, such as accounting, commerce, economics, finance, HR, insurance, IT, law, manufacturing, marketing, the stock exchange, trade, transport, etc. The language skills that BE courses focus on include writing e-mails and reports, making presentations, doing negotiations, using the telephone, attending and participating in meetings, etc. English for Business is by far the most common ESP sub-field taught in Europe and in Serbia.

One of the latest approaches in foreign language teaching is **Content and Language Integrated Learning – CLIL**, and, more specifically, **Integrated Content and Language Learning in Higher Education (ICLHE)**. In this approach, teaching of ESP is closely linked to the content classes: ESP teachers use the materials and tasks that the students are assigned in the content courses (Fortanet – Gomez & Raisanen, 2008). Students are expected to possess the adequate level of English for learning through the medium of this language. In theory, the cooperation between a language teacher and a content teacher should be complete, meaning that both of them correct papers and share grading, but in practice this largely depends on individuals. One of the drawbacks of CLIL approach is the fact that it mainly focuses on writing, while oral communication skills are neglected. Apart from that, this approach sometimes relies on the assumption that students already possess good knowledge of English and do not need any special training to follow CLIL courses, which is not always true.

3. FOCUS ON EUROPE

According to the information about top 100 European universities (found at Webometrics website at http://www.webometrics.info/top500_europe.asp), their respective websites, as well as the research results of several authors (Fortanet – Gomez & Raisanen, 2008, and Perovic, Svetlin Gvardijancic., Ignjacevic, 2008.), the authors of this paper have made several conclusions regarding the state of ESP teaching at tertiary level education in Europe. Universities from Great Britain have been excluded from the research since it only focuses on teaching English as a foreign language.

The research was sometimes restricted by the limited amount of information provided by the university websites, and by the absence of its English (or other world language) translation. Due to the limited length

of this paper, the results shown here will refer mostly to faculties of business, economics, and the related fields, i.e. to English for Business as a sub-field of ESP.

European countries and their universities show some similarities, but also significant differences regarding the extent of teaching ESP, levels at which the courses are given, credits gained, the approaches and methodology used in foreign language teaching at tertiary level education.

In most European countries, ESP is taught independently of content classes using specially created ESP material. ESP courses are typically offered in the first cycle of tertiary education, mostly in the first and second year of the bachelor's degree. Unlike Spain, where only a few universities offer English (and other foreign) languages in their study plans (mostly Business, Economics, Tourism, Engineering, and Architecture), in Finland, for example, all higher education institutions offer these programs. This, according to Fortanet – Gomez & Raisanen (2008), makes Finland "the country with the greatest number of ESP programs in the EU" (p. 35). The extent of ESP teaching varies significantly (from one to four semesters on average), depending on the school and the country in question. Generally speaking, faculties of business, administration, economics, and related fields offer at least two mandatory courses in ESP. The number of credits gained per ESP course ranges from 3 to 6.

In countries such as Germany and Finland, as well as at the University of Bologna, for example, universities are affiliated to language centers that teach languages for special purposes. Apart from ESP, there are usually a number of languages offered, as well as the levels of knowledge. At Technical University in Munich (ranked 33rd in Europe by Webometrics), for example, completed foreign language courses are not mandatory, but can each bring 3 credits. One of the benefits that affiliation to language centers bring to university students is that they have a variety of languages and levels to choose from. The drawback, however, is that this arrangement usually means additional cost to students.

North European countries Sweden and the Netherlands, whose citizens are generally well-known for their exceptional English language skills, have gone furthest with the implementation of CLIL (integrated content and language approach). These countries also offer a wide variety of programs in English for international students, too, but those will not be discussed here. At Utrecht University (Faculty of Law, Economics and Governance), there are optional English-taught courses for Dutch students both at bachelor's and master's degree level.

Many European universities, regardless of the country, offer elective courses in English for Academic Purposes either at the end of first-cycle university education or during the master's programs to enable their students to conduct academic research in English.

Apart from the abovementioned approaches to teaching ESP, the authors of this paper have also noticed a growing trend of offering various university courses at all levels (bachelor's, master's and doctoral), and even whole programs (especially Master's) in English. Despite the fact that they bring obvious benefits (both to universities and their students) and encourage student and teaching staff mobility, linguists warn that they promote the ad hoc use of English as medium of instruction, with little attention paid to the educational consequences or to the language-learning objectives. (Fortanet – Gomez & Raisanen, 2008).

The information available proved that universities in all EU members and our surrounding countries share the same general trend of reducing the number of ESP contact hours as well as the number of ESPB credits considerably (Perovic, Svetlin Gvardijancic., Ignjacevic, 2008.), despite the EU multilingualism and foreign language policies. This trend is certainly one of the negative consequences of the Bologna process since it opposes the multilingualism and language learning policies issued by the EU and the EC. An encouraging fact is, however, that European universities have introduced a number of CLIL (more precisely, *ICLHE*) programs, as well as EAP courses.

4. FOCUS ON BELGRADE UNIVERSITY

The state of affairs at the Belgrade University is in many ways different than that of different universities in Europe. Firstly, there is no option of affiliating university courses with language centres and acknowledging such classes as taking regular exams and getting an appropriate number of credits.

Belgrade University consists of a total of 31 faculties organized in four groups: medical sciences, social sciences and humanities, natural sciences and mathematics, and technological sciences. (Arts will not be included in this paper.) Due to the fact that not all Faculty websites provide information on study programmes, not all faculties were included in this analysis. This section of the paper looks at the presence of English language courses at the faculties of the Belgrade Universities, whether they are mandatory or elective, and how many classes are offered and what credits students get (where applicable).

Of the 26 faculties observed, two of them (the Faculty of Architecture and the Faculty of Civil Engineering) have no English language courses included in their study programmes. Those faculties offering English language courses either have them as a mandatory or as an elective course.

In the group of medical sciences and four of the analyzed faculties, the Faculty of Dental Medicine has English as an elective course during the first two years of studies, throughout all four semesters. The Faculties of Veterinary Medicine and the Faculty of Pharmacy have English as a mandatory course only in the first year of studies, and students get from 1.5 to 3 credits for this exam. The best example in this group is the Faculty of Medicine, with English as a mandatory course during the first two years with 3 available at the end of each year, and as an elective course in the third, fourth and fifth year of studies. As far as the authors of the papers had insight into course programmes, the ESP taught at the finishing years of the Faculty of Medicine belongs to the sub-field of English for Academic Purposes. To our knowledge, this is the only EAP course offered at Belgrade University.

In the second group – social sciences and humanities and the six observed faculties, the Faculty of Economics has English as an elective course which brings students 4 credits per the third and fourth semester. Of the faculties where English is mandatory, the Faculty of Law has this subject only in the first semester of the first year. Nevertheless, it brings students 8 credits, which cannot be ignored when stressing the significance of the course. The Faculty of Orthodox Theology, the Faculty of Security, the Faculty of Political Sciences and the Faculty of Philosophy have English as a mandatory course during the both semesters of the first two years, while the Faculty of Political Sciences' students of the Department of International Relations have English thought their graduate studies.

As for the natural sciences and mathematics, the six faculties of this group which were analyzed show a diverse state of affairs. Two of them – the Faculty of Biology and the Faculty of Physics – have English as an elective course; the first has it during the first three semesters, while the second – only during the first semester of the first year. At the Faculty of Mathematics, the faculty for Physical Chemistry and the Faculty of Chemistry, English is mandatory and is held in the first two semesters, the second two semesters and in the second semester of the first year, respectively.

Finally, the fourth group of technical sciences, including the Faculty of Organizational Sciences, is both the most numerous and the group where English language courses are most present. In addition to the two already mentioned faculties offering no English courses whatsoever, another eight faculties were analyzed in this group. Two faculties – the Faculty of Agriculture and the Faculty of Mining and Geology – have English as an elective course, in the second semester and in the third and fourth semester respectively. As for those with English as a mandatory subject, the Faculty of Mechanical Engineering, the Faculty of Technology and Metallurgy and the Faculty of Forestry have the course for two semesters, the Faculty of Transport and Traffic Engineering is the best example of this group with four semesters, and the Faculty of Electrical Engineering and the Faculty of Organizational Sciences have English for three semesters.

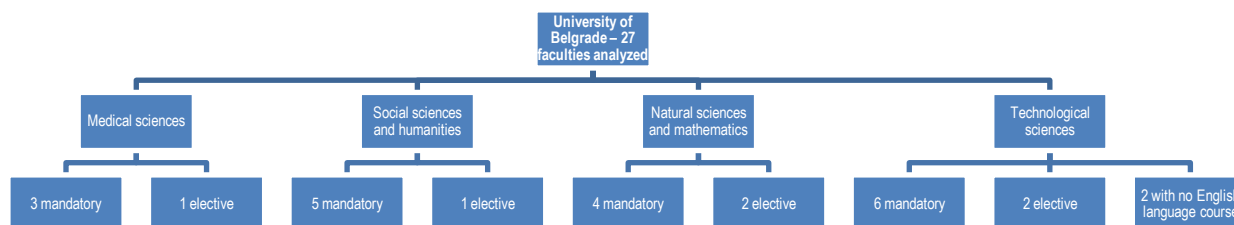


Figure 1 Number of Faculties with English as mandatory or elective course

The number of classes per week ranges from two to five, but the majority of faculties have three classes per week on average. The number of ECTS credits these courses bring ranges from 2 to 10.

The prevalent approach to English language learning at the University of Belgrade is English for Specific Purposes (ESP). The majority of the faculties use tailor-made ESP courses and course books written by English language teachers working at these institutions, whereas others use course books published by renown and widely famous publishing houses specializing in the subject (Cambridge University Press, Oxford University Press, Macmillan, etc.)

5. CONCLUSIONS AND RECOMMENDATIONS

This paper attempted to give an overview of the state of English language learning and teaching in Europe and our country. It also defined some important terminology and trends in current studies in the field. Since it was pointed out that English language learning is very important in order to provide students with greater mobility, help them apply for and get scholarships for further education at some of the European universities and gain practical experience which could then be further implemented, it is of utmost importance to continue work on and improvement of the state of English language learning in our country and our universities.

Having seen an overview of how present English is as a course at our faculties, we can see that the majority of them have appropriate and sufficient programmes, but that there is also room for improvement. ESP is the most common approach and should be further implemented, in order to enable students for future efficient work in their field of interest. Also, EAP (English for Academic Purposes) needs to be further developed so as to enable young academics to have a better access to foreign literature and enable them to be able to participate in international academic environments.

The Faculty of Organizational Sciences is among the faculties which have recognized these trends. They also have classes in English language which provide students with sufficient knowledge so that they could be able to participate in international programmes later on during their studies. This aspect of studies could be further improved through a closer cooperation of the English language teachers and the lecturers of respective courses, in order to deliver as better courses as possible. This cooperation could lead to the implementation of CLIL (Content and Language Integrated Learning), which would be the first such case at Belgrade University, and the best possible way of preparing our students for further education abroad and employment in the modern business world.

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MAPPING STUDENTS' INFORMAL LEARNING USING PERSONAL LEARNING ENVIRONMENT

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Abstract: *Personal learning environments represent widely spread ways of learning, especially for informal learning process. The aim of this research is to identify the elements of students' personal learning environment and to determine the extent to which students use modern technologies as a part of their non-formal learning. Mapping system for gathering data and analysis of percentages and frequency counts were used for data analysis in the SPSS. The results show that the students' personal learning environment includes the following elements: Wikipedia, Google, You Tube and Facebook in 75% of all cases, and an interesting fact is that all of them belong to a group of Web 2.0 tools and applications.*

Keywords: *Personal learning environment (PLE), informal learning, lifelong learning, students*

INTRODUCTION

In industrial age a person has been educated to be able to work in one type of job, and was expected to work in same conditions and in the same manner during his whole life. In modern world, a person must continuously invest in acquiring new skills and knowledge, and constantly work on improving his value on today's global market. To achieve this requirement person has to be able to learn, adapt and re-learn the things he learned just couple of years ago. Therefore, lifelong learning has become an integral part of our lives and our way of learning. In accordance with requirements of modern working environment, it is necessary to prepare students to adapt to usage of modern information and communication technologies (ICT) in the workplace. Therefore, students need to get used to using ICT more during the studies. The aim of this research is to identify the elements of students' personal learning environment and to identify the extent to which students use modern technologies for learning as a part of their non-formal learning.

1. DEFINITION OF LIFELONG LEARNING

Marick and Vatkis define learning as "the way in which individuals or groups acquire, interpret, reorganize, change or assimilate a related cluster of information, skills and feelings. It is also primary to the way in which people construct meaning in their personal and shared organizational lives". (Marsick & Watkins, 1990, p. 4)

According to Rubenson, European Union, the OECD and the UNESCO proclaimed three fundamental attributes in 1976 that lifelong learning is based on: (Rubenson, 2011)

- it is lifelong and therefore concerns everything from cradle to grave,
- It is life-wide recognizing that learning occurs in many different settings, and
- It focuses on learning rather than limit itself to education.

Lifelong learning is mostly recognized as its one segment - adult education. The contemporary literature does not mention classification of education but in fact the classification of learning, as a base of educational process. The distinction has been made between three categories of settings where purposeful learning activity takes place (European Commission 2000): (Rubenson, 2011)

1. Formal learning. This learning typically takes place in an education or training institution; Formal learning is structured, institutionally sponsored, often classroom-based, with an instructor or trainer planning, implementing and evaluating the learning taking place (Conlon, 2004); it is structured (in terms of learning objectives, learning time, or learning support) and leads to certification. From the learner's perspective, formal learning is intentional. (Rubenson, 2011)

2. Non-formal learning. It is learning that typically does not lead to certification and is not provided by an education or training institution. It is structured (in terms of learning objectives, learning time, or learning support). Non-formal learning could take place in working environment. From the learner's perspective non-formal learning is intentional. (Rubenson, 2011)
3. Informal learning. Informal learning is learning resulting from daily life activities related to work, family or leisure. It is not structured (in terms of learning objectives, learning time, or learning support) and typically does not lead to certification. It may be intentional, but in most cases it is unintentional, incidental or random. (Rubenson, 2011) Other definitions of informal learning by Marsick and Volpe (1999) conclude it is an integration of work with daily routines, triggered by an internal or external jolt, not highly conscious, is often haphazard and influenced by chance, inductively occurs through action and reflection, and is linked to the learning of others. (Conlon, 2004)

Marsick and Watson emphasize that there is a difference between informal and incidental learning. Informal learning is mostly experiential and non-institutional. It differs from formal learning by degree of control exercised by the learner, location (not classroom-based), and predictability of outcomes. The examples of informal learning are self-directed learning, networking, coaching, mentoring, performance planning and trial-and-error. Incidental learning is unintentional, a byproduct of another activity. It differs from formal because it is a subset of informal learning. The examples of incidental learning are: learning from mistakes, assumptions, beliefs, attributions, internalized meaning constructions about the actions of others, hidden curriculum in formal learning. (Marsick & Watkins, 1990, p. 7)

Different researchers use non-formal as informal learning, and informal as incidental learning. It is not possible to state with certainty that during the non-formal and informal learning, incidental learning does not happen. In this paper we address non-formal, informal and incidental, collectively as informal learning. We analyze informal learning as a type of learning that occurs in the learning process using personal learning environment (PLE).

Within this paper we observed the informal learning using contemporary information and communication technologies (ICT), in the Web 2.0 environment. We wanted to assess to what extent particular Web 2.0 learning tools are used in a student's PLE on the course E-Learning at Faculty of Organizational Sciences.

2. PERSONAL LEARNING ENVIRONMENT

Personal Learning Environments (PLE) is term used to define new approach in a way how the learning is transformed through a range of new technologies and Web 2.0 platforms which are currently available to us. It can be best described through the 3P Learning model which encompasses three core elements: Personalization, Participation and Knowledge-Pull (Chatti, Jarke, & Specht, 2010). We could try to define PLE as unique personal digital interface which integrates both personal and professional interest of individual including formal and informal education.

According to V. Teemu and H. Stina the main idea with PLE „is to put students in central position in the learning process by allowing them to design their own learning environments“ (Valtonen, Hacklin, Dillon, Vesisenaho, Kukkonen, & Hietanen, 2012). It is not considered as software application or technical approach to learning „but rather as philosophical, ethical and pedagogic approach“ (Attwell, 2007), which should foster students to exercise their capacities as autonomous learners within a structured context. Through personalization students should be able to handle huge amount of information, while still keeping the „head above the water“, to avoid information overload (Eppler & Mengis, 2004) and efficiently adopt required knowledge.

Starting from definition of PLE we gave at the beginning of this document, concept of PLE will define the environment through which individual learner will be able to search information and adopt knowledge, while at the same time contribute to the others in their own learning environment through sharing research and knowledge.

Web 2.0 platforms allow individual learners to gather information from different sources and chose to adopt them in order which he personally feels is the best way for him. Structured approach to this information gathering is enabling to leave undesired or unnecessary information aside, and only focus on „quality sources“ which are preferred or desired. While individual PLE can exist and be efficient at some point, true value of PLE comes from existing interactions between the individual learners who can form a network of readers and contributors with highly loose network structure.

One of the commonly accepted ways of representing PLE is through visual diagrams also called mappings (Leslie, 2011). They are enabling learner to easily “map” different areas of learning, segmented through different streams of information, that can be further dissolved to different sources of information, in thus way easily documenting structure of data and information which are acquired by learner.

2.1. Characteristics and functions of PLE

Avoiding “holy” debate which is lead around PLE regarding what are the distinguishing characteristics of Personal Learning Environments that should uniquely define PLE, one of the first views on the PLE model we consider today was created by Scott Wilson in 2005 (Wilson, 2006), followed by Stephen Downes (Downes, 2006).

According to the work I. Buchem, G.Attwell and R.Torres we could easily define necessary characteristics of the framework which could be consider as PLE (Buchem, Attwell, & Torres, 2011):

- Support to open interoperability standards of Web 2.0 to receive and share materials from different data's and sources
- Grouping tools to blocks and fundamental groups of elements
- Learner centered – supports establishing rules and learning strategies, based on learners individual preferences and learning needs,
- Controllable and managed - learner chooses level of aggregation, different formal and informal sources,
- Establishing knowledge management – annotations, archiving, searching, filtering,
- Different roles with peers (learner, teacher, expert...)

2.2. Advantages and disadvantages

One of the key advantages that PLE offers is its fully open framework which gives ability to connect to any source of information, and quite quickly have learner receive lots of quality information from all over the world. Span of information sources is limited only by the learners desire to seek new sources, and his ability to fluently understand different languages. As stated by S. Downes in this manner the learning in PLE is about developing capacities (not competencies, skills, etc.) and the outcome of personal learning is engendered through empowerment (S. Downes, 2010).

The main issue however stays how to control the quality level in order to cut through received information and distinguish only the quality one.

While learner can start just by goggling the term and searching for authors in the field to gain quick results, it could easily turn into unstructured learning which in the end will fail to deliver desired outcomes. Because of this it is really important for a learner to approach establishing the PLE in a structured manner.

2.3. Establishing the Personal Learning Environment

The only real requirement for a PLE to function is full and constant access to internet in order to acquire data and information defined inside PLE structure. While there are certain possibilities to establish PLE that uses internet in limited manner (timely limited access, dial up, and firewall closed access), the nature of Web 2.0 with such vivid dynamics of information flow is making this almost impossible. Besides internet access the next required things is to prepare and document goals and areas of interest before learner starts receiving information.

Simple steps to start individual PLE could be identified in three simple steps:

1. **Identify three things which you are required/would like to learn.** In order to avoid information overload and efficiently gather the information, it is important for a learner to specify areas or terms which he would like to learn. Due to the danger to “walk of the path” in an information jungle it is of good advantage to have learner identify maximum three items or areas for which he would like to develop PLE.
2. **Identify three sources which are acceptable for learner.** Based on technologies and connection available, as well as learning habits, learner should identify up to three sources of information for each area. Decision is often influenced by the platforms already provided to learner (company, university, closed club, etc) or learner is supposed to establish on its own. In this step it is important that the learner is not making any concrete steps in establishing sources or access just to identify the sources (e.g. RSS feed, Facebook, Twitter, Slide Share, Netvibes, and Wikipedia, etc).
3. **Document defined PLE.** Documenting the PLE is one of the most crucial parts in establishing the PLE, due to the fact that this will allow learner to see information flow in structured manner, and easily decide if it should be redefined or adjusted. It could be done by handwriting, or through sophisticated visual tools (Mind Manager, Visio, PowerPoint etc), and while the form itself is not so much important, detailing the flow of information is the key element. Lack of documenting could either establish PLE which would flood the learner with too much information, or it would reduce the chances to correctly add new sources of information, which would in long run limit his knowledge environment.

3. RESEARCH

Research objectives:

1. Determining what tools that students use in their everyday life they perceive as learning tools.
2. Identifying key elements of a student's personal learning environment and fundamental groups of elements that student's personal learning environment consists of.
3. Determining the average student's learning environment.

Main research questions:

1. What are the elements that students perceive as part of their PLE?
2. What are the fundamental groups of elements of a students' PLE?
3. What are the key elements of students' PLE?
4. How does an average students' personal learning environment at FOS looks like?

Research method

Students were given an assignment as a part of their “E-learning” module at Faculty of organizational sciences (FOS). For the assignment, each student was required to design his personal learning environment in a form of mapping activity. The students had to submit a document in which they had to draw their PLE diagram. In other words, they had to map all elements which they perceive as part of their learning environment according to examples that were given during the lectures and in the guidelines. Example of students' PLE is presented in Figure 1.

Guidelines were developed to assist students in understanding concepts of personal learning environment and to provide examples of PLE diagrams. In examples of PLE diagrams students were able to see what elements could constitute a PLE. For example, some people identified following as elements of their PLE: Web 2.0 tools such as Wikipedia – for acquiring information, YouTube and SlideShare for sharing videos and presentations and Facebook - for social networking. Other people identified colleagues or television as traditional resources for gathering information.

Classical survey wasn't the first choice, we chose mapping because we wanted to find out not only what elements they actually use, but what of them they perceive as a part of their learning environment. Clark at al. cite that mapping system has much advantages because phenomenographic approach (Marton, 1994; Mavers, Somekh, & Restorick, 2001) “is about ‘variation in the ways people see, experience, think about, understand and conceptualize the phenomena they encounter’ and points to the ‘layering’ of the

individual's awareness as they are called to situate phenomena according to these different 'ways of experiencing' their technological world" (Clark, Logan, Luckin, Mee, & Oliver, 2009).

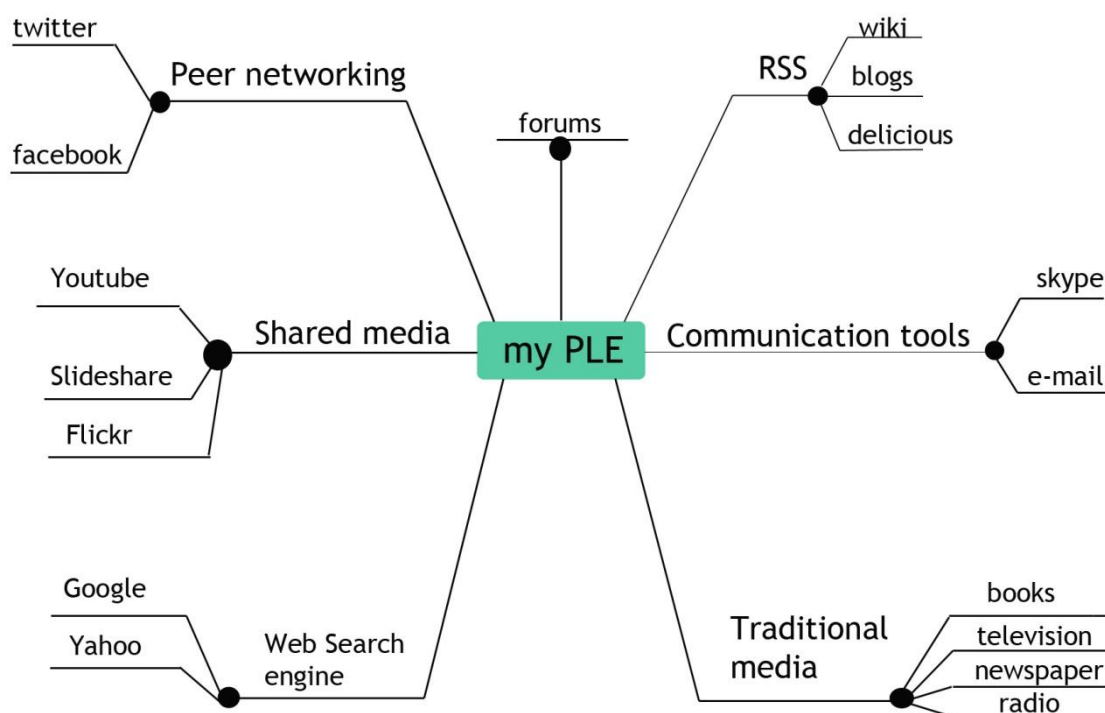


Figure 1: Example of students' PLE

Data Analysis

For further analysis SPSS statistical software was used. Because of the diagram form, data had to be put in form suitable for SPSS. Every element in the diagram was transformed into a YES/NO question.

The example of question design: I use "particular PLE element" for learning. YES/NO.

Example: I use blogs for learning. YES/NO

Collected data were analyzed using percentages and frequency counts for determining the extent in which particular elements, tools or applications are used for learning.

Results

The research was conducted at Faculty of organizational sciences, during "E-learning" module, in the winter semester 2011/2012. The participants were all students of final (4) year of study at a program Information systems and technologies that elected module "E-learning". There were 52 students, 23 male students (44,2%) and 29 female students (55,8%).

The identification of elements that students perceive as part of their PLE is shown in the Table 1. Some students already grouped elements according to their purpose, for example: For Internet search I use..., for communication I use ..., or Traditional tools, Internet tools, etc. According to their grouping system and literature review (Clara & João, 2010), (Tutty & Martin, 2009) (Bartolome, 2008) we identified fundamental groups of elements.

Table 1: Students' PLE: elements and groups of elements

PLE elements	Grouping - phase one		Grouping phase two
WordPress	Blogs	Web 2.0 tools and applications	Online learning resources
Blogger			
Technorati			
Wikipedia	Wiki		
Shared Media	Shared Media		
You Tube			
Flickr			
Slide Share			
Podcasts			
Shared Workspaces	Shared Workspaces		
Google Docs			
Drop Box			
Facebook	Social Networking and Microblogging services		
LinkedIn			
Google+			
MySpace			
Twitter			
Social Gropus	Social Gropus		
RSS	Bookmarking		
StumbleUpon			
Tagging	Tagging		
Web-based aggregators	Web-based aggregators		
Google Reader			
Netvibes			
Web Search Engines	Web Search Engines		
Google			
Google Scholar			
Yahoo			
Forums	Forums		
Email	Online Communication		
Skype			
MSN Messenger			
moodle	LMS		
Other Learning Portals: W3School, Lynda, TED, The Learning Network	Other Learning resources		
Online articles			
TV/Radio	TV/Radio		
Books	Books		
Faculty (teachers/assistants)	People (communication)		
Family and Fiends			
Colleques			

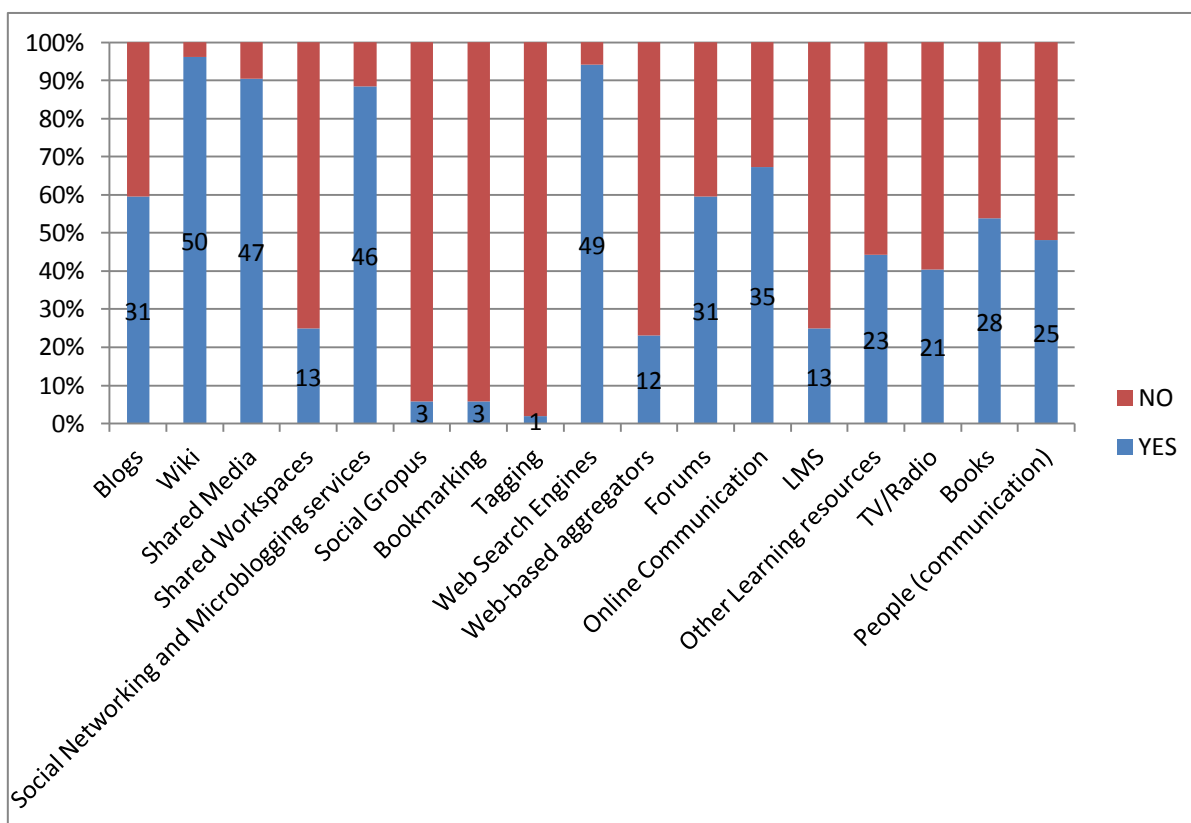


Figure 2: Students' learning tools

After listing all the elements that students perceive as part of their learning environment, we used frequency counts to identify what are the elements that are mostly used among students (Figure 2). As key elements we identified: Blogs, Wiki, Shared Media, Social Networking and Microblogging services, Web Search Engines, Forums, Online communication and Books, because in more than 50% of cases students identified them as elements that they are using for learning.

More than 80% of students use:

1. Wiki – 96,2% of students use Wikipedia.
2. Web Search Engines - 94,2% of students use Web Search Engines: 88,5% use Google, 25% use Yahoo and 15,4% use Google Scholar.
3. Shared Media - 90,4% of students use Shared Media: 84,6% use YouTube, 11,5% use Slide Share, 9,6% use Flickr and 3,8% use Podcasts.
4. Social Networking and Microblogging services - 88,5% of students use Social Networking or Microblogging services: 76,9% use Facebook, 28,8% use Twitter, 13,5% use Google+, 7,7% use LinkedIn and 5,8% use MySpace.

Regarding the question of an average students' personal learning environment, we concluded that in 75% of cases a students' PLE include the following elements: Wikipedia, Google, You Tube and Facebook, and interesting fact is that all of them belong to a group of Web 2.0 tools and applications.

6. CONCLUSION

Throughout this research we concluded that majority of students in everyday life (informal learning process) have not utilised PLE for achieving maximum results even though they have somehow established PLE in certain unstructured form.

After the concluded research we have received positive feedback from students in that they plan to use PLE as a method of supporting their own learning, and that they recognise the value of structuring their PLE.

It would be interesting to conduct further research on faculties which don't have Information Technologies as a major subject area, in order to measure whether there is any impact on accepting and utilising PLE the orientation of students towards technology subjects. It would be interesting to analyze results if the use of PLE and Web 2.0 applications and tools is structured through formal learning at Faculty. Furthermore, it would be interesting to conduct this research at universities in other regions or countries to explore how culture of students, either regional or national, influences the usage and utilisation of PLE.

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TAILORING E-LEARNING COURSES USING MECHANISMS FOR ADAPTATION

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Abstract: *This paper presents an approach to tailoring e-learning courses according to students' characteristics. We introduce sophisticated mechanisms that enable creation, organization and implementation of adaptive courses, based on student model. The main goal of the research is to foster the learning process, as well as students' achievement, by extending Moodle LMS features with services for learning resources and activities adaptation. Business intelligence tools, an expert system and various adaptation techniques were used for developing adaptation services. Adaptation is implemented with respect to three criteria: students' knowledge from the learning domain, students' learning styles and students' interests. The architecture and main features of the adaptation mechanisms are described in the paper. The developed mechanisms for course adaptation were used in the effectuation of the educational process at the Laboratory for E-Business, Faculty of Organizational Sciences.*

Keywords: adaptive e-learning, learning management system, tailoring e-learning courses, mechanisms for adaptation.

1. INTRODUCTION

Systems for e-learning include set of complex processes, different elements, services and users' roles. Users of these systems belongs to heterogenic groups considering their characteristics. At the same time, e-learning systems provide various types of learning resources: tutorials, e-books, scientific articles, etc. Each learning resource is specific and has different way of presentation, content structure, area of study, etc. Number and quantity of education content increases rapidly. In development of an effective e-learning platform one of the most important requirements is to identify users' characteristics and then use the obtained information for creation and realization of educational processes (Aixia & Wang, 2011). Currently, researches show that majority of educational institutions use so called learning management systems (LMS) (Graf, Liu, & Kinshuk, 2010; Graf, 2007). These solutions provide variety of features that enable management of: courses, e-learning activities, e-learning resources, collaboration, etc. LMSs appear to be the best possible solutions for realization of teaching and learning resources (Barać, 2011; Despotovic, Markovic, Bogdanovic, Barac & Krco, 2012; Graf, Liu, & Kinshuk, 2010). LMSs are focused on the support for all processes in e-education (Brusilovsky, 2004; Graf, 2007). Main goal is to enable users to use appropriate services that facilitate organization of teaching and learning processes. At the same time, communication tools such as forums, chats, wikis, etc. improve interaction during courses realization. However, LMSs deliver the same course content to each student, including same course organization, resources and services (Brusilovsky & Millan, 2007; Graf, Kinshuk & Ives, 2010). They do not consider any students' characteristics, such as: knowledge level, motivation, learning styles, expectations, etc. (Essalmia, Ayeda, Jemnia, Kinshuk & Graf, 2010). Managing courses without taking into account these issues very often results in failure (Dekson & Suresh, 2010).

Main goal of the paper is to improve learning process by developing mechanisms for adaptation. These features enable extending Moodle LMS, without need to create new solutions for e-learning. Students should be provided with personalized courses that are adapted to their characteristics.

2. DELIVERING ADAPTIVE E-LEARNING COURSES

Adaptive e-learning courses are emerging issue in the modern e-learning systems (Despotovic et al., 2012). Adaptivity of e-learning courses is reflected in the adaptation of forms of learning materials presentation, methods of communication, interaction, collaboration, organizing pace of courses in accordance with requirements and characteristics of students (Brusilovsky, 2011; Graf, Kinshuk & Liu,

2009; Kock & Paramythis, 2011). Adaptation techniques are (Atif, Benlamri & Berri, 2003; Brusilovsky, 2004, 2011): adaptive interaction, adaptive content delivery, adaptive content discovery and creating, adaptive collaborative support. Two approaches could be noticed in scientific researches within area adaptive of e-learning: developing adaptive web-based systems and extending LMS features. Adaptive web education systems (AWES) have been developed on the basis of theoretical concepts of adaptive hypermedia (Brusilovsky, 2004, 2011; Graf, 2007, Graf & Kinshuk, 2008). However, these systems have a few drawbacks (Brusilovsky, 2004, 2011; Brusilovsky and Millan, 2007; Graf & Kinshuk, 2008). First of all, creation of such systems and their integration into educational process is quite complex and rather expensive process that requires high level of involvement of all users. One of the most common problems is the inability to reuse created learning resources. Basic features of e-education system, such as: administration of courses, learning content, etc., is complex to use in adaptive systems. There are no common services for communication and social interaction among participants in e-education. Second approach, imply using all the advantages of the existing LMSs and enhancing them with personalization features[ref]. This approach is used in the paper. Moodle LMS is one of the most comprehensive solutions that provide numerous functionalities and services (Graf & Kinshuk, 2008, Barać, 2011). Moodle is flexible for implementing new components and integration with other systems and technologies (Graf, 2007).

Personalization parameters

E-learning systems incorporate the concept of adaptivity through the development of a model of a student (Tzouveli, Mylonas & Kolias, 2008). Model of a student includes information about learning objectives, prior knowledge, pace of learning, behaviour, way of interaction and communication (Bruslovsky, 2011; Tzouveli et al., 2008). Student modelling is the process whereby an adaptive learning system creates and updates a student model by collecting data from several sources implicitly (observing user's behaviour) or explicitly (requesting directly from the user) (Bruslovsky, 2011). Most frequent used personalization parameters are presented in figure 1 (Brusilovsky and Millan, 2007).

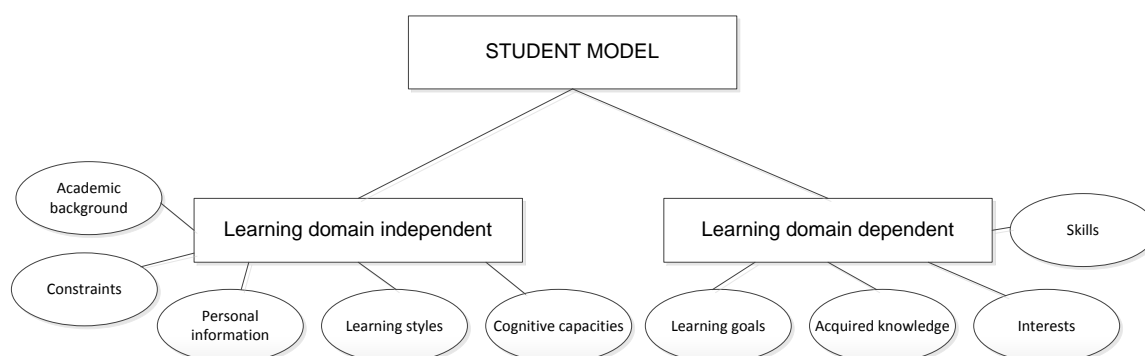


Figure 2: Common characteristics in student model

Four types of the parameters were used for implementing personalized e-learning courses:

- Learning style
- Preknowledge
- Interest and expectation

In order to gather data about these factors, we developed questionnaires and tests. Students' preknowledge is assessed by tests with 20 questions from domain area. Based on test results each student is classified as: beginner, intermediate or advanced. Information about learning goals and expectation are gathered via questionnaire.

There are several different learning style models presented in literature; however, Felder-Silverman Learning Styles Model (FSLSM) is often used for providing adaptability regarding learning styles in e-learning environments (Felder & Silverman, 1988). Felder-Silverman model describes a single student along four dimensions: 1) Active and reflexive learning style; 2) Sensitive and intuitive learning style; 3) Visual and verbal learning style; 4) Sequential and global learning style. Questionnaire to determine learning styles of our students was created by adjusting the Index of Learning Styles Questionnaire (Felder & Silverman, 1988; Mihailović, Despotović-Zrakić, Bogdanović, Barać & Vujin, 2012).

3. DEVELOPING MECHANISMS FOR E-LEARNING COURSES ADAPTATION

Expert system for student modelling

In order to create student model expert system “ELAB” was developed. The system aimed to define attributes that describe each student’s characteristics based on data collected through the knowledge test and questionnaire about learning styles (Buche & Querrec, 2011). Expert system “ELAB” make decision in five steps (Barać, 2011). First four steps are related to four dimension of FSLSM model. Fifth attribute is defined in according to achievement on learning domain knowledge. After selecting student and course, teacher can assign attributes to the student (Figure 2). Firstly, teacher choose a test/questionnaire, i.e learning style dimension and the expert system define the attribute value for chosen criteria.

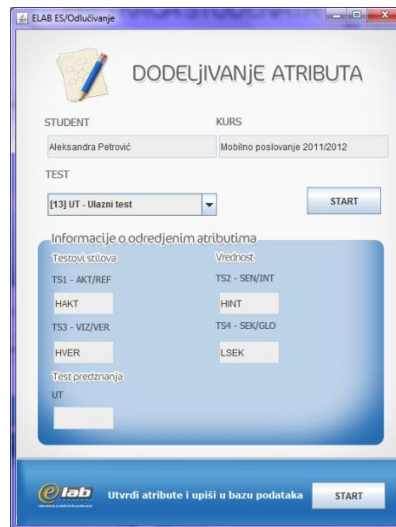


Figure 3: Assigning attributes to a student

Figure 3 presents final output from the system. In the example presented bellow, the expert system concluded that the student is quite active, intuitive, verbal (HAKT, HINT, HVER) and a little bit sequential learner(LSEK). At the same time, the student achieved high result on the knowledge test related to course Internet technologies (id=7).

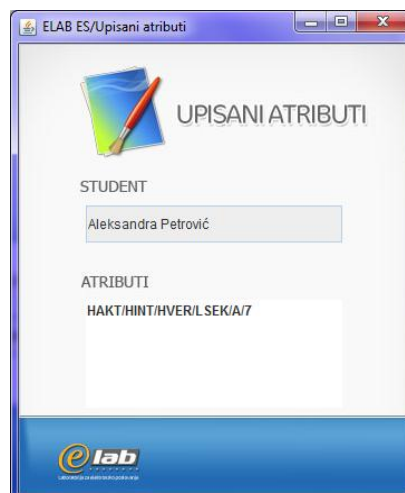


Figure 4: Recorded attributes for a student

Mechanisms for adaptation

When developing the mechanisms for adaptation application, one of the key requirements was not to change Moodle LMS solution core, but to develop application that would be independent of particular LMS. Implementation is realized through following (Barać, Bogdanović, Milić, Jovanić & Radenković, 2011):

- PHP application that implements adaptive mechanism
- New Moodle LMS block and module that would present adapted learning objects and activities
- Extend existing Moodle LMS database by adding new tables

The application was developed using modern programming paradigms. It is flexible, dynamic, service oriented and with rich user interface. Key components are implemented as Moodle modules and blocks and do not require any changes in existing Moodle system. The architecture of the propose solution is presented in figure 4. Within the Moodle LMS, a module and a block for adaptive mode have been created. The module enable adaptation of a: group, student, course, learning resource/activity, collaboration, etc. The application uses existing MySQL database. Adaptation mechanisms get data both from several Moodle tables and student model tables (Expert system outputs). In order to foster adaptive collaboration an SMS service was implemented, as well as an Android application for sending information to students.

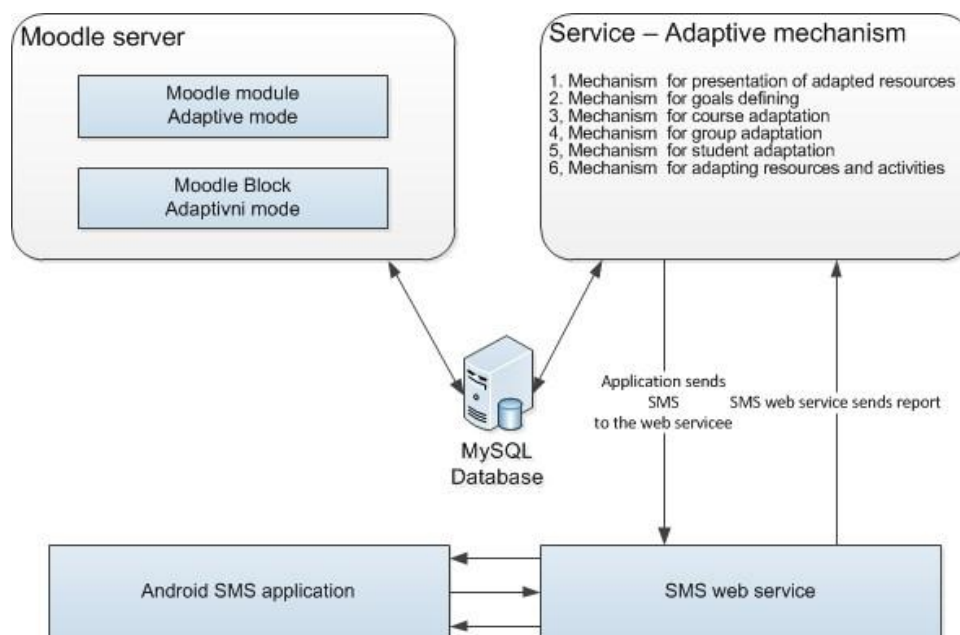


Figure 5: Architecture of the adaptive mechanisms application

Adaptive mode of the course is presented in figure 5. Only learning resources and learning activities that fit student's characteristics are presented to them. In the example, student has low level of knowledge from the area of JavaScript. Therefore, in adaptive mode they are provided by resource „Praktikum“, version adapted to their styles, and introductory test. A student can add Moodle block „Adaptive resources“. Then, only they can see all adapted learning resources and activities within the course.

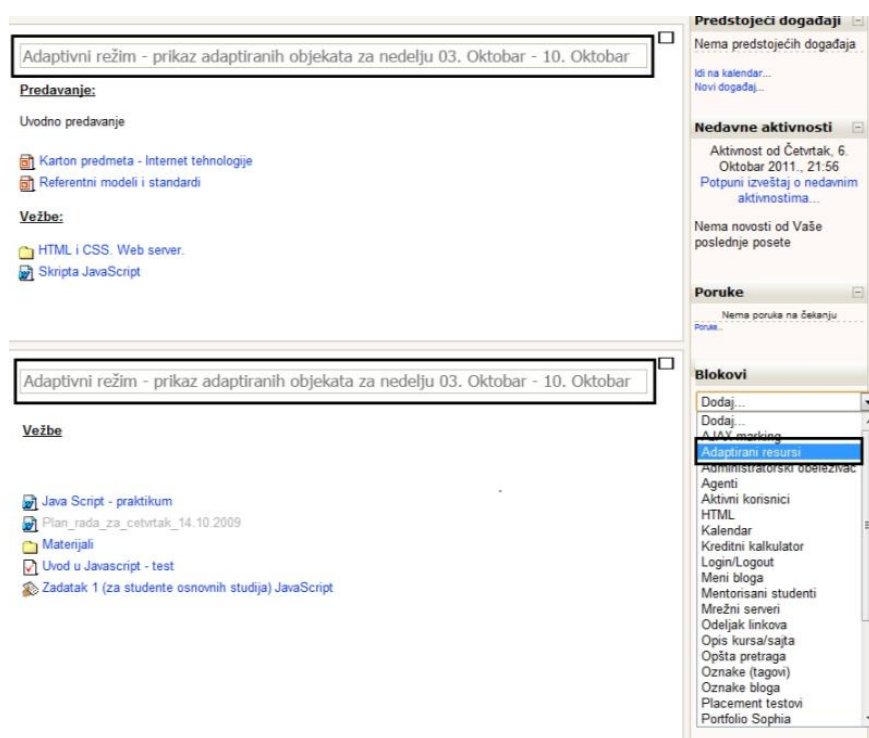
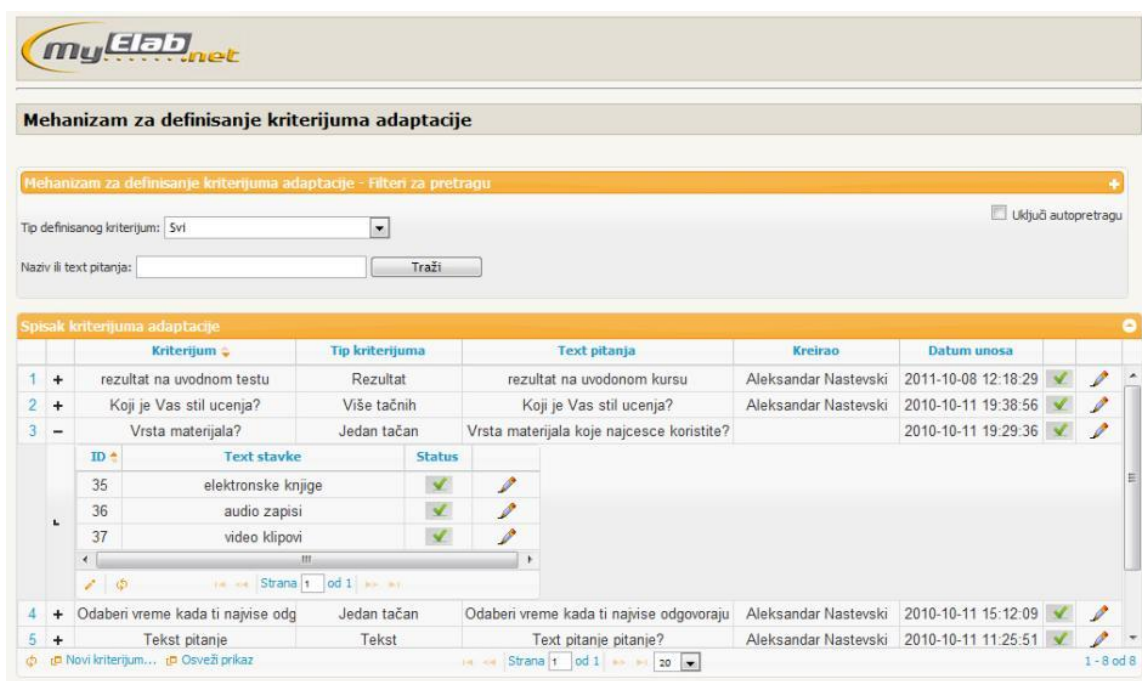


Figure 6: Moodle course “Internet technologies” in adaptive mode

The application enable teachers to add adaptivity to the existing courses. Following features are available to the teachers:

- Creating and defining adaptation criteria
- Adaptation criteria management
- Managing questionnaires and tests
- Learning resource and activity adaptation
- Group personalization
- SMS messages management

Within the application four different type of adaptation criteria could be defined: dynamically created text, number, predefined text, combination of predefined text. Mechanism for adaptation criteria management is shown in figure 6.



Mehanizam za definisanje kriterijuma adaptacije

Mehanizam za definisanje kriterijuma adaptacije - Filteri za pretragu

Tip definisanog kriterijuma: Svi

Naziv ili text pitanja: Traži

Spisak kriterijuma adaptacije

	Kriterijum	Tip kriterijuma	Text pitanja	Kreirao	Datum unosa	
1 +	rezultat na uvodnom testu	Rezultat	rezultat na uvodnom kursu	Aleksandar Nastevski	2011-10-08 12:18:29	
2 +	Koji je Vas stil učenja?	Više tačnih	Koji je Vas stil učenja?	Aleksandar Nastevski	2010-10-11 19:38:56	
3 -	Vrsta materijala?	Jedan tačan	Vrsta materijala koje najcesce koristite?		2010-10-11 19:29:36	
	ID	Text stavke	Status			
	35	elektronske knjige				
	36	audio zapisi				
	37	video klipovi				
4 +	Odaberi vreme kada ti najise odgov	Jedan tačan	Odaberi vreme kada ti najise odgovoraju	Aleksandar Nastevski	2010-10-11 15:12:09	
5 +	Tekst pitanje	Tekst	Text pitanje pitanje?	Aleksandar Nastevski	2010-10-11 11:25:51	

Strana 1 od 1

Figure 7. Mechanism for defining adaptation criteria

Figure 7 shows an example of defining adaptation criteria that is based on level of knowledge on introductory test. Teacher can set a number of points for each category of knowledge (beginner 0-5, intermediate 5-8, advanced 8-10). When teacher classify learning resources and activities, they can choose for which category of students knowledge it should be presented.



Definisanje kriterijuma adaptacije...

Uspešno učitani podaci!

Podaci o kriterijumu adaptacije

Tip kriterijuma: Rezultat

Naziv: rezultat na uvodnom testu

Sadržaj kriterijuma adaptacije

Text kriterijuma: rezultat na uvodnom testu

Sačuvaj unos...

Prikaz kriterijuma adaptacije...

Uspešno učitani podaci!

Kriterijum adaptacije

rezultat na uvodnom kursu

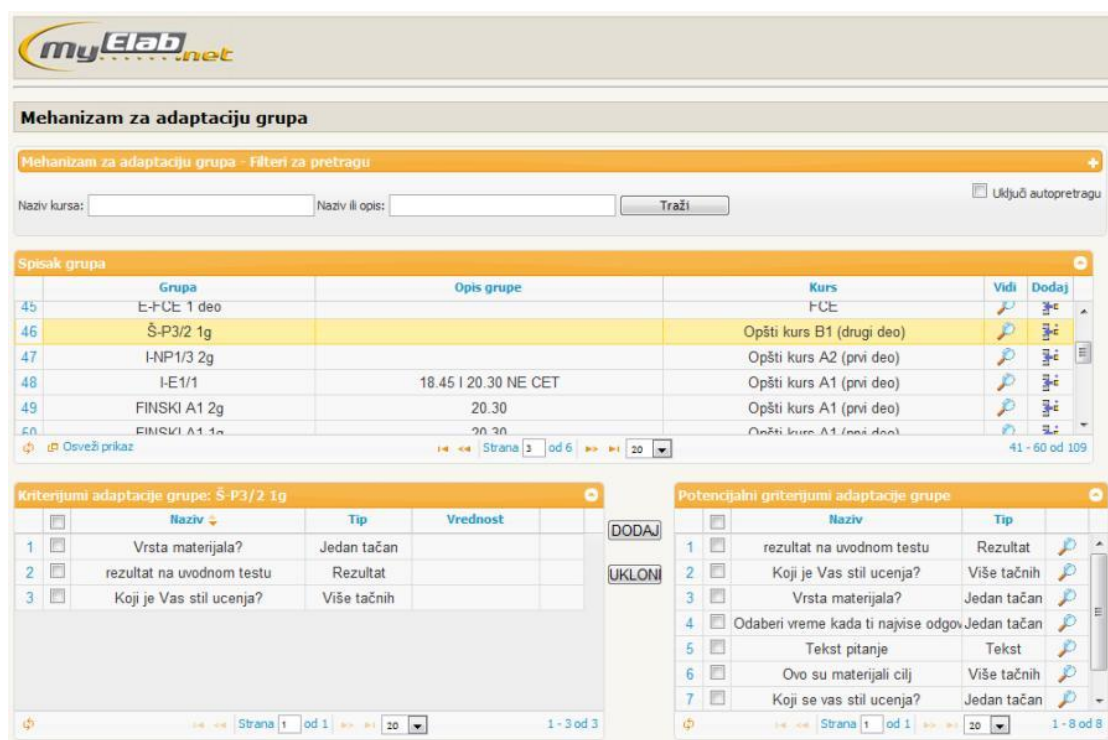
Rezultat:

☐ Rezultat veći od unetog broja ☐ Rezultat manji od unetog broja

Sačuvaj unos

Figure 8. An example of defining adaptation criteria

Further, the mechanisms for adaptation enable group personalization, i.e. learning activities and resources are adapted to the group of students (figure 8.). This type of adaptation can be quite effective and economic when big number of students are enrolled in the course. Teacher can choose criteria that are to be applied in group personalization. For instance, if criteria for group adaptation is FLSM model dimension sequential/global and value of the criteria is GLO, it implies that all the learning resources and activities that are adapted for students with global learning style, will be presented to that particular group of the students.



Mehanizam za adaptaciju grupa

Mehanizam za adaptaciju grupa - Filteri za pretragu

Naziv kursa: Naziv ili opis: Traži ☐ Uključi autopretragu

Spisak grupa

	Grupa	Opis grupe	Kurs	Vidi	Dodaj
45	E-FCE 1 deo		FCE		
46	Š-P3/2 1g		Opšti kurs B1 (drugi deo)		
47	I-NP1/3 2g		Opšti kurs A2 (prvi deo)		
48	I-E1/1	18.45 20.30 NE CET	Opšti kurs A1 (prvi deo)		
49	FINSKI A1 2g	20.30	Opšti kurs A1 (prvi deo)		
50	FINSKI A1 1g	20.30	Opšti kurs A1 (prvi deo)		

Osveži prikaz Strana 3 od 6 20 41 - 60 od 109

Kriterijumi adaptacije grupe: Š-P3/2 1g

	Naziv	Tip	Vrednost
1	Vrsta materijala?	Jedan tačan	
2	rezultat na uvodnom testu	Rezultat	
3	Koji je Vas stil učenja?	Više tačnih	

DODAJ UKLONI

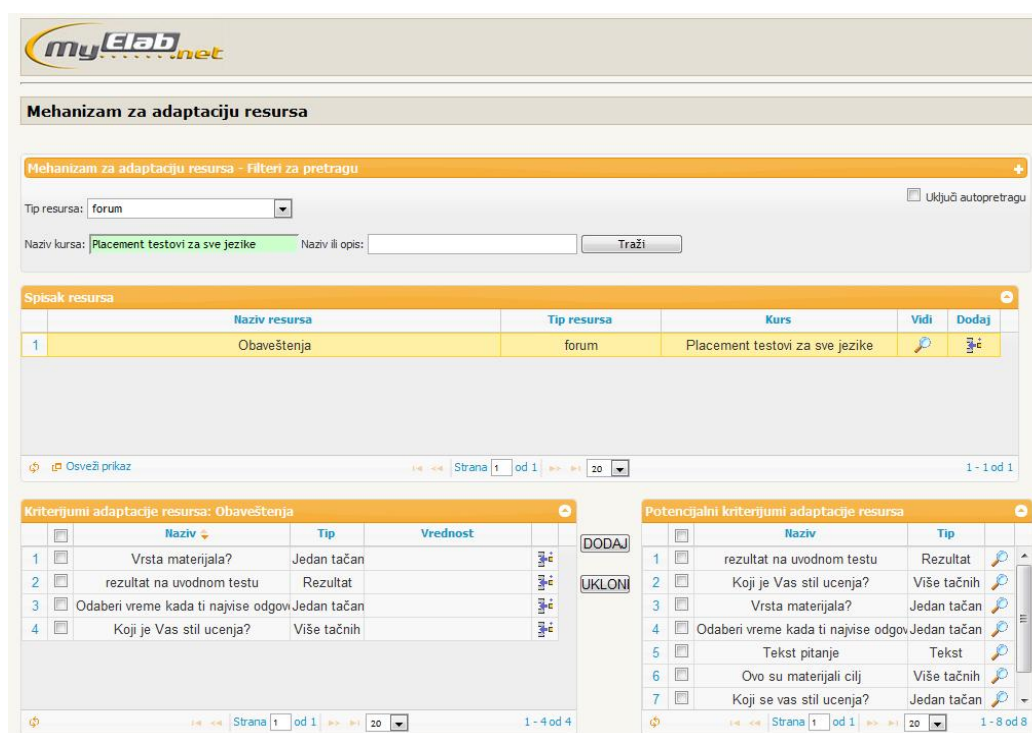
Potencijalni kriterijumi adaptacije grupe

	Naziv	Tip
1	rezultat na uvodnom testu	Rezultat
2	Koji je Vas stil učenja?	Više tačnih
3	Vrsta materijala?	Jedan tačan
4	Odaberi vreme kada ti najviše odgov.	Jedan tačan
5	Tekst pitanje	Tekst
6	Ovo su materijali cilj	Više tačnih
7	Koji se vas stil učenja?	Jedan tačan

Strana 1 od 1 20 1 - 8 od 8

Figure 9. Group adaptation

Figure 9 shows learning resources and activities adaptation. After selecting course, all the resources and activities from the course are presented to a teacher. The teacher can choose each learning resource/activity and define adaptation criteria to be applied for it. For instance, if adaptation criteria learning style FLSM dimension active/reflexive, value *AKT* is chosen for learning activity *forum*, the forum will be delivered only to student that has active learning style. For each learning resource and activity, more than one criteria can be selected. A learning resource/activity will be delivered to a student only if all the selected criteria are in accordance to the attributes from the student model.



Mehanizam za adaptaciju resursa

Mehanizam za adaptaciju resursa - Filteri za pretragu

Tip resursa: Uključi autopretragu

Naziv kursa: Naziv ili opis: Traži

Spisak resursa

	Naziv resursa	Tip resursa	Kurs	Vidi	Dodaj
1	Obaveštenja	forum	Placement testovi za sve jezike		

Osveži prikaz Strana 1 od 1 20 1 - 1 od 1

Kriterijumi adaptacije resursa: Obaveštenja

	Naziv	Tip	Vrednost
1	Vrsta materijala?	Jedan tačan	
2	rezultat na uvodnom testu	Rezultat	
3	Odaberi vreme kada ti najviše odgov.	Jedan tačan	
4	Koji je Vas stil učenja?	Više tačnih	

DODAJ UKLONI

Potencijalni kriterijumi adaptacije resursa

	Naziv	Tip
1	rezultat na uvodnom testu	Rezultat
2	Koji je Vas stil učenja?	Više tačnih
3	Vrsta materijala?	Jedan tačan
4	Odaberi vreme kada ti najviše odgov.	Jedan tačan
5	Tekst pitanje	Tekst
6	Ovo su materijali cilj	Više tačnih
7	Koji se vas stil učenja?	Jedan tačan

Strana 1 od 1 20 1 - 8 od 8

Figure 10. Learning resource integration

Figure 10 shows a learning resource lesson within Moodle course, that is designed for students with visual learning style. This resource is delivered only to students who has visual learning style.

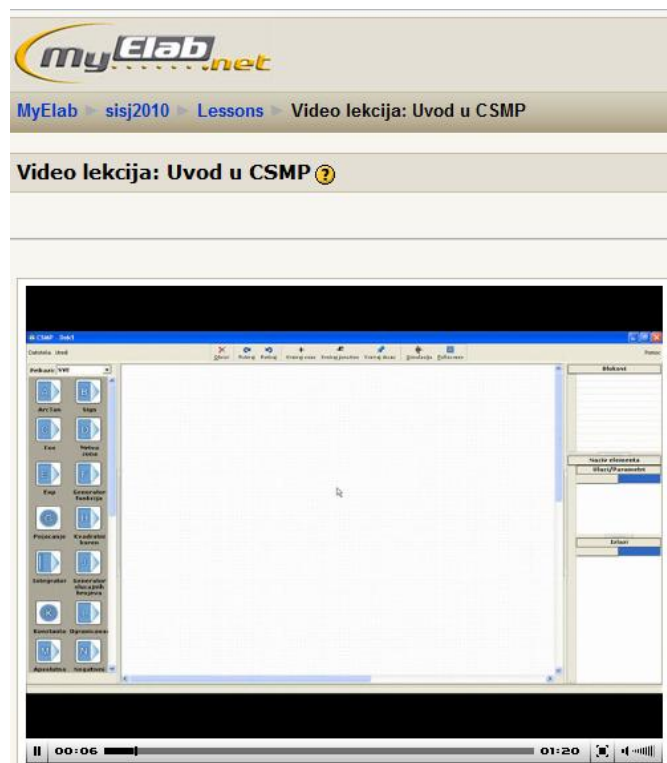


Figure 11. An learning resource for students with visual learning style

6. CONCLUSION

This paper presented adaptive mechanisms that enable LMSs to generate courses that fit students' characteristics. The adaptation services enable tailoring Moodle courses and features based on data from student model. Adaptation was performed considering three criteria: students' knowledge from the learning domain, students' learning styles and students' interests. Architecture and main features of the adaptation mechanisms were described. Main contribution of the paper is reflected in the fact that proposed mechanisms combine the advantages of LMSs with those of adaptive learning systems by enhancing LMSs with adaptivity.

Evaluation of the system should provide additional information about users' experience in using the system, as well as data about system performances and impact on learning process outcome. Future researches are directed toward improving adaptation mechanisms and automation of adaptation process, as well as complete integration of all processes in adaptive e-learning system. Mechanisms for adaptation could be improved by introducing ontologies and concepts of semantic web. Integration of social networks and developing services for social interaction should improve students' loyalty and motivation for learning

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IMPLEMENTATION OF CRM CONCEPT IN E-EDUCATION

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Abstract: *A new vision of higher education system in which the student is the central subject opens up new learning opportunities that include customization and adaptation to students' needs and preferences. Student satisfaction can be increased in this way, and mutual trust will remain intense after graduation as well. Student Relationship Management (SRM) is often applied in order to improve the quality of the administrative process in educational institutions. However, SRM can also significantly improve the teaching and learning process. This paper focuses on these aspects of SRM. In this paper, we present SRM opportunities for the improvement process of e-education. For student relationship we use SugarCRM. We present the teaching and learning process implemented in the described system, the metrics for the evaluation of system performance and the results of using the SRM system within regular activities.*

Keywords: CRM, SRM, ERM, social CRM, e-education

1. INTRODUCTION

Customer relationship management (CRM) has been defined as the management approach that involves identifying, attracting, developing and maintaining successful customer relationships over time in order to increase the retention of profitable customers. The CRM introduction into e-learning is a long and demanding process because students' demands are increasing simultaneously with the growth of technology capability. The steps in the CRM implementation in e-learning field are as follows defining the CRM goal and strategies, adaptation and implementation. From the perspective of the student, the CRM strategy allows interaction with the educational institutions from a single entity that has a complete understanding of their unique status. From the perspective of the educational institutions, the CRM strategy provides a clear and complete picture of each individual and all the activities pertaining to the individual.

A model of improving CRM concept for applying in develop the electron system of education is shown in this paper. The major goal is to improve the current system of e-education by development of methods for managing relationships with students (SRM-Student Relationship Management) based on previously identified needs of the Laboratory for e-business (Faculty of organizational sciences). Application of the developed solutions in the real system of e-education is described in detail in a practical part of this paper.

2. THEORETICAL BACKGROUND

Customer relationship management (CRM) is a coherent and complete set of processes and technologies for managing relationships with current and potential customers and associates of the company, using the marketing, sales and service departments, regardless of the channel of communication (Chen, & Popovich, 2003). CRM is a highly fragmented environment and has different meanings for different people (Sohrabi, Haghighi, & Khanlari, 2010). CRM is endorsed to generate and administer bonds with clients more efficiently through the itemized and precise analysis of customer information utilizing distinctive information technologies (Peppers, & Rogers, 2011). To assess future customer behavior and offer the best possible care, it is necessary to exploit, evaluate and regularly update the company's knowledge about the customer (Wilde, 2011). CRM is therefore understood as a customer-oriented management approach where information systems provide information to support operational, analytical and collaborative CRM processes and thus contribute to customer profitability and retention (King, & Burgess, 2008).

Just as CRM strives to build long-term relationships with customers, employee relationship management (ERM) strives to build long-term relationships with employees. ERM's two main internal user groups are

employees and managers. ERM enables managers to communicate with their teams, align employees with the overall goals of the business, share information and build a common understanding. ERM also offers support to employees through workflow modelling that depicts how tasks should be performed, provision of job-related information and collaboration with colleagues (Buttle, 2009).

Educational institutions are becoming aware that education belongs to the service industry. Students' demands and desires have to be met. Independent learning and teaching is an educational system and consists of sub-systems: a learner, a teacher and a method of communication (Moore, 1973). The integration of CRM into e-learning is a long and demanding process because students' demands are increasing simultaneously with the growth of technology capability. Student relationship management (SRM) is the systematic care of a business relationship between the university and students, where service quality is becoming an ever more interesting question. Student satisfaction can be increased in this way, and mutual trust will remain intense after graduation as well. SRM is a new vision of higher education system in which the student is the central subject of the teaching process opens up learning opportunities that include customization to the student and teaching methods, modes of communication, both between teachers and students and among students themselves (Kumar, 2008).

The steps in the CRM implementation in e-learning field are defining the CRM goal and strategies, adaptation and implementation. From the perspective of the student, the CRM strategy allows interaction with the educational institutions from a single entity that has a complete understanding of their unique status. From the perspective of the educational institutions, the CRM business strategy provides a clear and complete picture of each individual and all the activities pertaining to the individual. Data related to students characteristics and interaction are substantial for SRM. Data should be acquired, stored, analyzed, distributed and applied throughout the educational institution in a timely manner. Educational institutions should consider what data about students are required to support analytics and operational processes. SRM technologies form a fundamental part of any educational institution's application portfolio and architecture. SRM application requirements should be considered as the provision of integrated functionality that supports seamless student-centric processes across all areas of the learning.

Performance measurement is one of the key aspects of managing the SRM system. It's very hard to effectively manage SRM system, if educational institutions don't have insight in functionality of the system. Well defined SRM system metrics increases chances for success through synchronization of processes in an educational institution. This affects on increase of quality of the educational process. The absence of appropriate SRM metrics has bad influence on students' results, communication and satisfaction of their demands. Techniques of performance measurement and system metrics that are described in the literature, put focus on key performance indicators. Some of the authors indicate need of measuring global performances, but they don't offer framework or methods for designing metrics. Additional research is necessary for identification of SRM metrics and overcoming barriers of implementation. Bigger part of literature focuses on analysis and classification of system for performance management, and smaller part to SRM metrics.

SRM must be observed as one entity and system for performance measurement must have global character. Goal is development of system metrics that enables identification of fields for improvement SRM system performance. In this way, educational institution can focus their efforts and achieve better performance. With considering all specificity of SRM system, system metrics should satisfy following criteria: metrics is based on processes, metrics is defined on all levels (strategic, operative), metrics is synchronized with the strategy of educational institutions, and metrics cover all relevant processes.

Customer or student interactions, conversations, and relationships are what transform CRM into social CRM. Social CRM is a philosophy and a business strategy, supported by a system and a technology, designed to engage the customer in a collaborative interaction that provides mutually beneficial value in a trusted and transparent business environment. Social CRM can provide the tools and strategies for meaningful, accurate customer insight (Greenberg, 2010a). Social CRM is based on the ability of a company to meet the personal agendas of their customers while at the same time meeting the objectives of their own business plan (Garcia-Crespo, Colomo-Palacios, Gomez-Berbis, & Ruiz-Mezcua, 2010). The characteristics of social CRM are (Greenberg, 2010b):

- fully integrated into an enterprise value chain and that includes the customer as part of it,
- customer interactions are encouraged through authenticity and transparency,

- knowledge is utilized in context to create meaningful conversations,
- the company processes are modeled from the customer point of view,
- both information-seeking and information-contributing behaviour are encompassed into the customer business ecosystem,
- resides in a customer ecosystem,
- creating conversation with customer - engaging customer in activity and discussion – observing and redirecting conversations among customers are activities done in the marketing frontline,
- business is an aggregator of experiences, products, services, tools and knowledge for the customer,
- the intellectual property that is created with the customer, partner, supplier, problem solver is also owned together,
- the business is focused on environments and experiences that engage the customer,
- focus of technology is on both, operational and social/collaborative areas and customer is integrated into the value chain.

Success factors have received increasing attention within the literature of CRM. CRM success factors in e-education are (Almotairi, 2009):

- communication of CRM strategy,
- willingness to share data,
- student orientation,
- motivate staff,
- education schedule and plan,
- connectivity,
- monitoring and feedback,
- software customization,
- teacher and student involvement,
- creating of multi disciplinary team,
- student information management,
- student contact management.

3. IMPLEMENTATION OF CRM SYSTEM IN E-EDUCATION

3.1 Model of CRM in e-education

A new vision of higher education system in which the student is the central subject of the teaching process opens up learning opportunities that include customization to the student and teaching methods, modes of communication, both between teachers and students and among students themselves (Kumar, 2008). The advantages of modern information and communication technologies allow to connect students with teachers, as well as students and colleagues in many manners: from communicating via electronic mail (e-mail), talking over the Internet (chat), maintenance of electronic conferences (forum), teaching in an electronic classroom (e-classroom).

SRM aims to build mutually beneficial relationships with student at segment, cohort or individual level. A fundamental approach to achieving this goal is to customize the value proposition in order to attract and retain targeted students. SRM aims to fit the offer to the requirements of the student. Customization has both cost and revenue implications. It may make strategic sense because it generates competitive advantage and is appealing to students, but there may be serious reservations because of the costs of customization. Educational institutions need to ask whether investment in customization will generate a return higher than they could achieve through other strategies carrying a similar amount of risk (Buttle, 2009).

The following figure shows the influence of CRM in an educational institution (David, 2005).

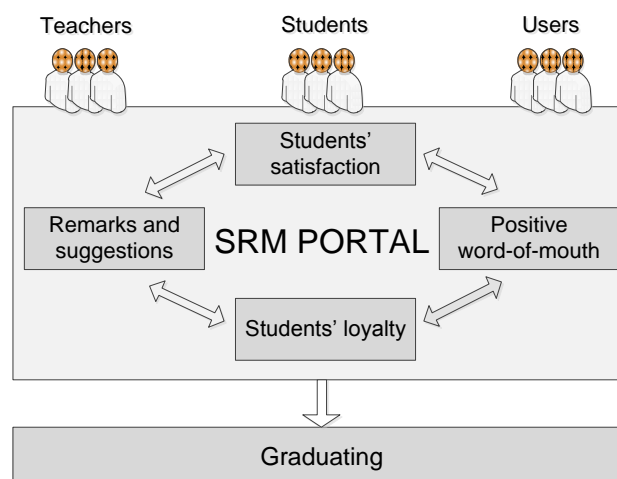


Figure 12: Influence of CRM in an educational institution

Figure 1 shows significant of good communication between educational institution and teaching staff with students. Node of communication processes in an educational institution represents a portal which access is enabled for teachers and students, and other users. Students' satisfaction with educational system of the institution where they study, positively affect on their attitude toward that institution. Students' loyalty toward educational institution decreases/disappears if they decide not to continue their further education at the institution (postgraduate study). The dissatisfaction of students and lack of loyalty toward educational institution may arise as a result of not taking into account their suggestions and opinions on possible improvements of the educational process, by the teaching staff and the management of educational institutions.

The educational institution must take proactive approach in creating a student relationship management. The SRM vision should be used as the guide to the creation of a SRM strategy which is all about how to build and develop a valuable asset: the student base. It must set objectives and metrics for attaining that goal. It directs the objectives of other operational strategies and the SRM implementation strategy. The student experience must be designed in line with the SRM vision and must be constantly refined, based on actively sought student feedback. The relationship with the students needs to be viewed and managed in terms of the student life cycle and formalized processes must exist to manage that life cycle. Collecting data is important for good relationship and adjustment educational system to the needs of each student, and personalization of educational services.

Successful e-education process should create processes that not only meet students' expectations and support the student value proposal, but also provide competitive differentiation and contribute to a designed student experience. In order to define an adequate set of metrics, we need to identify key processes within the e-education system.

3.2 CRM implementation in e-education

Implementation of CRM concept for improvement system of e-education of the Laboratory for e-business on Faculty of organizational sciences is described in this paper. Large number of courses for undergraduate and postgraduate studies is applied in the Laboratory for e-business. Work of the Laboratory is based on using of modern methods and technologies. Blended learning is practiced, and that is a combination of classic type of teaching in a classroom and teaching using the information and communication technologies. The major idea of work is based on improvement of existing system for communication with students in a system for e-education. A system should provide support for realization postgraduate studies (Master and PhD) as well as monitoring projects where the Laboratory participates.

Software solution SugarCRM is chosen for implementation of CRM concept because the solution is free, open source, easy for using and allows adjustment of functionalities of a system to needs of the Laboratory. Customization and adaptation the system environment to the activities of the Laboratory on Master and PhD studies is performed after installation.

Figure 2 shows schematic presentation of connections between created modules (Courses, Teachers, Master students, PhD students) and existed modules (Accounts, Projects).

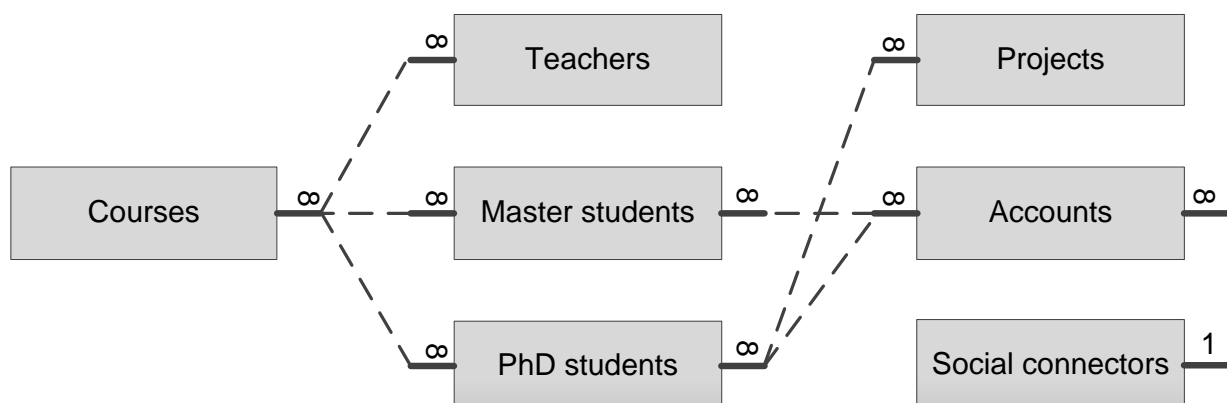


Figure 13: e-Lab's CRM modules

Module for improvement of activities of students on Master studies (Figure 3) contains major information about student - name and surname, ID number, department, e-mail, phone number, address and the module enables writing additional comments (remarks, suggestions, topics of final paper, notes, etc.). It is possible to get information about employment status of students and a company where they work on the social network LinkedIn through the module (Figure 4).

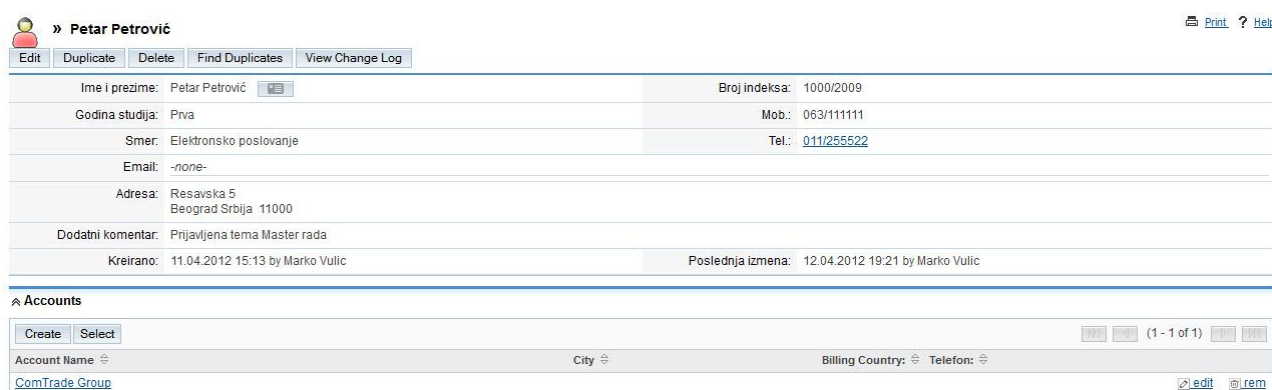


Figure 14: Master studies module

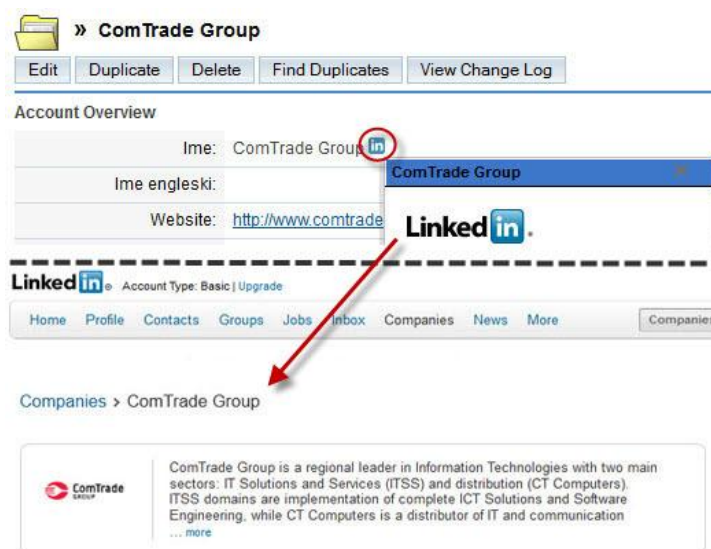
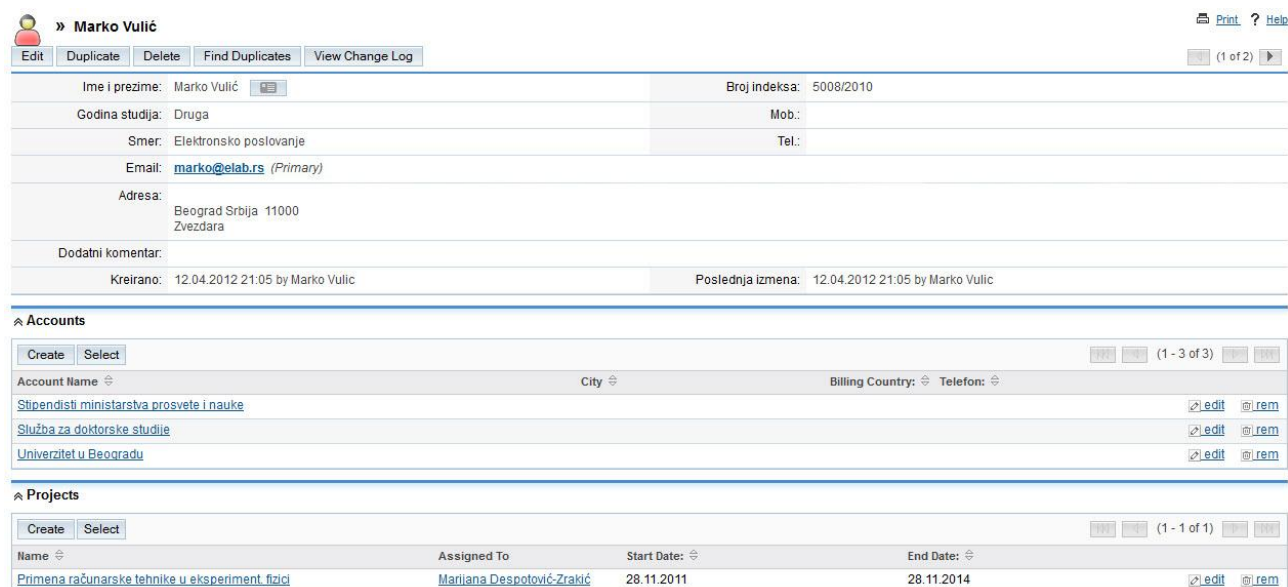


Figure 15: Company profile in LinkedIn

Figure 5 provides major information about a PhD student (department, years of study, e-mail, etc.) and thanks to the synergy with other modules, we get detailed information about a student from CRM data base of a student's service such as Ministry of Education and Science Republic of Serbia. CRM student profile enables viewing the data about activities related to project financed by the Ministry. The student's progress in activities is tracked by a mentor assigned by the Laboratory. CRM student profile also informs about educational meetings where the Laboratory participates.



» Marko Vulić [Print](#) [?](#) [Help](#)

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Ime i prezime:	Marko Vulić	Broj indeksa:	5008/2010
Godina studija:	Druga	Mob.:	
Smer:	Elektronsko poslovanje	Tel.:	
Email:	marko@elab.rs (Primary)		
Adresa:	Beograd Srbija 11000 Zvezdara		
Dodatni komentar:			
Kreirano:	12.04.2012 21:05 by Marko Vulić	Poslednja izmena:	12.04.2012 21:05 by Marko Vulić

Accounts

[Create](#) [Select](#) (1 - 3 of 3)

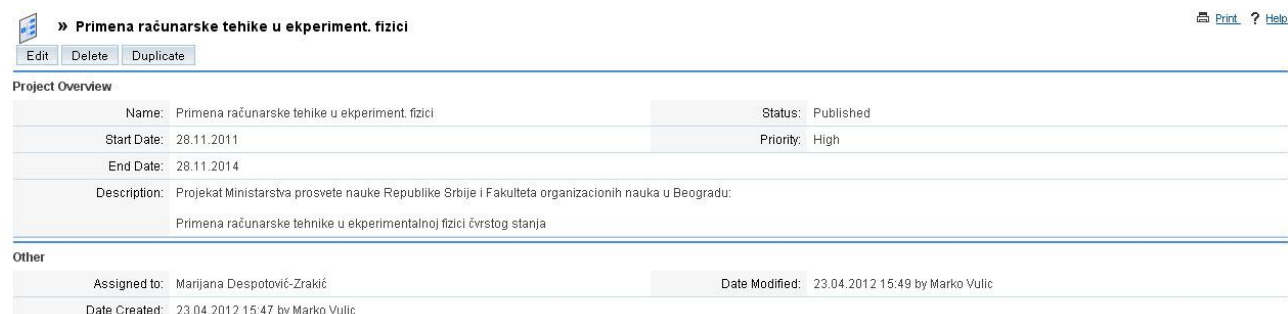
Account Name	City	Billing Country	Telefon	
Stipendisti ministarstva prosvete i nauke				edit rem
Služba za doktorske studije				edit rem
Univerzitet u Beogradu				edit rem

Projects

[Create](#) [Select](#) (1 - 1 of 1)

Name	Assigned To	Start Date	End Date	
Primena računarske tehnike u eksperiment. fizici	Marijana Despotović-Zrakić	28.11.2011	28.11.2014	edit rem

Figure 16: PhD studies module



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Project Overview

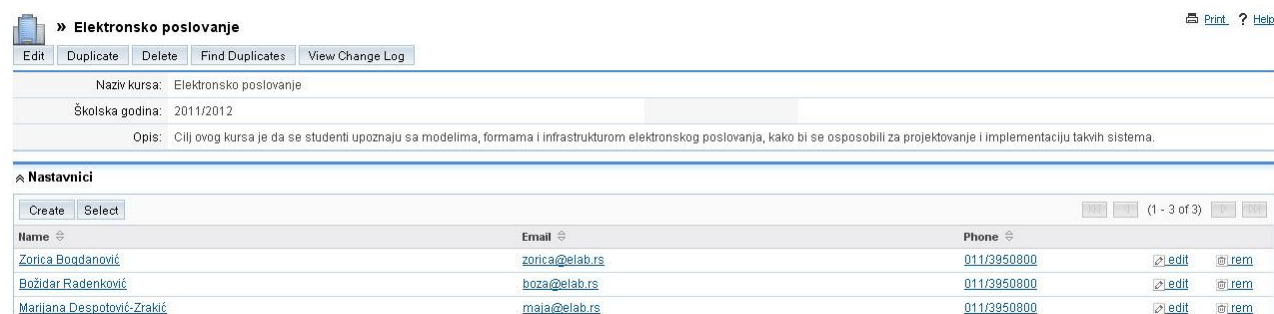
Name:	Primena računarske tehnike u eksperiment. fizici	Status:	Published
Start Date:	28.11.2011	Priority:	High
End Date:	28.11.2014		
Description:	Projekat Ministarstva prosvete nauke Republike Srbije i Fakulteta organizacionih nauka u Beogradu: Primena računarske tehnike u eksperimentalnoj fizici čvrstog stanja		

Other

Assigned to:	Marijana Despotović-Zrakić	Date Modified:	23.04.2012 15:49 by Marko Vulić
Date Created:	23.04.2012 15:47 by Marko Vulić		

Figure 17: Projects module

A module (Figure 7) was created in order to planning, organizing and implementation educational activities, i.e. courses. It provides information about subject teachers besides general information about courses. The goal is to raise a relationship management system between students and educational institutions on a higher level in a simple and quick way by availability and exchange of information to students.



» Elektronsko poslovanje [Print](#) [?](#) [Help](#)

[Edit](#) [Duplicate](#) [Delete](#) [Find Duplicates](#) [View Change Log](#)

Naziv kursa:	Elektronsko poslovanje
Školska godina:	2011/2012
Opis:	Cilj ovog kursa je da se studenti upoznaju sa modelima, formama i infrastrukturom elektronskog poslovanja, kako bi se osposobili za projektovanje i implementaciju takvih sistema.

Nastavnici

[Create](#) [Select](#) (1 - 3 of 3)

Name	Email	Phone	
Zorica Bogdanović	zorica@elab.rs	011/3950800	edit rem
Božidar Radenković	boza@elab.rs	011/3950800	edit rem
Marijana Despotović-Zrakić	maja@elab.rs	011/3950800	edit rem

Figure 18: e-Lab course module

4. CONCLUSION

The customer relationship management system is seen by educational institutions as a tool for more effective management of communication. The educational institutions that use the CRM are able to automate activities such as generating and sending e-mails, responding to student requests for a particular type of information, etc. The system based on maintaining relationships with students, the prospective students and the graduates represents the imperatives of competitiveness.

CRM metrics not only gauge the level of success, but also provide the feedback mechanism for continuous development of strategy and tactics. CRM metrics must follow and measure the enterprise's own CRM strategy. A hierarchy of metrics is required, depending on their purpose and who is using them.

We used SugarCRM in order to improve the development of higher education institution. The main goal was to emphasize the advantages and constraints of applying CRM in education. The future research directions include the further development of CRM infrastructure for student relationship management that can be shared, and organized for educational, scientific and research purposes.

ACKNOWLEDGMENTS

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MOBILE APPLICATION FOR EDUCATIONAL CLOUD MANAGEMENT

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Abstract: *The subject of this paper is the application of mobile services to working with distributed learning resources in the cloud. The goal of this paper is to introduce new services to students which will enable more convenient learning in the cloud computing environment. We have developed an Android application which enables the usage of cloud computing resources by students, who can make reservations of desired learning resources. The developed application is integrated with previously developed web services and with Moodle. The application is deployed within the e-learning infrastructure of the Laboratory for E-Business at the Faculty of Organizational Sciences in Belgrade.*

Keywords: *e-learning, cloud computing, mobile application, virtual machine, Android*

1. INTRODUCTION

Using information and communication technologies in the teaching process is inevitable nowadays. A large number of universities all around the globe use systems for e-learning. A number of users and quantity of available teaching materials in these systems are increasing and distance-learning systems are becoming more complex, thus it is needed to provide more advanced and more scalable IT infrastructure. The second issue is providing virtual machines for heterogeneous software running on different operating systems. For exceeding these problems, introducing cloud computing infrastructure is one possible solution.

Cloud computing infrastructure management is a problem which can be solved by developing an application. Laboratory for E-business at the Faculty of Organizational Sciences in Belgrade developed an application ELABCloud for cloud management. The application is designed for administrators of cloud computing infrastructure as well as to students which represent end-users of the system. The application consists of two main parts, which are web application and mobile application. In this paper, the mobile application will be described in detail.

2. TECHNOLOGIES USED FOR DEVELOPING THE APPLICATION

Mobile technologies are handheld IT artefacts that encompass hardware (devices), software (interface, applications), and communication (network services) (Jarvenpaa & Lang, 2005). By the end of 2011, it is estimated that there are more than 86 mobile subscribers per 100 inhabitants in the world (Free Statistics, 2011).

Service-oriented architecture represents a set of principles which permit developing of distributed applications (Vescoukis, Doulamis, & Karagiorgou, 2012). It includes all aspects of creating and using of business services (Yang, Sun, & Lai, 2011). Service oriented architecture (SOA) delivers application platform which connects business processes with operating resources. It provides interfaces for a new service based on the enterprise semantic and functional demands which are mapped into existing systems.

Web service is software which enables interoperable interaction between devices which are connected to network. Web services can be realized using different technologies. One of possible approaches is using REST architectural style. REST (REpresentational State Transfer) is an architectural style for distributed systems such as World Wide Web (Hamad, Saad, & Abed, 2010). This architectural principle is first defined by Roy Thomas Fielding in his PhD thesis (Fielding, 2000). In REST, all objects are resources with unique identifications. Data can be represented using XML, JSON, HTML or other technology (Wang, Mao, & Cai, 2009).

Realized web services should be scalable and reliable because they need to serve a large number of users simultaneously, which can be achieved by introducing the cloud computing infrastructure. This infrastructure enables working with distributed resources.

Cloud computing is a part of computer science and it enables providing Internet services to external customers via very scalable computing capacities (Sultan, 2010). It is abstracted, high-scalable and controlled computer infrastructure which hosts applications for end-users. Data and services are located in shared, dynamic and scalable set of resources based on technologies of virtualization and scalable application environments (Srinivasa, Nageswara, & Kumar, November 2009).

Cloud computing represents an infrastructure which is able to provide a high value to the distance-learning system, due to its ability to deliver computer resources as a service. One of the most important features of cloud computing is scalability which is enabled thanks to virtualization (Dong, Zheng, Yang, Li, & Qiao, 2009).

There are four types of cloud computing models: private cloud, public cloud, hybrid cloud and community cloud. Roles in the cloud computing are: cloud computing vendor, cloud computing provider and cloud computing customer. There are several approaches, depending on the way of delivering technology to the end-user (Costanzo, Assuncao, & Buyya, 2009): infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS).

3. CLOUD COMPUTING INFRASTRUCTURE OF THE LABORATORY FOR E-BUSINESS

Laboratory for E-business at the Faculty of Organizational Sciences in Belgrade conducts a large number of courses for undergraduate and postgraduate studies. These courses include E-business, Internet Technologies, M-business, Concurrent Programming, Internet Marketing and other courses. The Laboratory has been using e-learning concepts since 2001 and the concept of blended learning, which represents a combination of traditional learning and distance learning, is applied at the Laboratory.

Model of implemented cloud computing infrastructure at the Laboratory is presented in the Figure 1.

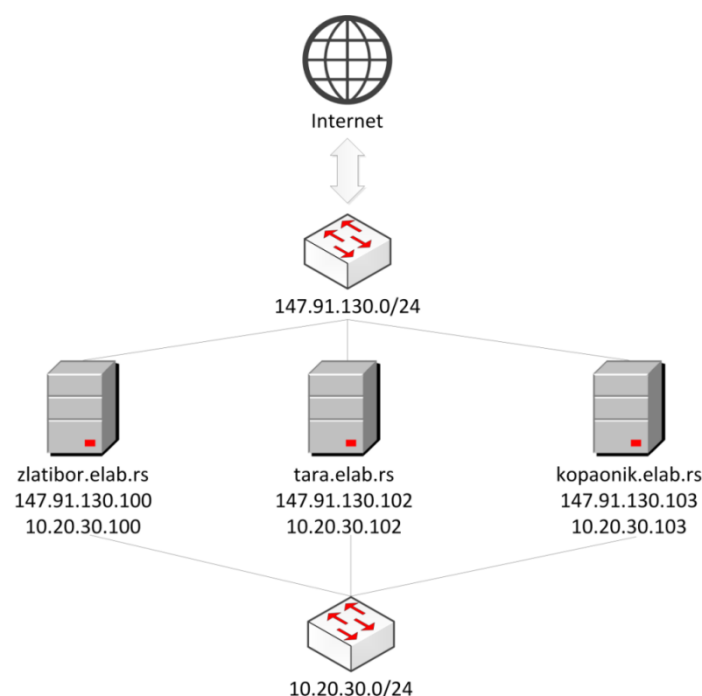


Figure 1: Model of cloud computing infrastructure

Moodle Learning Management System (LMS) is software which has been used in the Laboratory for several years. It permits managing the courses and it is used by schools, universities and individual teachers. Moodle enables publishing courses, teaching materials and assignments to web and tracking the progress of students. It is the core of the IT infrastructure of the Laboratory.

Apache is open source web server software which is used for running Moodle, as well as other web application at the Laboratory. For database management, MySQL server is used.

Subjects which are conducted at the Laboratory require very heterogeneous software packages running on different operating systems. Cloud computing infrastructure provides a scalable environment and it permits running different virtual machines simultaneously. Different system and application software is installed on these virtual machines.

Software OpenNebula is used for deploying cloud computing infrastructure. Currently, the infrastructure consists of three nodes. OpenNebula FrontEnd which controls the infrastructure is installed on one of these nodes. The non-shared storage subsystem is used for managing image repositories. Images are stored on the same server where the OpenNebula FrontEnd is installed.

Each node has a public and a private network interface. Public network interface uses public range of IP addresses assigned to the Faculty of Organizational Sciences (147.91.130.0/24). Private network interface uses private IP addresses (10.20.30.0/24). The main purpose of introducing private network interface is obtaining higher speeds for transferring large images between FrontEnd (where the image repository is located) and cloud nodes.

For delivering SMS services to students, Ozeki SMS Gateway is used. By using web services, it is integrated with other services provided by the Laboratory.

For user management, the Laboratory uses OpenLDAP server. It is an open source implementation of LDAP protocol which enables defining user accounts and roles. Using LDAP is convenient for users because they need to have only one account for accessing to all services which the Laboratory provides.

4. DESIGN AND IMPLEMENTATION

4.1. User request

It is needed to develop an application which is able to manage the cloud computing infrastructure powered by OpenNebula. The application should use OpenLDAP user accounts for authentication. Administrator prepares virtual machines with needed system and application software for taught courses. By using the application, administrator should be able to associate virtual machines to corresponding courses. All students which are enrolled to a specific course should be able to make a reservation for desired virtual machines. During the process of making a reservation, students should be able to choose a virtual machine they need as well as date and time when they want to use the virtual machine. Students should be able to make a reservation using their web browser or Android-based mobile devices. When previously reserved virtual machines are ready, students should receive SMS notifications. Remote access to virtual machines should be provided only by using a web browser.

4.2. Architecture of the application

The architecture of the application is shown in the Figure 2.

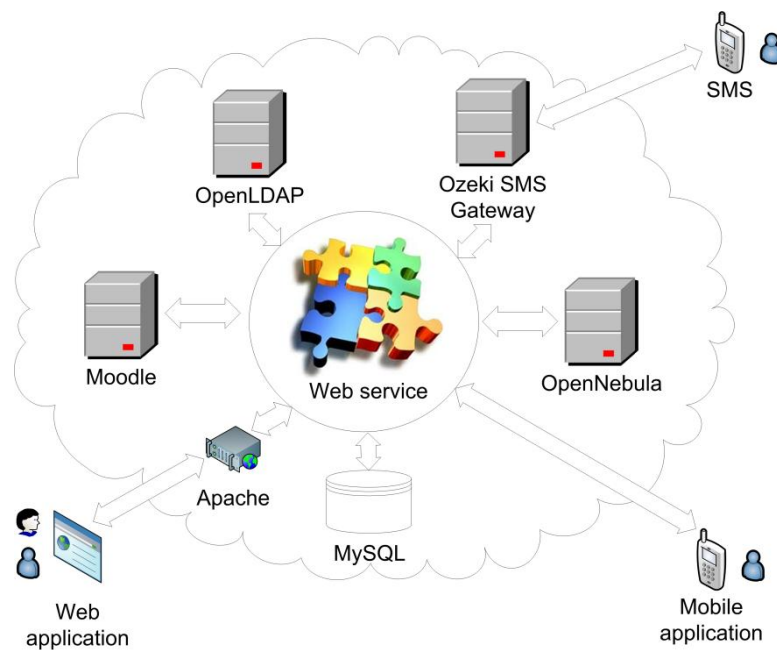


Figure 2: The architecture of the application

Administrators can access the application only by using their web browsers. End-users (students) can access the application using either their Android-based mobile devices or web browsers. End-users can also be notified about their learning progress via SMS messages. The application is based on REST web services. This approach permits developing mobile and web applications simultaneously, using the same infrastructure and the same data sets.

Web service enables integration of heterogeneous components, which are OpenNebula, Moodle LMS, MySQL database, OpenLDAP and Ozeki SMS Gateway. The main part of the web service is integration with OpenNebula software, which is responsible for managing the cloud computing infrastructure. OpenNebula provides its own application programming interface (API), which permits managing the cloud computing infrastructure from any other application. OpenNebula API uses XML-RPC based web services which can be used for invoking remote methods. Our web service uses OpenNebula's functionalities related to displaying all images for virtual machines in the cloud, as well as starting and stopping virtual machines.

The other principal functionality of web service is integration with Moodle LMS. Web service communicates with Moodle LMS using its built-in web services based on REST architectural style. This kind of integration enables fetching the list of students which are enrolled to the specific Moodle course.

User authentication subsystem is realized by using the LDAP protocol. User accounts are stored on the OpenLDAP server. LDAP authentication enables having a unique username-password combination for accessing all services. Same authentication data can be used for logging into Moodle LMS, this application and any other future services provided by the Laboratory.

MySQL server is used as a database server. Different data needed for the application are stored into the database, including the data related to reservations of virtual machines and data related to virtual machines that were previously enabled by administrators.

Web service is also integrated with Ozeki SMS Gateway, which permits sending SMS notifications to students. The computer where Ozeki SMS Gateway is installed is connected to GSM modem, which permits sending the messages.

4.3. Designing and deploying web application

There are two user roles in the web application: administrator and student (end-user). Use cases for administrator are following: displaying main settings, displaying running instances and modifying available virtual machines. Use cases for students are following: displaying available virtual machines, making

reservation of a virtual machine, displaying previously made reservations, displaying running instances, remote access to an instance and displaying Moodle courses.

After successful authentication, administrator can view system settings.

Other features related to administrator include displaying all running instances of virtual machines and displaying and modifying virtual machines.

Administrators make a choice which course they want to change available virtual machines for.

System displays a form for modification of enabled virtual machines for selected course (Figure 3). Administrator chooses which virtual machines are going to be available for desired course and confirms the entry.



Figure 3: Enabled virtual machines

System informs the administrator about the change.

Similarly, if students are logged in, they can choose an option for making a reservation for a virtual machine. After choosing a desired virtual machine, they should choose a date and time when they want to use virtual machine and a period of duration in hours.

Finally, if a student is logged into the application at the time defined for a previously made reservation, it is possible to invoke a remote access to a virtual machine choosing an appropriate option (Figure 4).

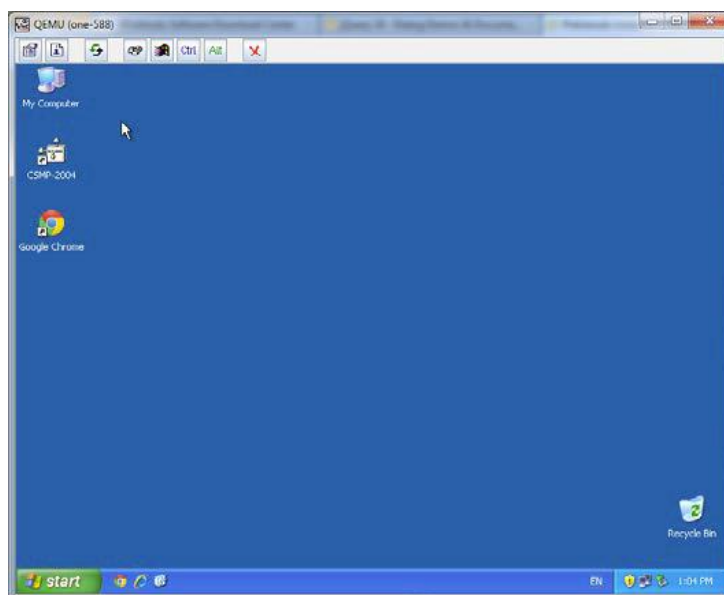


Figure 4: Remote access to a running virtual machine

4.4. Designing and deploying mobile application

After the analysis of user's requirements, following use cases were identified for a user of mobile application: login, making a reservation of virtual machine, making a reservation of virtual machine by scanning a QR code from Moodle LMS, displaying previously made reservations and log out. In addition to the use cases related to the mobile application, it is needed to implement SMS mobile services which are able to send a reminder to students at the time when reserved virtual machines are scheduled to run.

Mobile ELABCloud is developed for Android platform 2.2 or later. Main menu of the mobile application is displayed after successful authentication (Figure 5). Using the mobile ELABCloud application, student can make a reservation of any available virtual machine and it is also possible to view previously made reservations. This application uses same web services as the web application, thus the integration with Moodle LMS platform is supported as well. Currently, it is not supported to invoke remote access to a virtual machine by using a mobile device.



Figure 5: Main menu of the mobile ELABCloud application

The procedure of making a reservation is very similar to the web application's procedure. After a successful login, the student needs to select an appropriate option from the main menu and then it is needed to select a virtual machine, date and time of availability and duration (Figure 6). The system then informs the student about a successful reservation.



Figure 6: Making a virtual machine reservation via ELABCloud mobile application

The mobile application also permits another way for reserving virtual machines. In each Moodle course where the administrator enabled using of prepared virtual machines, there is a specialized resource in the form of web page (Figure 7). This page displays a list of virtual machines enabled for the current course. For each virtual machine, a corresponding QR code is displayed. QR code represents an ID number stored in the database for that virtual machine. QR code can be scanned using Android mobile devices by choosing an appropriate option in the main menu of the mobile ELABCloud application. After scanning the code, it is necessary to choose date, time and duration for reserved instance of the selected virtual machine.

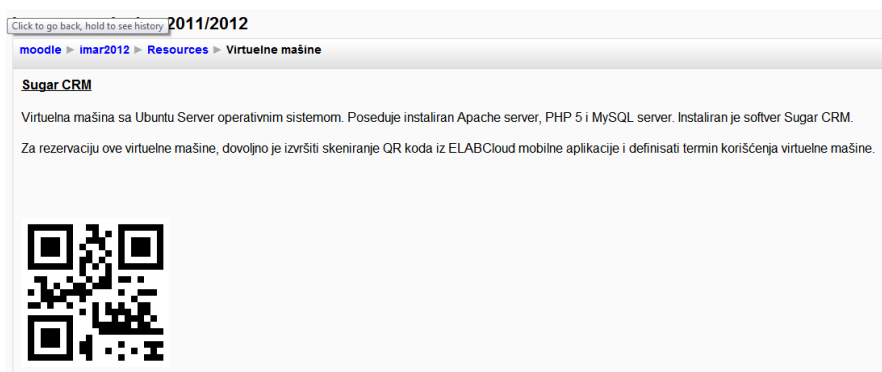


Figure 7: List of virtual machines at a Moodle course

Ozeki SMS platform provides a possibility of sending SMS notifications to students. It is integrated with ELABCloud web services which enable fetching the data about reserved virtual machines and users which made these reservations. OpenLDAP memorizes all data related to users, including their mobile phone numbers. These numbers are used for sending SMS reminders to students. SMS reminder is sent at the time which was scheduled for initiating a virtual machine during the reservation process. The content of a SMS is following: "The reserved virtual machine is now running. Please login to the ELABCloud application to use it."

6. CONCLUSION

Applications of mobile technologies, service-oriented architecture and cloud computing in e-learning were presented in this paper. Application ELABCloud which permits cloud computing resource management using web and mobile access was described. The application integrates OpenNebula, OpenLDAP, Moodle LMS and Ozeki SMS Gateway. REST architectural approach was used for developing web services. Target users of ELABCloud application are students and teaching stuff of the Laboratory for E-business. This application can be applied in other institutions as well. In the future, the application can be improved in several ways:

- Developing mobile applications for other mobile platforms;
- Improving of the integration of application with Moodle LMS and other components;
- Improving of the virtual machine reservation algorithm;
- Developing of a single-sign-on service which uses LDAP directory;
- Creating a module for analytics and statistics.

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SOFTWARE SOLUTIONS FOR CLASSROOM-PERIOD SCHEDULE REOPTIMIZATION USING FF AND FFD LOGIC

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Abstract: *This paper presents software solutions for the mathematical model which deals with university's teaching schedule defragmentation problem. According to the appropriate procedure, the following databases were formed: a database of all coded university courses and a database of the teaching schedule for each university classroom on a weekly basis. Based on the two previous steps the university temporal-spatial matrix is formulated. Then, the flowcharts are defined. Their main subroutines are calculation of a daily occupation parameter for each classroom at the university level, and reoptimization which consists of repositioning period fragments following FF and FFD approximation algorithm procedures. The programs written in C++ were tested at the University "Džemal Bijedić" of Mostar, B&H (56 classrooms, 12 periods and 6 working days per week).*

Keywords: *reoptimization, daily temporal – spatial matrix, bin packing approximation algorithms*

1. INTRODUCTION

School schedule is form of the general scheduling problem. It is defined as a description of movement and grouping of resources in time to achieve appropriate goals that are constrained by a set of conditions. In the general case, there is a set of resources and a set of processes which has to be performed for each of these resources. The resources include students, teachers, classrooms, periods, etc., while processes are lectures carried out by teachers, attended by certain group of students in the classroom of the appropriate type and capacity, in such a way that none of the participants is required to attend two lectures in the same time. Usually, on this basic problem many other constraints are added, such as periods allocated to lectures must be divided by working days of the week, number of lecture attended by students is defined by curriculum, teachers' working hours must not be exceeded, etc. Therefore, it is said that school schedule is feasible if and only if it satisfied its associated set of constraints.

On the other hand, one often deals with cases of improvement (optimization) of existing solution, called reoptimization. In this way, the timetable problem of University "Džemal Bijedić" can be considered. Each faculty for themselves makes lectures' timetable at the beginning of the semester for their classrooms. Exceptions are four university classrooms. Also, there are few cases when certain faculty cedes free periods in their classrooms to another one. So, it is obvious that the main disadvantage is drastically low level of classrooms' utilization at the University level.

However, the classrooms' utilization can be significantly improved if faculty lectures' timetable are considered at the University level. This means, the unification of all faculty timetables in University one, which can be further reoptimized, so, the number of used classrooms at the University level can be reduced. Reduction of the number of used classrooms means less cost to their maintenance as well as maintenance of equipment in them, while on the other hand opens up the possibility of their lease (additional revenue). So, University gets more effective management of available space. Another objective could be better planning for future investments in physical capacity.

In order to reach the goals, a mathematical model already presented in (Humo, & Vejzović, 2007), modified by first fit (FF) and first fit decreasing (FFD) bin packing (BP) approximation algorithms, is used in this paper. Applying it leads to the development of software and its application at the University "Džemal Bijedić" of Mostar.

2. INPUT DATA

In order to study temporal-spatial interaction it is necessary to define a subset of a basic period set on a daily basis for higher education H_d (Humo, 2005). In a concrete case this subset for observed University has been defined as follows: $H_d = \{08.15 - 09.00; 09.15 - 10.00; 10.15 - 11.00; 11.15 - 12.00; 12.15 - 13.00; 13.15 - 14.00; 14.15 - 15.00; 15.15 - 16.00; 16.15 - 17.00; 17.15 - 18.00; 18.15 - 19.00; 19.15 - 20.00\}$.

Temporal-spatial interactions are presented through daily schedules of teaching activities. For University "Džemal Bijedić" of Mostar it is represented by daily temporal-spatial matrix $M(I,J)$. One dimension of this matrix (columns) consists of the elements of subset H_d ($n(H_d)=bd$), while another dimension (rows) consists of the classrooms at the University. So, the row of university spatial-temporal matrix is 56×12 (56 classrooms in which the teaching is performed, 12 elements of H_d subset – bd).

The elements of university matrix f_{ij} ; $i=1, 2, \dots, 56$; $j=1, 2, \dots, 12$, are the course codes with a specific teaching activity performed in a given classroom in a given period.

The above course code consists of six figures. The first digit refers to a department. The following three figures refer to the course of the given department. The fifth figure of the code refers to the type of teaching activity. The last figure indicates the presence of different groups of students having the same type of teaching activity in a given course, but in different time periods. For example, code 800422 indicates the exercises for the second group attending the course Roman Law studied at the Department of Law, as shown in Figure 1.

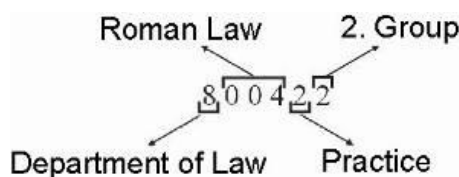


Figure 1: Course code

It is important to notice that one part of the code – its first digit – refers to a given department (element of the basic set: *departments*), while the following – second, third and fourth figures – refer to a concrete course (element of the basic set: *courses*), for which a specific teaching activity is performed (Humo, 2005). So, the university matrix is not two-dimensional, but four-dimensional, because its elements represent the interaction among elements of the basic sets: classrooms, periods, departments and courses. Introducing teachers (elements of the basic set: *professors*) and students (elements of the basic set: *students*), in a given model (course code), it could even be observed as a six-dimensional mathematical space.

A daily university spatial-temporal matrix, defined in this way, represents the input data for a software solution of its reoptimization, and it is shown by Figure 2.

As far as the proposed mathematical model is concerned, the difference is that the values of its elements are not binary. The values of its elements are 0 if there is no teaching activity in a given period in a given classroom, or they have the value defined by a code if there is a determined teaching activity performed. After loading the university spatial-temporal matrix it is necessary to calculate number of periods q_i for which classroom r_j is occupied and then to form the sequence $QR(I)$; $I = 1, 2, \dots, 56$; where the q_i elements refer to occupation of each single classroom for the working day under consideration.

Additionally, it is necessary to form resulting matrix of daily students' number $SA(I,J)$ (56×12) whose each element $sa(i,j)$ refers to how many students attend lecture given by f_{ij} . Furthermore, it is important to form following sequences: $TU(I)$; $I = 1, 2, \dots, 56$; where the t_i elements refer to type of each single considered classroom (general or special usage, laboratory, etc.), and $RM(I)$; $I = 1, 2, \dots, 56$; whose elements represent number of seats in each of considered classrooms.

		08.15-09.	09.15-10.	10.15-11.	11.15-12.	12.15-13.	13.15-14.	14.15-15.	15.15-16.	16.15-17.	17.15-18.	18.15-19.	19.15-20.
1	AL												
	UN												
	DM												
2	kino sala	703210	703210	100810	100810	501940	501940	101122	101122	0	0	0	0
3	Inf.u.c.1	0	0	0	0	0	0	601323	601323	601323	601323	0	0
4	Inf.u.c.2	604510	604510	604520	604520	604710	604710	604710	604710	0	0	0	0
5	masa sala	0	0	0	104220	104220	104220	0	0	0	0	0	0
6	velika sala	104210	104210	104210	100922	100922	100922	100922	0	0	0	0	0
7	Kab.hist.	220410	220410	220410	220610	220610	222920	222920	223020	223020	0	0	0
8	FHM5	0	0	0	201310	201310	201120	201120	209520	209520	0	0	0
9	FHM4	205510	205510	0	0	0	0	0	0	0	0	0	0
10	Tantawi	0	0	209420	209420	210420	210420	0	0	0	0	0	0
11	Fono-kab.	0	0	218720	218720	202820	202820	0	0	0	0	0	0
12	Amfiteatar	0	0	209220	209220	209410	209410	215510	215510	215510	215510	0	0
13	FHM2	0	0	0	0	218510	218510	0	0	0	0	0	0
14	FHM1	210520	210520	218520	218520	219120	219120	214320	214320	0	0	0	0
15	PA3	207820	207820	201510	201510	0	0	0	0	0	0	0	0
16	mult.u.c.	0	0	0	0	0	0	0	0	0	0	0	0
17	Inf.u.c.1	300922	300922	301921	301921	301922	301922	300622	300622	0	0	0	0
18	Inf.u.c.2	0	0	0	0	302121	302121	300821	300821	302122	302122	0	0
19	Inf.u.c.3	0	0	0	0	0	0	0	0	0	0	0	0
20	Inf.u.c.4	0	0	0	0	0	0	0	0	0	0	0	0
21	Inf.u.c.5	0	0	0	0	303922	303922	0	0	0	0	0	0
22	Inf.u.c.6	0	0	0	0	303821	303821	0	0	0	0	0	0
23	Amfiteatar	0	0	300610	300610	0	0	0	0	0	0	0	0
24	Amf.movi	300110	300110	302210	302210	0	0	0	0	0	0	0	0
25	U.c.1/i	402010	402010	402010	402010	400624	400624	400624	402123	402123	402123	402123	0
26	U.c.2/i	0	0	401310	401310	401310	0	0	402310	402310	402310	402310	0
27	U.c.3/i	0	0	403020	403020	403020	401421	401421	401421	401421	401421	0	0
28	U.c.4/i	0	0	403420	403420	400721	400721	400721	0	0	0	0	0
29	Inf.sala	403510	403510	403510	402510	404210	404210	404210	404210	404210	0	0	0
30	Sala GF	502610	502610	502610	0	504110	504110	504110	504110	0	0	0	0
31	Sala 12/3	502410	502410	502210	502210	501620	501620	501310	501310	501310	0	0	0
32	Sala inf.	0	0	0	502710	502710	502710	0	0	0	0	0	0
33	U.c.1q.	0	600910	600910	601110	601110	0	601322	601322	0	0	0	0
34	U.c.1iq.	0	0	601820	601820	0	0	0	0	0	0	0	0
35	U.c.1iq.	0	0	603410	603410	603420	603420	602610	602610	602620	0	0	0
36	U.c.1	503920	503920	503920	503920	0	705020	501810	501810	0	0	0	0
37	St.lik.1	0	0	0	0	0	0	0	0	0	0	0	0
38	St.lik.2	0	725910	725910	725910	0	0	0	0	0	0	0	0
39	U.c.201	0	0	701010	701010	718110	718110	718110	0	0	0	0	0
40	U.c.202	0	0	708110	0	0	730320	730320	0	0	0	0	0
41	U.c.204	723520	723520	709210	709210	709220	709220	0	0	0	0	0	0
42	U.c.205	0	0	708720	708720	721710	721710	0	705120	705120	0	0	0
43	U.c.206	0	0	714810	714810	730310	730310	0	0	0	0	0	0
44	U.c.207	716721	716721	716722	716722	0	0	0	0	0	0	0	0
45	Prakt.bot.	702721	702721	702722	702722	0	0	0	0	0	0	0	0
46	Prakt.anol.	702521	702521	702522	702522	704020	704020	0	0	0	0	0	0
47	U.c.Mosp.1	0	0	719210	719210	720710	720710	720710	0	0	0	0	0
48	U.c.Mosp.2	0	715721	715721	715722	715722	0	0	0	0	0	0	0
49	U.c.Mosp.3	0	0	717920	717920	0	0	0	0	0	0	0	0
50	U.c.Mosp.4	0	0	723310	723310	724810	724810	0	0	0	0	0	0
51	U.c.103	0	712820	712820	713010	713010	0	712810	712810	0	0	0	0
52	Sala 1q.	0	0	801110	801110	0	0	0	0	0	0	0	0
53	Sala 1iq.	0	802610	802610	802610	802621	802622	0	0	802010	0	0	0
54	Sala 1iq.	0	804110	804110	804110	803910	803910	804510	804510	0	0	0	0
55	Sala IVq.	805321	805321	805322	805322	805410	805410	805410	0	0	0	0	0
56	Sala post.	805522	805522	805521	805521	805522	805521	0	0	0	0	0	0

Figure 2: University matrix for Monday before reoptimization

3. FF AND FFD REOPTIMIZATION CONCEPT

Usually, the university (school) calendar is used as a base for the time-school problem analysis. First of all, this calendar with opening and closing data, allows comparing educational systems and their capacity and flexibility to meet the needs of students, as well as the other sectors of society. In this context, school time flexibility means a better use of available time, rather than asking for more time. Spatial dynamics of teaching is basically related to the distribution in space of different teaching activities. The greater the variety of these activities exists, the more specialized spaces are required.

Temporal and spatial coordination of different academic activities could be expressed as interactions among the elements of periods and classrooms sets on one side with the elements of the departments, courses, professors and students sets on the other side. Classes, in any given classroom, are scheduled in the course's fragments consisting of one, two, three or more periods. This means that every classroom is occupied during certain fragments of course periods, while in the others it is empty. Therefore, each classroom's daily occupation consists of occupied and empty fragments distributed in a determined way. In general, this distribution is different for each of the classrooms considered.

It is now reasonable to develop the reoptimization (defragmentation) procedure for the occupied fragments which will enable better usage of the classrooms available while maintaining the current time schedule. In order to do this, after identifying the status of all periods (occupied or empty) as well as the occupied fragments (clusters of periods), it is useful to calculate the q_i of each single classroom for the working day under consideration. When q_i are calculated for all the classrooms, the defragmentation procedure or fragments repositioning may start. The course fragments of the classroom with minor values of the q_i should be moved from their original position to the corresponding empty fragments of the classroom with major values of the q_i . When moving fragments from one classroom to another, additional conditions such as classroom size (number of seats) and teaching facilities installed (classroom type) must be respected. In addition, if there are more alternatives (classrooms) satisfying the above conditions, additional criteria, such as location vicinity, curricular similarity, etc. may be introduced.

Now, after main concept of defragmentation is shown, it is reasonable to introduce BP procedures. It was proved that BP approximation algorithms never differ from optimal packing by significantly more than 70 percent and they can on occasion be essentially this bad (Garey, & Johnson, 1990). The classroom's course fragments should be moved from their original position to the corresponding empty fragments of

the classroom with major values of the q_i , considered as objects of BP. This means that object size represents fragment of course periods size which we are trying to move to the corresponding empty fragments of the classroom with major values of the q_i . Meanwhile, other classrooms are considered as bins whose size is equal to number of elements of H_d subset (for University "Džemal Bijedić" it is equal to 12).

After these transformations it is reasonable to use approximation algorithms FF and FFD for defragmentation of spatial-temporal dynamics at university.

FF algorithm starts with classroom r_1 (first row of daily temporal-spatial matrix). First step is to determine first classroom's course fragment size. If it is one-period fragment, then: $f_{1j} \neq 0 \wedge f_{1j-1} \neq f_{1j} \neq f_{1j+1}$. For two-period fragment: $f_{1j} \neq 0 \wedge f_{1j-1} \neq f_{1j} = f_{1j+1} \neq f_{1j+2}$, and for n-period fragment:

$$f_{1j} \neq 0 \wedge f_{1j-1} \neq f_{1j} = f_{1j+1} = f_{1j+2} = \dots = f_{1j+n-1} \neq f_{1j+n}; j+n \leq b_d$$

In general case, for any classroom r_i and any n-period, fragment relation must be satisfied:

$$f_{ij} \neq 0 \wedge f_{ij-1} \neq f_{ij} = f_{ij+1} = f_{ij+2} = \dots = f_{ij+n-1} \neq f_{ij+n}; j+n \leq b_d \quad (1)$$

When relation (1) is satisfied, next step is seeking for "suitable classroom" $r_i \neq 1$, starting with r_2 , in which classroom's r_1 n-period fragment can be allocated. Classroom r_i is suitable if classroom type and number of seats are matched with same parameters for classroom r_1 , r_i must have corresponding empty fragments where classroom r_1 n-period fragment can be allocated, and q_i is greater than or equal to q_1 . So, suitable classroom r_i must meet:

$$tu_1 = tu_i \wedge q_1 \leq q_i \wedge sa_{1j} \leq m_i \wedge f_{ij} = f_{ij+1} = f_{ij+2} = \dots = f_{ij+n-1} = 0; i \neq 1$$

In general, above conditions are:

$$tu_p = tu_i \wedge q_p \leq q_i \wedge sa_{pj} \leq m_i \wedge f_{ij} = f_{ij+1} = f_{ij+2} = \dots = f_{ij+n-1} = 0; i \neq p \wedge j+n \leq b_d \quad (2)$$

Index p in relation (2) refers to classroom whose period fragments are trying to be allocated to the classroom r_i that meets relation (2). In case when relation (2) is not satisfied, next classroom is investigated, and so on. If there is no suitable classroom, same procedure is repeated for next classroom's r_1 occupied period fragment. After classroom r_1 , algorithm shifts to r_2 , then r_3 , and so on to the last classroom r_k , repeating above described procedure.

Of course, if classroom r_i is empty ($q_i=0$) or its all periods are occupied ($q_i=b_d$), algorithm is avoiding it. But, if relation (2) is matched, algorithm allocates classroom's r_1 n-period fragment to r_i , q_i is increasing for n , while q_1 is decreasing for n . After relocation, FF defragmentation is repeated for all period fragments of observed classroom, and for all remaining university classrooms.

FFD procedure begins with sorting classroom's r_1 n-period fragments in decreasing manner. Classroom's r_1 biggest n-period fragment (n_{max}) has a priority for allocating following FF procedure. After it, same procedure is repeating for the next biggest n-period fragment of classroom r_1 , to the last (the smallest) one. When application of FFD algorithm for classroom r_1 is finished, it is applied for all other university classrooms respecting their order in daily temporal-spatial matrix $M(I,J)$. Of course, relations (1) and (2) must be matched for allocation.

4. SOFTWARE SOLUTIONS

Figure 3 shows flow chart diagram for FF algorithm. So, routine begins with classroom r_1 . If it is empty or occupied all day then it has to be excluded ("if $QRI=0$ " or "if $QRI=12$ ").

Counter $BVZB$ follows classroom's occupied period fragment size which is trying to be allocated. It is increased by one when element of matrix M for observed classroom is not equal to zero, and when two contiguous elements are opposite to zero and equal (they have same course codes).

When occupied period fragment is found ($BVZB \neq 0$), subroutine "relokacija FF" (rFF) is seeking for classroom where observed period fragment can be relocated. This means that relations (1) and (2) must

be matched ($QR(K) \geq QR(I)$, $TU(K) \geq TU(I)$, and $RM(K) \geq SA(I, J)$). If these inequalities are satisfied, then time terms compatibility is investigated using variable L . Further on, if these inequalities are met together with $BVZB = BVSB$, relocation counter BR is increased by one, subroutine rFF decreases classroom's q_i whose period fragment is relocated by period fragment size. In the same time, rFF increases occupation of classroom where observed period fragment is relocated for the same value. But, if only one of above conditions is not met, rFF is seeking for suitable free time terms in other classrooms respecting there matrix order. After finishing rFF, above procedure is repeated for other period fragments of observed classroom. When these relocations are finished, routine FF is applied for other university classrooms respecting there matrix order.

In the end, it is necessary to investigate if any relocation was made ($BR=0$). If this is met, FF routine ends, but if it is not, routine goes to beginning and repeats procedure. This is necessary because of the following simplified case: let's take three contiguous classrooms $r-1$, r , $r+1$ (generally, they don't need to be contiguous) which meet these conditions $QR(r-1) \leq QR(r)-1$, $QR(r+1) \geq QR(r)$, $TU(r-1)=TU(r)=TU(r+1)$, $SA(r-1) \leq RM(r)$ and $SA(r) \leq RM(r+1)$. Figure 4 shows that in first step relocation of classroom's r_{i-1} period fragment at position t_{j-1} , t_j , t_{j+1} is not possible. But, in second step, after relocating t_{j+1} period from classroom r_i to r_{i+1} , it is obvious that procedure must be repeated, because period fragment relocation at position t_{j-1} , t_j , t_{j+1} in r_{i-1} classroom is possible to r_i . This is reason why it is necessary to repeat routine rFF until $BR=0$.

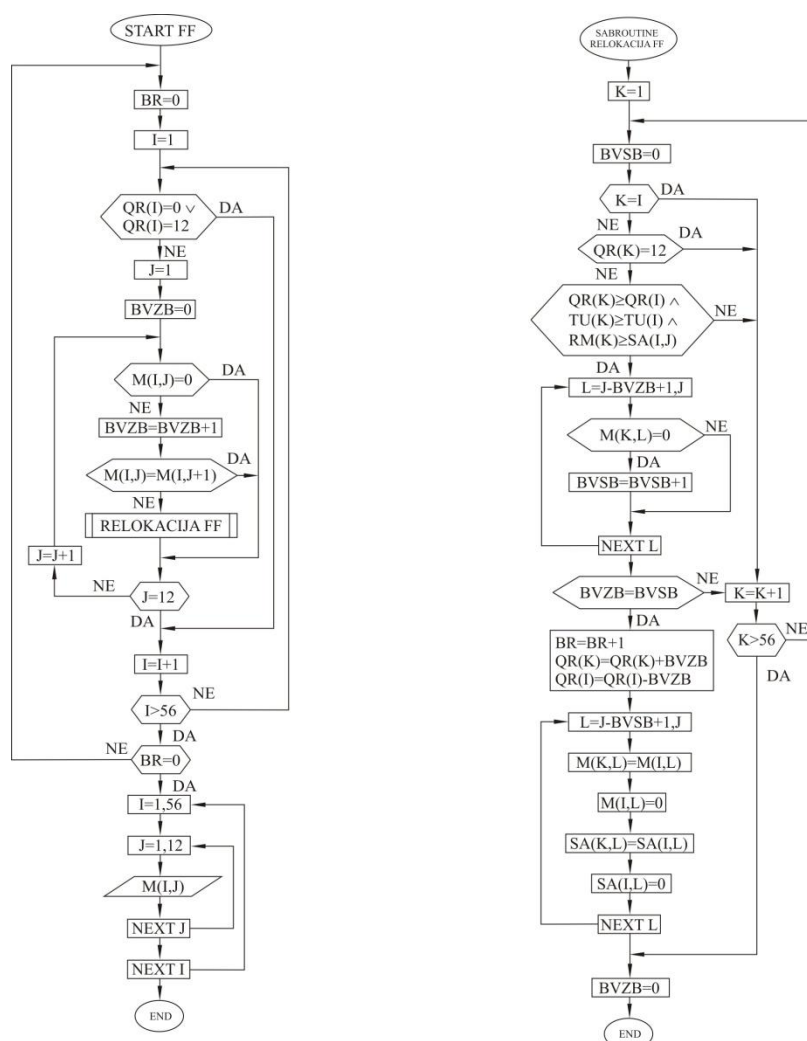


Figure 3: Flow chart diagrams for routine FF (left) and subroutine rFF (right)

Figure 4: Repeating defragmentation procedure until $RB=0$

```

1 while (br==1){
2   br=0; i=1; j=1; k=0;
3   while (pronadi_blok(1, j, k)){
4     if (relokacija_ff(1, j, k)){
5       j=j+k;
6       k=0;
7       br=1;
8     } else {
9       j=j+k;}}
10  bool pronadi_blok(int ucionica, int
    sdat, int sduzina){
11    int brojac = 1;
12    bool repeat_flag = true;
13    while (repeat_flag){
14      repeat_flag = false;
15      while (qr[ucionica] == 0 ||
        qr[ucionica] <= BROJ_TERMINA) &&
        ucionica <= BROJ_UCIONICA){
16        ucionica++;
17        sat=1;
18        if (ucionica > BROJ_UCIONICA){
19          return false;
20        } while (m[ucionica][sat] == 0 && sat <=
        BROJ_TERMINA){
21          sat++;
22        } if (sat > BROJ_TERMINA){
23          ucionica++;
24          sat = 1;
25        } repeat_flag = true;}}
26  if (sat == BROJ_TERMINA){
27    duzina = 1;
28    return true;}
29  while (m[ucionica][sat] ==
    m[ucionica][sat+1]){
30    brojac++;
31    sat++;}
32  sat = sat - brojac + 1;
33  duzina = brojac;
34  return true;}
35  bool relokacija_ff(int ucionica, int
    pocetak, int duzina) {
36    for (int i = 1; i <= BROJ_UCIONICA;
        i++){
37      int brojac = 0;
38      if (qr[i] != 0 && qr[i] != BROJ_TERMINA
        && i != ucionica && qr[i] >=
        qr[ucionica] && tu[i] >= tu[ucionica]
        && m[i] >= sa[ucionica][pocetak]){
39        for (int j = pocetak; j < pocetak +
            duzina; j++){
40          if (m[i][j] == 0) {
41            brojac++;
42          } if (brojac == duzina) {
43            for (int j = pocetak; j < pocetak +
                duzina; j++){
44              m[j][j] = m[ucionica][j];
45              m[ucionica][j] = 0;
46              sa[i][j] = sa[ucionica][j];
47              sa[ucionica][j] = 0;
48              qr[i] = qr[i] + duzina;
49              qr[ucionica] = qr[ucionica] - duzina;
50            } return true;}}
51    } return false;}

```

Figure 5: C++ code for FF procedure

```

graph TD
    START_FFD([START FFD]) --> BR0[BR←0]
    BR0 --> I1[I←1]
    I1 --> ORQ1{OR(I)≠0 ∨  
OR(I)=12}
    ORQ1 -- DA --> RELOKACIA_FFD[RELOKACIA FFD]
    RELOKACIA_FFD --> I1
    ORQ1 -- NE --> I1_1[I←I+1]
    I1_1 --> I56{I>56}
    I56 -- FD --> BR0
    I56 -- NE --> NEXT_J1[NEXT J]
    NEXT_J1 --> M_LJ1[/M(L)J/]
    M_LJ1 --> NEXT_I1[NEXT I]
    NEXT_I1 --> END1([END])

    START_ZAUZETI_FFD([START ZAUZETI FFD]) --> BZL0[BZL←0  
BVZB←0]
    BZL0 --> J12_1[J←1,12]
    J12_1 --> M_LJ2{M(L)J=0}
    M_LJ2 -- DA --> BVZB_BVZB1[BVZB←BVZB+1]
    BVZB_BVZB1 --> M_LJ2_1{M(L)J≠M(L)J+1}
    M_LJ2_1 -- DA --> BVZB_BVZB1
    M_LJ2_1 -- NE --> BZL_BZL1[BZL←BZL+1  
NVZB(BZL)←BVZB  
NILZ(BZL)←J-BVZB+1  
BVZB←0]
    BZL_BZL1 --> NEXT_J2[NEXT J]
    NEXT_J2 --> K1_BZL[K←1,BZL]
    K1_BZL --> MIN100[MIN←100]
    MIN100 --> N1_BZL[N←1,BZL]
    N1_BZL --> NVZB_N_MIN{NVZB(N)≠MIN}
    NVZB_N_MIN -- DA --> INDEX_NILZ_N[INDEX←NILZ(N)  
MIN←NVZB(N)]
    INDEX_NILZ_N --> NEXT_N[NEXT N]
    NEXT_N --> SNVZB_K_MIN[SNVZB(K)←MIN  
NVZB(K)←NVZB(K)+1000  
SNILZ(K)←INDEX]
    SNVZB_K_MIN --> NEXT_K1[NEXT K]
    NEXT_K1 --> K1_BZL1[K←1,BZL]
    K1_BZL1 --> NVZB_K_NVZB_K1000[NVZB(K)←NVZB(K)+1000]
    NVZB_K_NVZB_K1000 --> NEXT_K2[NEXT K]
    NEXT_K2 --> END2([END])

    START_ZAUZETI_FFD --> K_BZL[K←BZL]
    K_BZL --> BVSB0[BVSB←0]
    BVSB0 --> T1[T←1]
    T1 --> T1{ T=1 }
    T1 -- DA --> ORQ_T12{OR(T)≠12}
    ORQ_T12 -- DA --> ORQ_T12
    ORQ_T12 -- NE --> ORQ_T12_1{OR(T)≠Q(R(I) ∧  
RM(T)≠SA(L,NILZ(K)) ∧  
TU(T)≠TU(I))}
    ORQ_T12_1 -- DA --> L_SNVZB_K_SNVZB_K1[L←SNILZ(K),SNILZ(K)←SNVZB(K)+1]
    L_SNVZB_K_SNVZB_K1 --> M_L_T1{M(T,L)=0}
    M_L_T1 -- NE --> BVSB_BVSB1[BVSB←BVSB+1]
    BVSB_BVSB1 --> NEXT_L1[NEXT L]
    NEXT_L1 --> BVSB_SNVZB_K{BVSB≠SNVZB(K)}
    BVSB_SNVZB_K -- NE --> T1_T1_1[T←T+1]
    T1_T1_1 --> T1
    BVSB_SNVZB_K -- DA --> BR_BR1[BR←BR+1  
OR(V)←OR(V)∨SNVZB(R)  
OR(U)←Q(R(I)∨SNVZB(R))]
    BR_BR1 --> L_SNVZB_K_SNVZB_K1
    L_SNVZB_K_SNVZB_K1 --> M_L_T1_1{M(T,L)≠M(L)  
M(L,L)=0  
SA(T,L)≠SA(L,L)  
SA(L,L)=0}
    M_L_T1_1 --> NEXT_L2[NEXT L]
    NEXT_L2 --> K_BZL_1[K←BZL-1]
    K_BZL_1 --> K0{K=0}
    K0 -- DA --> END3([END])
    K0 -- NE --> T1_T1_1
    T1_T1_1 --> T1
    T1_T1_1 --> T5[T←5]
    T5 --> END3

```

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Counter *BZL* determines how many occupied period fragments are in observed classroom. *BVZB* counter has same role as in rFF. This means that it determines each occupied period fragment size, and they are elements of *NVZB(I)*. So, observed classroom whose occupied period fragments are trying to be allocated, has *BZL* occupied period fragments that have *BVZB* sizes. It is also necessary to create *NILZ(I)* sequence. Its elements represent matrix *M* column index for observed classroom, where each occupied period fragment starts presented by *NVZB(I)* elements. Now, following FFD algorithm, sequence *NVZB(I)* has to be sorted. In programming, there is lot of different sorting procedures. One of them is used here, and it will not be explained. *SNVZB(I)* is sorted *NVZB(I)* sequence. As *NILZ(I)* elements follow occupied period fragment's positions (presented by *NVZB(I)* elements in matrix *M*), it has to be sorted too. Result is *SNILZ(I)*, which is sorted *NILZ(I)* sequence. Subroutine zFFd is finished, and subroutine "relokacija FFD" (rFFD) starts (right flow chart diagram on Figure 6).

Subroutine rFFD requires seeking for suitable classroom where *SNILZ(I)* elements are trying to be allocated, so that the last element *SNILZ(BZL)* is trying to be allocated (because *NILZ(I)* is sorted ascending), starting with first matrix row *M(1,J)*, to classroom satisfying four conditions: $QR(T) \neq 12$, $QR(T) \geq QR(I)$, $TU(T) = TU(I)$, and $RM(T) \geq SA(I, SNILZ(K))$. If at least one of these conditions is not satisfied, rFFD repeats procedure with next classroom.

In the case that all four conditions are met, it is necessary to determine if classroom *T* is free for period fragment that is trying to be allocated. So, to do relocation, matrix elements *M(T,L)* must be zeros for $\forall L \in [SNILZ(K), SNILZ(K) + SNVZB(K) - 1]$, which means that *BVSB* = *SNVZB(K)* (counter *BVSB* determines free period fragment size in *T* classroom). *QR(T)* is increasing for period fragment size while *QR(I)* is decreasing for the same value, matrix elements *M(I,L)* become zeros and *M(T,L)* becomes course code whose period fragment is relocated for $\forall L \in [SNILZ(K), SNILZ(K) + SNVZB(K) - 1]$, allocation counter *BR* is increasing by one, number of students who attend course is relocated from *SA(I,L)* to *SA(T,L)* after what *SA(I,L)* becomes zero for $\forall L \in [SNILZ(K), SNILZ(K) + SNVZB(K) - 1]$. But, if *BVSB* \neq *SNVZB(K)*, procedure is repeated for (*T*+1) classroom. Subroutine rFFD is repeated for all *SNVZB(I)* sequence's elements (*BZL* times).

When one classroom is finished, rFFD, zFFD and rFFD are repeated for all other matrix classrooms. After all classrooms are investigated, it is necessary to determine if *BR* \neq 0, for the same reason explained by Figure 4. When *BR* = 0, rFFD ends. C++ code for FFD procedure is given by Figure 7.

```

1  while(br==1) {
2  br=0; i=1;
3  while(zauzeti_ffd(i)){
4  if(relokacija_ffd(i)){
5  br=1;
6  i++;}
7  bool zauzeti_ffd(int ucionica){
8  int bvzb = 0;
9  int index = 0;
10 bzl=0;
11 bool repeat_flag = true;
12 while (repeat_flag){
13 repeat_flag = false;
14 while((qr[ucionica] == 0 ||
15 qr[ucionica] == BROJ_TERMINA) &&
16 ucionica <= BROJ_UCIONICA){
17 ucionica++;
18 if (ucionica > BROJ_UCIONICA){
19 return false;
20 }
21 for(int sat = 1; sat <=
22 BROJ_TERMINA; sat++){
23 if(m[ucionica][sat]!=0){
24 bvzb++;
25 }
26 if(m[ucionica][sat] !=
27 m[ucionica][sat+1]){
28 bzl++;
29 }
30 nvzb[bzl] = bvzb;
31 nilz[bzl] = sat-bvzb+1;
32 bvzb=0;}}}
33 for(int k = 1; k <= bzl; k++){
34 int min = 100;
35 int index_n;
36 for(int n = 1; n <= bzl; n++){
37 if(nvzb[n] < min){
38 index_n = n;
39 }
40 min = nvzb[n];
41 }
42 snvzb[k] = min;
43 snilz[k] = index;
44 }
45 }
46 }
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```

Figure 7: C++ code for FFD procedure

Figure 8 a and b shows matrix *M* after applying FF and FFD procedures, respectively.

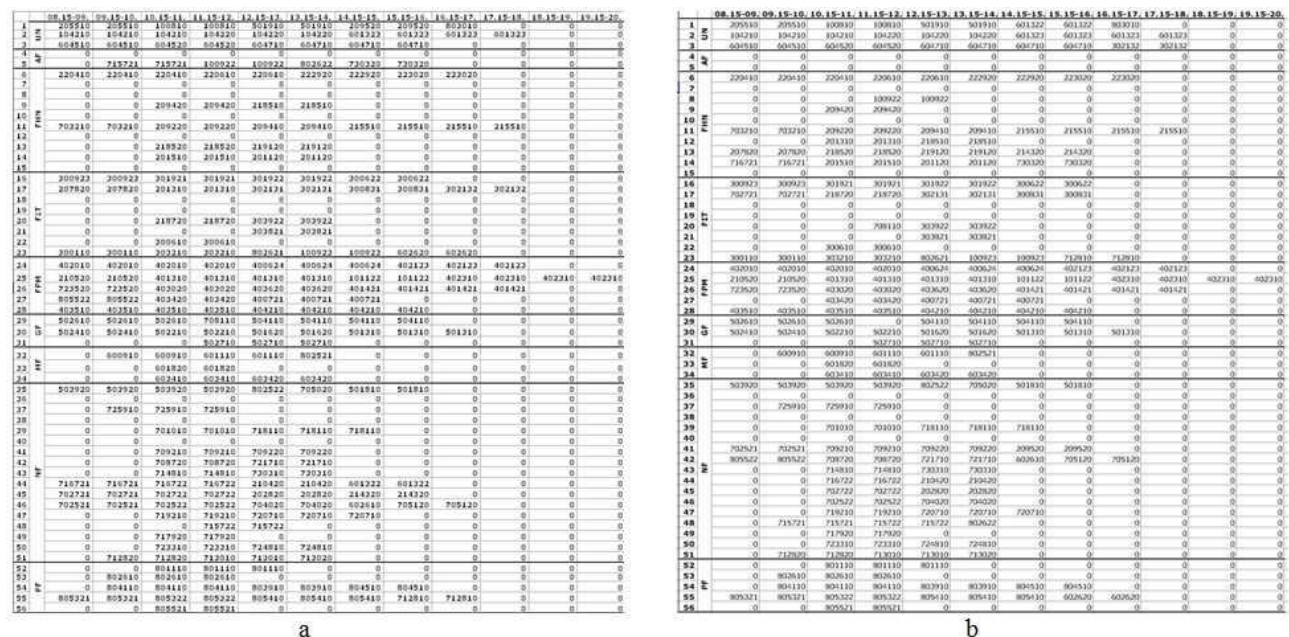


Figure 8: Matrix M after applying FF (a) and FFD (b) procedures

FF and FFD procedures applied in university time table reoptimization are upgraded software solutions of (Vejzović, Humo, 2007).

5. DISCUSSIONS

Now, it is reasonable to make comparison between input and output matrix M (Figures 2 and 8). As a result of school timetable reoptimization the number of empty classrooms is increased: from 5 in input matrix M to 12 using FF, and 10 for FFD solution.

Very interesting comparison of classrooms with maximum of six occupied periods, where empty classrooms are not taken into account, can be done. In that case, 33 of those classrooms were reduced to 23 for FF, and 25 for FFD. Similar situation is for all other working days, which can be seen in Table 1.

Further analysis could be done comparing mornings' and afternoons' periods, where solutions are not helpful due to human factor, because general tendency at University is to complete all teachings to 14.00. So, reoptimized school timetable by FF and FFD solutions can offer more efficiently usage of university classrooms. At the same, it was shown that solutions have practical value.

Table 1: Comparison between input and output matrix M for other working days

STATE	TUE.	WED.	THU.	FRI.
INPUT	≤6	30	28	37
	=0	5	8	8
FF OUTPUT	≤6	17	17	24
	=0	12	16	16
FFD OUTPUT	≤6	17	16	24
	=0	12	16	16

6. CONCLUSION

Today, requests for more time are very frequent in every human activity. These requests are often an insurmountable obstacle. However, the solution lies in better time flexibility, and its better utilization. Furthermore, more regular spatial arrangement of planned instructional activities, can considerable diminish the problem of lack of time. The proper time-space dynamics, not only in the system of higher education, but also in other spheres of human labor such as ports, airports, railways, even in manufacturing, does not represent only saving. It is representing (re)optimization, too. In the general sense, optimization is a way to improve the economic effects of human work.

Further on, presented software solutions have shown that it is possible to increase the flexibility of pre-defined temporal and spatial dynamics of real system of higher education such as University "Džemal Bijedić" of Mostar. Increasing the flexibility of scheduling classes (increasing the number of empty classrooms) at the university, which includes its heuristic optimization with respect to realistic constraints, is also a concrete example of practical application and relevance of these solutions. Thus, solutions are practically applicable, with respect of the real limitations concerning the type of classrooms in which teaching is conducted, their capacity (number of seats), and the size of the group of students (their number) who attend a given class.

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CONTEMPORARY MODEL OF AN INFORMATION SYSTEM IN PRIMARY AND SECONDARY SCHOOLS

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Abstract: This paper presents an information system whose task is to improve the quality of teaching and educational and administrative work systems in schools. The advantages of applying an information system based on information and communication technologies in education are: improving the quality of teaching, objectivity in the evaluation of students' knowledge, and transparency, which is reflected in the viewing and access to data and other documents by students, parents, school management, school teachers, sectors in the Ministry of Education and other factors directly or indirectly involved in the teaching process. Another advantage is the mobility of data from the database which is used for statistical analysis and serves to improve the teaching and educational process by increasing the overall quality of educational and training efficiency.

Keywords: education, process, information, system, transparency, objectivity, teaching, quality, statistics

1. INTRODUCTION

The educational process in Bosnia and Herzegovina (BiH) and its surrounding countries is still stagnating on its traditional method which is based on frontal work with students using a piece chalk and a black-board with the lack of use of ICT. The reason for this is inefficient engagement of state sectors, schools' management and teachers themselves. In this type of constellation in the education process it is very hard to lift the level of quality of lecturing, with that the knowledge of students. To improve the education process it is vital to start using an information system in phases. First phase: convince the proficient state sectors in investing in education, second phase: training the teaching staff to use ICT in lectures, and phase three: use of the information system which will in a very short time enhance the quality of teaching.

2. PREPARATION OF A TEACHER FOR CLASS-ENTRY DATA

The preparation for class of the teaching unit which will be covered is very important so that the lecture reaches its peak. Preparation as a guide, for the teacher through the lecture is important as well as other elements. Educational tools, in this case it would be a computer with a 60 inch (152 cm) LCD monitor. The computer that the teacher uses would have to be connected to all the other computers that the students use. The teacher would than use software to enter data for the lecture structure with all elements of the preparation. The data is stored in a knowledge base and database with all the additions (documents, instructions, presentations, software and other that the teacher used during the preparation of the given teaching unit). All data of this lecture preparation is visible to a new teacher who will come as a substitute to the one that made this lecture preparation and will with new innovations upgrade and leave for the next teacher to come. Apart from the new teacher, the preparation (with all its documents) can be seen by students' parents that prepare their child for evaluation and view all material the teacher used for preparation.



Photo No. 1. Data distribution

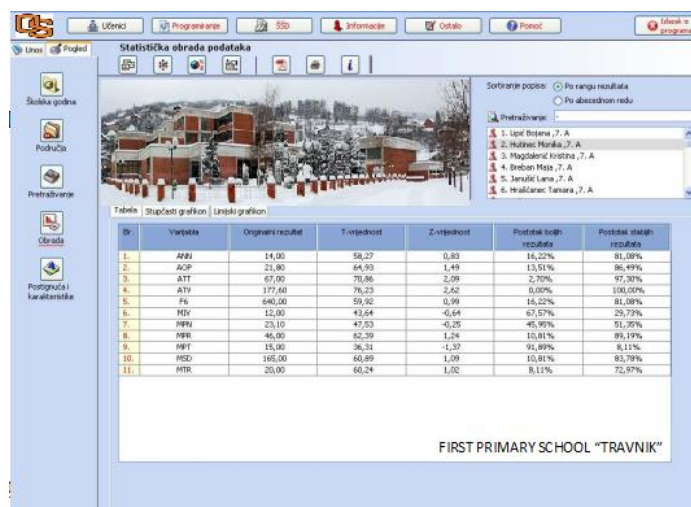


Photo No. 2. Preparations for one class and one subject

The web server can store statistics data of teachers' reports (students' accomplishments and behaviour), students' statistics, classes, school generations, statistics of absences and other information (financial, goods and materials and other) which are needed by Ministry sectors. This data is entered by school sectors. Data that is crucial for the upbringing of the student is entered by the school psychologist, data that is related to the accomplishment and behaviour of students is entered by the class teachers and the financial, goods and materials data is entered by the school secretary. The full overview is done by the school director. What should be pointed out is that the view inside a certain subject can only be done by the teacher that teaches that subject and not into any other module. The secretary has access to only his/her module (bookkeeping), the school psychologist has access only to data that is related to him/her. It is important that only students' parents have access to their own data while others do not.

3. THE INFORMATION SYSTEM MODULES

The information has nine modules:

- **Lecture preparation module** – the teacher enters the lecture preparation (lecture structure) and other information that is important for the lecture realization,
- **Teaching diary module** – teachers enter accomplishments and behaviour of students, attendance and other information related to the teaching process,
- **School secretary module** – entry of materials and financial data and other reports and information,
- **School psychologist module** – entry of all inclusion data and all other information related to the upbringing of students,
- **Parents module** – view of students' accomplishments,
- **Ministry module** – view of statistics data on request, sending information and instructions toward schools,
- **School director module** – view of all data on request. There are as many computers as there are students in a classroom (student-computer),
- **Moodle module** – transfer system of documents and other files needed by teachers and students. Entry to this module is protected by a LOG-IN password system. Each student or teacher has their own LOG-IN password.
- **Student evaluation module** – students in this module receive a test by random choice of questions and are required to complete it in a certain amount of time (45 min.). After the test, students are allowed to view their results. The test is electronically sent to a database where it stays visible to all factors of the teaching process.

4. THE INFORMATION SYSTEM INFRASTRUCTURE

The computers are linked to a local (LAN) network with one server and LCD monitor which is placed above and behind the teacher, visible to all students in the classroom. The computer that the teacher uses is connected to the LCD monitor mounted on the wall facing the students. Everything being done on the teachers' computer can be seen on the monitor. The network of computers is linked to a global network-internet. Students' computers are equipped with the same programs as the teachers' (same version), the only difference is in the access to the programs, maps and documents. The teacher has access to all programs on the computers being used by the students.

All computers in the school are connected to a network. The main database and knowledge base are on the web server. Every user has his/her LOG-IN password and access to only their module. Access to data can be established by any computer linked to the internet. Each student is given his/her own (always the same) computer. For work with documents we have chosen the Moodle system that gives each student a subject on whose module includes all documents and additions for the given subject.

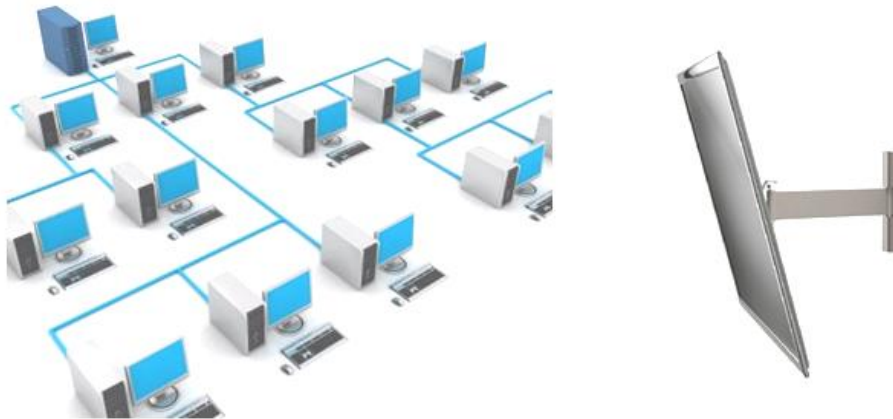


Photo No. 3. Blueprint of computers in a local network, classroom with one monitor (152cm.)

5. DESCRIPTION OF A LECTURE

Instead of a teaching diary a teacher has a computer in front of him. The work schedule in modules is as follows:

1. Opens the **Teachers' diary module**:
Enters the students' attendance data (present and absent). This module is constantly open during the lecture and any data relating to it can be entered at any time (credit for students' activities ect.).

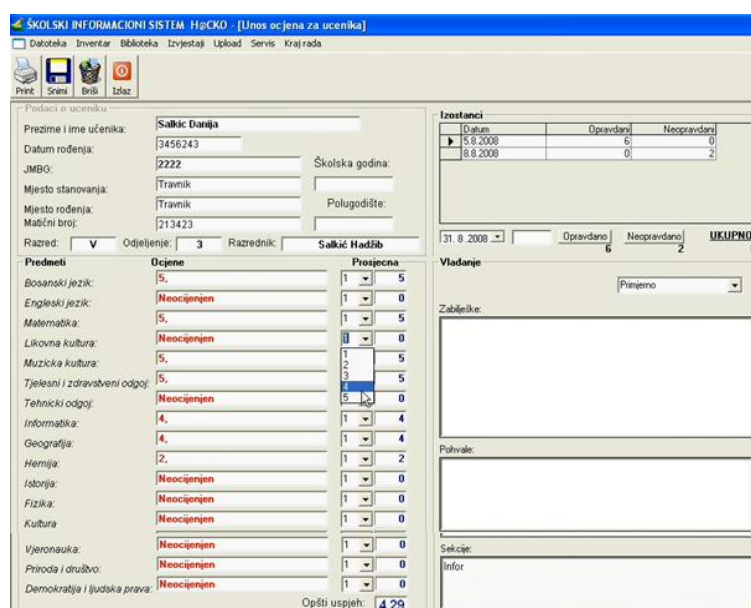


Photo No. 4. Score of students

2. Opens the **Lecture preparation module**:
Lecture preparation (lecture structure) leads the teacher through the teaching unit with all additions (presentation, links, and all other needed documents) which are crucial for the teaching unit to be as successful as possible. Of course, the work of the teacher is followed on the LCD monitor visible to all students, above the teachers' desk.
3. The teacher **starts one of the programs** on the computer in he/she wishes to work in. At the same time the students follow the teachers' instructions and work independently unless the teacher has assigned a group assignment. Teachers usually use the internet to show the students how to explore and solve the given assignment. The students can use only those programs on the computer which are pointed out by the teacher. After finishing an assignment students transfer the document into a subject map where it stays and a copy is sent to the teacher.
4. **Moodle system**:
Consists of all necessary documents, presentations and other additions related to the teaching unit.

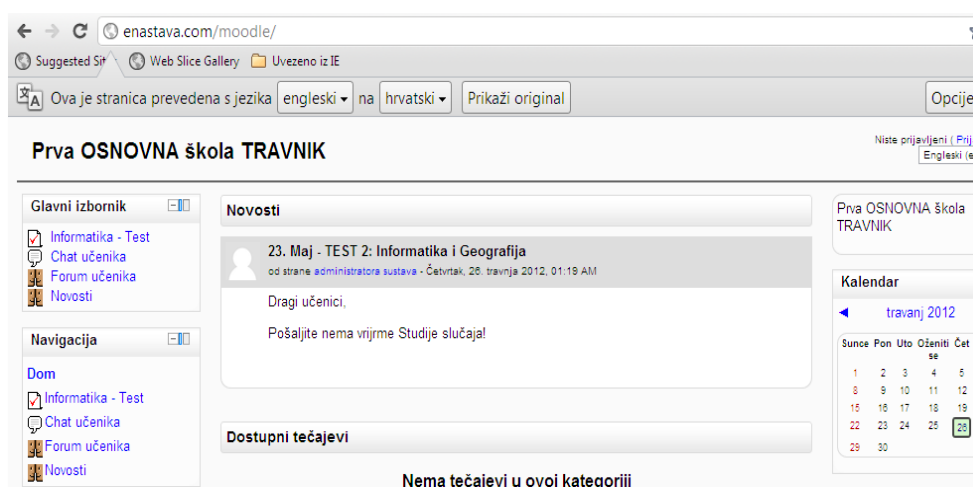


Photo No. 5. Moodle system Web interface

Everyone has access to the Moodle system; according to privileges (student, teacher, moderator, administrator) so that others without a LOG-IN password do not have access. This is one kind of privacy protection and exchange of information, documents and other additions between students, teachers and

others in the teaching process, so others who are not in the teaching process are unable to access and violate the work system.

It is very important to emphasise that apart from documents, presentations, additions and such, a live-stream link is installed into the Moodle system which enables following of lectures (which are taking place) through this channel as well. Registration is free but for the complete version with a price (on www.Livestream.com), that also enables additions that were used during the lecture. They are usually instructions which are made in Camtasia studio as a video clip. After the finished instruction (video clip) it is uploaded onto a live-stream channel (www.livestream.com/prva-os-travnik). This way all video clips are found on one address and numbered according to the teaching unit. Students within 24 hours can start and watch any of the video clips. Apart from the video clips there is a possibility of following parts of the lecture live (online), for example, in a case of a weather storm or scheduling a special conference period. This type of communication enables students with special needs to listen to the lecture more than once and for those that have problems reaching school. In this case students are able to listen to the lecture from their homes and also the teacher to teach it from home. Also, lectures can be set in a way so that chosen students are given a LOG-IN password so they are able to defend their seminar papers. This type of communication through live-stream breaks the monotony of the lectures. There is also a possibility to make a debate club or quiz, and make two channels: www.livesream.com/ost-dk-1 and www.livesream.com/ost-dk-2 which would be posted on the webpage. One group of students would log on to one channel (or one class) with one assignment and the other to a second one (or other class). The teacher would be the mediator, while other students would follow what is happening from their homes on the webpage (www.is-nastava.ba/livestream-kanal). Comments would be able to be posted on the chat page of the live-stream channel. Presence to this event is reported by registration onto the chat channel, and under the channel video picture the number of persons present in this event is visible.

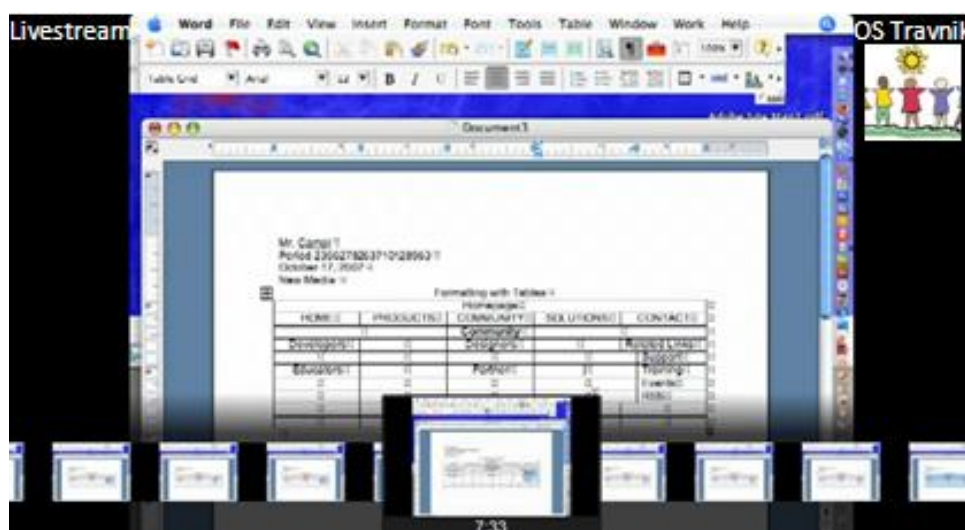


Photo No. 6. Livestream channel

6. STUDENT EVALUATION

After a certain teaching cycle, students are required to take a test. The test is done on a computer by a random choice of questions from a given subject. The teacher prepares questions and answers and enters them into this module. After the finished test, the students can see the results of their achievement. The test is electronically sent to a database and stays visible to all factors in the teaching process.

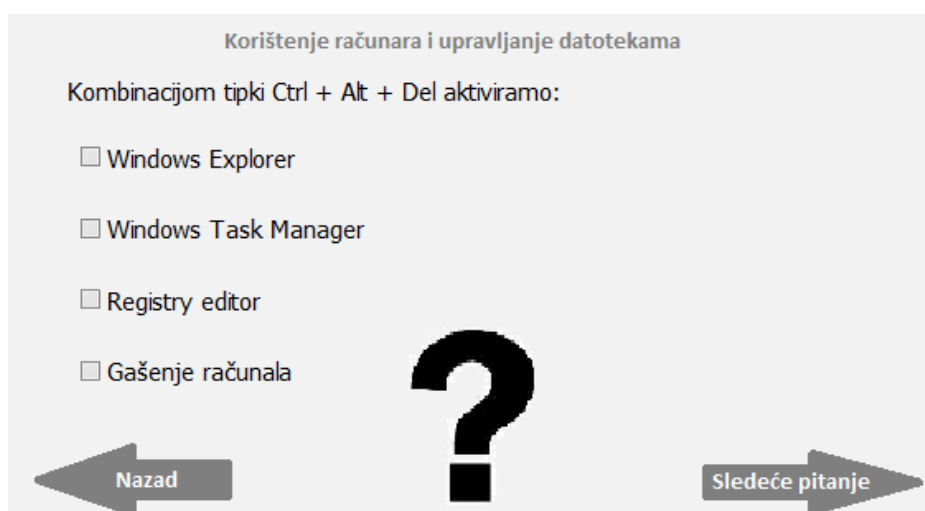


Photo No.7. Electronic test



Photo No.8. Anyplace Control - remote control



Photo No.9. Anyplace Control - file transfer



Photo No.10. Anyplace Control – direct connection mode



Photo No.11. Anyplace Control – online account

7. WEB PAGE – ACCESS TO DATA

The web page serves students, parents, teachers, school management and sectors in the Education Ministry to access data and work modules. Access to data is provided by the schools' IT sector which is responsible for the operation of this information system.

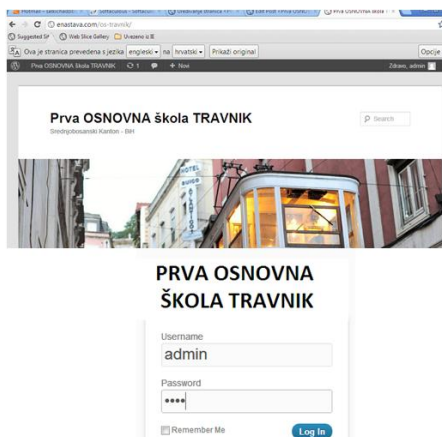


Photo No.12. Access to data and modules in operating the web page

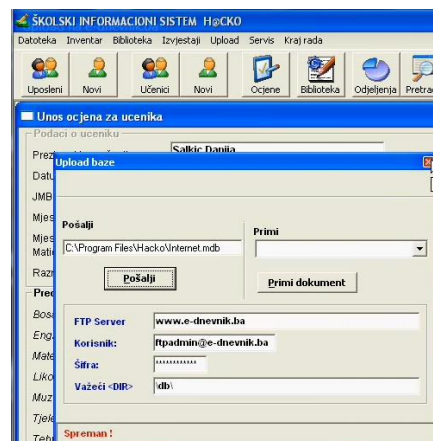


Photo No.13. Internet data



JMBG	PREZIME I IME	BOS.J	ENG.J	MAT.	LIK.	MUZ.	TZO	TEH.	INF.	GEO.	HEM.	IST.	FIZ.	KUL.	VJE.	PRI.	DEM.	UKUPNO
1113	Selvedin Haskić	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
151151	Ibrahim Abdić	5	5	5	4	0	0	0	0	0	0	0	0	0	0	0	0	4.75
171	Irma Zukan	1.2	4.33	3	0	0	2.33	2.67	0	0	3.33	0	0	0	0	0	0	2.81
1555	Siha	5	5	1.33	5	2	0	0	0	0	0	0	0	0	0	0	0	3.67
135	Mugo	4	4	5	0	5	0	1	0	0	1.33	0	0	0	1	0	0	3.05
121212	Dragan Stojnić	5	4	3	5	0	3	0	0	2.33	0	0	0	0	0	0	0	3.72

Photo No.14. Statistic score of students

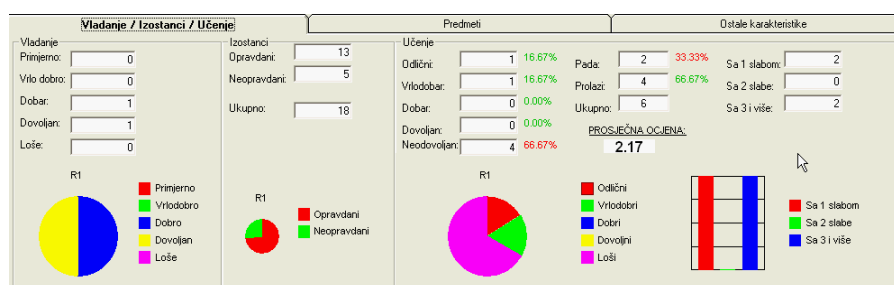


Photo No.15. Graphical representation of data

8. CONCLUSIONS

Education of students in the best way possible can be achieved by a wider use of information and communication technologies. Learning and teaching with the help of information and communication technologies we named e-learning, not eliminating the existing (traditional) methods of learning and technology, but enriching them when used adequately. It is not rare that institutions which believe that with creating a web page and posting a text on it that they created a platform for e-learning. We do not believe so. Our long-term experience in use of information systems supported by information and communication technologies gave us the basis for the next conclusions with positive and affective use of information and communication technologies in education (I) the role of the teacher is highly reduced, because the student with the help of technology has a greater source of information; (II) with video, the student receives an audio and text presentation of information; (III) digital information can be accessed at any time, so that lectures in school are more effective and used by students, and the way they are presented is more efficient and made easier on the teacher. Besides (IV) students' parents have the possibility to oversee and control responsibilities and results of the education of their dearest and (V) allows the school management to oversee and control the whole education process, work efficiency of teachers and other school staff.

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IMPROVEMENT OF SMES ENVIRONMENTAL SUPPORT PLANNING BASED ON NEW STRUCTURE OF SUPPORT DETERMINATION

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Abstract: *The subject of this paper was prompted by the importance of Suitable Structure of Support (SSS) determination, as one of the support actions that the environment provides to the SME sector – in the case of SMEs in Serbia. (Support can be viewed as a type of service, with a significant share of material resources in that service, i.e. in a specific form of support. Therefore, Structure of Support (SS) is the primary issue in this paper. If support is viewed as a service, it is also important to follow the process of providing that service). It is recognized that structure support planning is the root of successful support to the SME sector, so the subject of this paper is the improvement of the SMEs structure support planning process based on new structure determination (which, therefore, contributes to the suitability of structure support). **Problem:** Weak effect of the environment support to SMEs (not only in Serbia) at the beginning of the 21st century is the problem whose solution this paper is dedicated to. The conducted survey has identified the cause of the problem: the environment provides Low Suitability of Structure Support in relation to SMEs' support needs. Therefore, the ways of structure support planning and, consequently, an inappropriate process of planning and providing support has been recognized as a real problem of insufficient effectiveness of support provided to SMEs. The need for the improvement of the existing SMEs support planning process, as well as the need for innovation in the way support structure is determined, have been identified. **Idea:** (H0): If the planning of structure support that the environment provides to the SME sector achieves higher suitability with the structure envisaged by the owners/management of SMEs, better results of that support are achieved (and also higher SMEs' business performance). Of course, such structured support should and can be incorporated into support plans and, thus, support could be more effective and "supported" SMEs more successful. The presented idea has been tested in the case of providing support to the SME sector in Serbia. **The intention** is to show that the SMEs structure support can be improved (made more suitable for the one needed, or at least for the one that the owners/managers of SMEs want), and that this leads to the improvement of the planning and the overall management of providing support to SMEs, as well as of SMEs' successfulness. **Purpose:** This paper is intended for those who are planning and/or providing support to the SME sector. They are proposed to improve the "Structure of Support" performance (especially the "Suitability of Structure Support" indicator). This would, as an innovation, improve the process (as well as the system) of planning and the overall management of providing support and make it more effective. **Result of the survey/Contribution of the paper:** Based on the "Research on the conditions, needs and problems of SMEs and entrepreneurs" (conducted in 2010 and 2011), it is shown that better results are achieved by those who apply the here proposed method of designing structure support while planning support for the SME sector. This conclusion is derived from the observation that SMEs support is more effective if it is more in accordance with the objective needs of SMEs, or at least with the ones desired by the owners/managers of SMEs. Therefore, the conclusion is that the first step should be to determine the required/desired SMEs structure of support from the environment, and then to plan other support characteristics (such as details on types of support, scopes, periods, methods of delivery, etc.). It is concluded that the new way of designing structure of support and the proposed planning process of providing support leads to the improvement of the SMEs environmental support, which should be "kept permanently open" for improvement.*

Keywords: Small and Medium Enterprises (SME), Support for SMEs, Structure of SMEs support, Suitability of SMEs support, Planning the environmental support for SMEs.

1. INTRODUCTION

Subject of the paper is in the scientific field of Entrepreneurship and SME management. It refers to the improvement of the planning of SMEs' support system (more specifically: the process of planning the Structure of Support - SS). Identification of the actors involved in the support system should be the first step in defining of the suitable SMEs' support. There are two types of actors: the actors who are demanding for support (small and medium enterprises and entrepreneurs - SMEs) and the actors who are providing the support (government and its institutions, international institutions and other organizations that provide

support). The actors who are demanding for support (SMEs) have their needs and form their own expectations (rarely: requirements) for support (which is usually done by the managers/owners of SMEs, but the help of experts would be more reliable). It is shown in practice that the actors who are providing the support are actually trying to help the SMEs. The problem occurs because the SMEs' support that these organizations design is usually independent from the actual needs of the SME sector (but is designed according to their own competence/interest), so the delivered support is not suitable enough with the needs/requirements of SMEs. Support usually doesn't have the suitable structure and other performances.

The authors of the paper provide an answer to the research question: Does the support whose structure is more suitable with the one expected by the managers/owners of SMEs (related to solving problems and satisfying the needs of SMEs) achieve better effects (that have an impact on the overall business of SMEs)? The authors give an answer to the research question in accordance to analysis of the data collected by the Survey¹.

After reminding of the: a) Basic concepts of SMEs, their characteristics, problems and needs and b) SMEs' environment that provide support to the SME sector through the structure, institutions and resources of support (in case of Serbia), it is proceeded to the idea of improvement of the planning SMEs' support (so that SS is in accordance with the desired one). The concept of planning support, presented in this paper, can contribute to higher suitability of the SS with the one required, resulting in increased performance of providing support.

2. SMALL AND MEDIUM ENTERPRISES

Small and medium enterprises - SMEs is the phrase used for special type of enterprises that are becoming very important in the last decades of the 20th century. SMEs are recognized as: the engine of national economies' growth; the biggest potential of (self-) employment; the new job generator; companies that have great influence in the national, regional and local development (as a "tool" for prevention of the migration of people from some passive geographical areas) and as companies that obtained international character (because of their business in the global market). SMEs are a key source of national economies' growth (Spicer & Sadler-Smith, 2006, p. 134). SMEs are determined – using the criteria defined by the European Commission – as companies with up to 250 employees, whose annual turnover does not exceed 50 million [€] and/or whose total capital does not exceed 43 million [€] (The New SME definition, p. 5).

SMEs, as the largest category of companies (99.8 [%] of total enterprises in the EU and Serbia are SMEs) have many common features, despite the diversity and specificity of each of them. Attention of this paper is drawn to only one relevant characteristic: shortage of SMEs' resources. That characteristic of SMEs is the main constraint. It reflects to the other characteristics of SMEs: a) Integration of ownership and management; b) SMEs' small capacity; c) Specialized (niche) market; d) Lack of standard use, etc.

According to Barney (1991, p. 106), the necessary condition for developing competitive advantage and reaching company's strategic goal is the availability of resources. He notes that sustainable competitive advantages of a company come from its resources that are valuable, irreplaceable and difficult to imitate. Due to the limitation of SMEs' resource potential, it is obvious that SMEs need extra help.

Shortage of financial resources (as a universal resource) is one of the most commonly used justification² for the problems and failures of SMEs. SMEs' owners have difficulties with finance because they invest their personal savings and assets and the funds borrowed from family and friends into their business (Irwin, 1998, p. 162). Based on the characteristics of SMEs (in particular - on the basis of modest resource capacities) and the problems they face, it can be concluded that the SME sector needs the help and support. SMEs' environment is a potential source of help and support.

SMEs' environment is an important factor, viewed from the aspect of SMEs' support that is explored in this paper. The business environment is the business potential and resource of SMEs (Lazic-Rašović & Omerbegović-Bijelović, 2006, p. 5). According to Porter (1990, r. 73) "root of companies' competitiveness is in the nature of their business environment". Actors of SMEs' business environment are its stakeholders: customers, suppliers, competitors, banks and investors, educational and research institutions, the

¹ "Survey of conditions, needs and problems of SMEs and entrepreneurs", organized by the Regional Center for Development of SMEs and Entrepreneurship - Belgrade, conducted in 2010 – 2011, on a sample of 310 SMEs in Serbia (from cities: Belgrade, Kragujevac, Vranje, Jagodina, Arandelovac and Sombor).

² Research conducted in 2006 – 2008, during the preparation of a doctoral dissertation: "The contribution to application research of contemporary metamanagerial tools in small and medium enterprises with unbalancedly developed resources" (2008), M.Sc. Brankica Ljamić-Ivanović (under supervision of prof. dr J. Omerbegović-Bijelović), showed that the most important resource for the success of SMEs is the owner's competence.

government and its institutions, local communities, environmentally oriented organizations, media, organizations and agencies that provide support to the SME sector (Omerbegović-Bijelović, 2006, p. 5). SMEs can benefit and receive help and support from its stakeholders (whether in money or in other resources - material resources, knowledge, information, etc.). The rule is that each stakeholder has an interest to observe (and also to help and support) the existence and development of a specific SME.

The state that the SME sector needs help and that it expects the environmental support is justified by the analyzed data from the Survey - which shows that every SME from the sample had at least one problem in its business. The average number of problems per SME was 3.87 [problem/SME]. (Some of the main problems in the survey were: Shortage of financial resources (86.4 [%] of respondents), Lack of business ISO standard certifications (92.7 [%]), Inability of doing business on the international market (86 [%]), Inadequate legislation (34.3 [%]), Lack of information about the market trends and situation (29 [%]), Lack of trained personnel (12.5 [%]).)

In the Survey, SMEs were also asked about the types of support which they believe would assist in overcoming their problems. Survey has shown that every company in the sample reported at least one missing/desirable form of support. The average number was 2.88 [types of support/SME]. (Some of the most demanded forms of support are: Easy access to financial resources (82.9 [%] of respondents), Help in the promotion (54.8 [%]), Procurement of the missing equipment or replacement of the existing equipment (41.6 [%]), Professional support through training, consulting and mentoring (40.5 [%]). Therefore, based on the presented data, it can be concluded that the SMEs have a strong need for help and support from the environment.

3. SMEs SUPPORT

Term of SMEs support refers to any form of financial or non-financial help to SMEs that is provided from the environment (by other individuals, companies, institutions, state or some supra-system). The sources of various forms of SMEs support can be: Supply chain participants (customers, suppliers), banks, agencies (accountants, lawyers and consultants), business associations, government organizations, media, family, friends and others. Bennett and Robson (1999, p. 161) explain how buyers and suppliers can be a good source of information and help: a) Customers of a company may provide a good signal of product's market success; b) Suppliers are the sources of information about new technologies, opportunities and chances for innovation and cost reduction.

Usage of external support is strongly associated with successful business growth (Bennett & Robson, 1999, p. 155). Chrisman and McMullan (2004) have shown that small businesses that use the support services of public agencies have a higher rate of survival and growth than the firms that do not use these types of services. Therefore, the conclusion is that support is very important and that, consequently, the improvement of the environmental support can help the SME sector more effectively.

According to the basic categories of resources, the help/support that can be provided to SMEs is divided into **two main types**: financial and non-financial support.

Financial support – money is the key resource of this type of SMEs support. More precisely, it refers to the financial help of various institutions and organizations to start new business (start-up loans) or to improve the business of existing SMEs (loans to finance current operations). In many cases, money that is given to support SMEs is not a help itself, but a resource for the achievement of specific objectives, so it must be spent on planned activities. (For example, the support institutions provide funds to SMEs for: purchase equipment, employee trainings, export activities and innovation of products/ services/ processes/ management).

Financial resource, as a form of support, is necessary for the development of new business ventures. Patzelt and Shepherd (2009, p. 322) claim that entrepreneurs can achieve their strategic goals only if they have sufficient funds and available sources of funds.

Non-financial support refers to support that does not include money as a resource of support. It is some kind of service: consulting, mentoring, training and seminars in various educational fields (e.g. legal aspects of operations, business planning, marketing, finance, human resource management, change management, innovation), intended for "managers" of SMEs (owners, entrepreneurs and managers). The main objectives of non-financial support are knowledge and competence improvement of the SMEs' owners, management and employees. The non-financial form of support may also include: the transfer of technology, help with business networking (entrance into clusters and other associations), contribution to the SMEs' reputation and

promotion, reduced administrative barriers and increase of tax incentives, but also a platform for business development - such as business incubators and technology parks.

Non-financial support includes provision of resources and activities combination. The most important are: a) Technology transfer is very important for the development of the enterprises in many countries, so support measures for this process are created (such as: Technology Transfer Agencies and Technology Transfer Offices); b) Entrepreneurial networking - an important form of non-financial support, which refers to the formal and informal links of entrepreneurs and SMEs with other individuals and organizations, through which they do economic transactions. Those networks can provide access to important knowledge and improve the visibility and reputation of a new business ventures. Support creators use them for placing numerous support program this type of support (entrepreneurial networking) for numerous support program (e.g. for formation of clusters); c) Knowledge - a very important resource for the development of every company and one of the most important sources of competitive advantage (Spicer & Sadler-Smith, 2006, p.133). According to the Knowledge based theory, it is a basic asset/resource for any company. All other resources depend on it (Chirico, 2008, p. 434). There are three very important types of knowledge: 1 - knowledge about management and development of existing business or newly established company; 2 - knowledge about processes of products and services development and production; 3 - knowledge about market, where the new company will operate; d) Removal or reduction of administrative barriers allow entrepreneurs to focus on daily operations and finding new business opportunities in their environment (because high levels of bureaucracy and administrative barriers have a negative impact on new business ventures development, according to Patzelt & Shepherd, 2009, p. 326); e) Tax incentives - they can be an excellent form of support, so the governments of many European countries provide large number of them (e.g. reduction of tax rates and respite in tax payment).

The existing forms of support which are provided to SMEs in Serbia are presented in Table 1. It is obtained by research on forms of support intended for SMEs in Serbia (Support for Success, 2012).

Table 1: Institutions and type of support for the SME sector in Serbia

Institution	Support intended for:	Type of support
Ministry of Economy and Regional Development	Fast growing SMEs ("gazelles")	The funds for financing activities for encouragement of SMEs' competitiveness.
	SMEs	The funds for financing activities for strengthening of SMEs' innovativeness.
		Free services provided by the regional development agencies (consulting, training, promotion).
National Employment Service	Potential Entrepreneurs	Subsidies for self-employment.
		Mentoring and specialized training for entrepreneurs who have received subsidies for self-employment.
	SMEs	Subsidies for new job creation.
		Subsidies for employment of persons with disabilities.
		Professional practice - financial subsidies for training of unemployed persons without work experience.
National Agency for Regional Development	Potential Entrepreneurs	Non-financial and financial support to the business starters who are returning to their cities (underdeveloped municipalities).
	SMEs	Support programs for co-financing (up to 50 [%]) of project costs for the development of SMEs' competitiveness.
		Mentoring for start-ups and existing SMEs.
	SME clusters	Support programs for co-financing innovative project activities (up to 50 [%])
Innovation fund	SMEs	European Network of Entrepreneurship Program: Information about conditions for entering into the EU market, export opportunities, new technologies, potential partners, etc.
		Program of early development of start-up and spin-off companies that have the technological innovation with potential of creating new intellectual property.
Serbia Investment and Export Promotion Agency	SMEs	Grants for financing export activities and the international promotion.
Export Credit and Insurance	SMEs	Short-term loans for financing export activities.
		Guarantees issuance

Agency of the Republic of Serbia		Receivables insurance Factoring (assignment of receivables)
	SME/Entrepreneurs	Consulting for potential exporters.
Development fund	SME/Entrepreneurs	Loans for arts and old crafts.
		Credit support for beginners (newly established SMEs and entrepreneurs, women entrepreneurship).
		Guarantees for SMEs' and entrepreneurs' loans.
		Short-term loans for encouragement of competitiveness and liquidity, investment loans
		Low interest loans for development of SMEs/entrepreneurs in underdeveloped regions
National Bank of Serbia	SMEs	European Investment Bank, the Government of Italy and the European Agency for Reconstruction loans for SMEs
The Intellectual Property Office of the Republic of Serbia	SMEs	SMEs' intellectual property diagnostics
		Education of SMEs about intellectual property

Therefore, the Structure of SMEs Support (SS), as a set of individual environmental support components that are designed for solving SMEs' problems has next characteristics:

- **Type of support** - complex characteristic that indicates on: its form, nature of resources that are provided to SMEs, specific purpose;
- **Volume of support** - the number of different support types that are integrated into the SS that is provided to SMEs. If the SS, consists of several types, the volume of support is higher;
- **The intensity of support** - characteristic that involves introduction of indicators (and measuring unit of the indicator expression intensity) which may be: period of providing support, financial value of support, number of participants who provide support to SMEs (mentors, consultants, listeners). Intensity of one support type refers to the amount of certain type of resource that is used in the implementation of a specific form of support;
- **Process of providing support** - an essential part of the structure of environmental support (because processes "justified" structure). It also refers to the cost, time and risk that are appearing in support;
- **Support recipient satisfaction** – refers to the level of SMEs' managers/owners satisfaction with received support. It can be measured as a level of fulfillment of expectations for support;
- **Support provider satisfaction** – an indicator of fulfillment of their intentions and expectations;
- **The quality of support** – measure of fulfillment of the SMEs' support expectations (and also of the involved stakeholders expectations), which is usually expressed as the effectiveness and efficiency of SMEs support. The authors of this paper suggest that the quality of support can be determined through the other two characteristics: Suitability of support and Successfulness of support;
- **Suitability of support** - it can be defined as an indicator of compatibility of support provided to SMEs with the SMEs' problems recognized by competent individuals or organizations (experts, SMEs' owners/managers, specialized consulting organizations). According to Chrisman & McMullan (2004, p. 231) support should be conceptualized and organized so that, in terms of its structure, it corresponds to the particular problems and requirements/expectations of SMEs. They are drawing attention to the suitability of support: "It is preferable that advisors (who provide support to SMEs) rely on the ideas that are given by the owners/managers of SMEs, than to rely on prefabricated solutions to the SMEs' problems", because "the SMEs' owners/managers expect support that is suitable with their needs, that are numerous and that vary according to the activities, firm's sectors, firm's development phase and also according to the ambitions from the owner/manager "(Audet, Berger-Douce & St-Jean, 2007, p. 30);
- **Successfulness of support** – it refers to the effect of support on the problem solving and SMEs' performance indicators. It can be measured by different (direct or indirect) indicators: the degree to which problems in the company are solved, i.e. the effects on company performance (an increase of: revenue, profit, number of employees, market share, etc). Possibility of measuring the successfulness of support through the integral objective function, that will satisfy more stakeholders at the same time, is particularly interesting;

The main hypothesis of this paper refers to the connection of support suitability with the support successfulness (and therefore SMEs' successfulness): If the planning of SS that environment provides to the SME sector achieve higher suitability (SSS - as a performance indicator of SS) with the structure expected

by the owners/management of SMEs, better results of that support are achieved (and also higher SMEs' business performance).

For the purpose of proving the main hypothesis, 310 SMEs were surveyed. Two different things were analyzed - SMEs' requests for support (requests for solving problems that are identified by the SMEs' managers/owners), on one side, and the specific forms of support (that are provided to SMEs), on the one side. The level of agreement between the support SMEs are looking for and the support that is provided to SMEs is recorded as a variable - suitability of support. That variable could take integer value of how many times used SMEs support is suitable with the requirements of the manager/owner. An indicator/variable "Direct growth of total SMEs revenues", expressed in [%], was used for support success measuring.

Correlation analysis of these two variables gave the following result: Pearson Correlation ρ (suitability; increase in revenue) = 0.422 was statistically significant ($\text{sig} = 0.002$). The obtained coefficient of correlation is in the category of medium correlation. Dependence between suitability and successfulness of support (precisely, in this paper it refers to one successfulness indicator: direct increase of revenue as a result of the environmental support to SMEs) can be established on the basis of that correlation. (The authors believe that the reason why the relationship between two variables is not stronger ($\rho > 0.5$), is in the answer to the question "Are the owners/managers of SMEs competent enough to identify what is the problem of their SMEs?").

Since the statistical test confirmed a statistically significant relationship, it can be concluded that the hypothesis is true, i.e. that if support achieve higher suitability of structures (SS) with the structure expected by the SMEs' managers/owners, the better SMEs' business score will be achieved.

(The next conclusion is that if more competent experts define SMEs' needs, the more suitable structure of support will be given. That will lead to even higher improvement of planning/plans of support to SMEs). Based on this conclusion, the suggestion for improvement of the planning support process (and also the whole support system) should be defined by including the innovated ways of defining and designing structure of SMEs support. This can help the improvement of SMEs support and the success of their business.

4. IMPROVING THE PLANNING SUPPORT PROCESS TO SMEs

The purpose of planning model, that is proposed in this paper, is to help in directing always limited resources to the forms or activities of SMEs support that is "most promising", i.e. support that will have the biggest positive effect on the success of SME sector and, consequently, on the economy and quality of life. The initial hypothesis is defined to indicate that there is regularity in the designing of SMEs structure of support. Stakeholders are advised how to improve the system of SMEs support and how to participate in it.

Support planning is part of a more complex process which occurs in the support management system. Therefore, the complex management process of providing SMEs support can be presented in two phases (Omerbegović-Bijelović J. et al., 2010, p. 141 and p. 245):

F1. Planning – creation of plans for SMEs support where the highest goal(s) are decomposed into:

a) hierarchically-organized (and time-synchronized) goals' tree-structure, and b) A set of appropriate actions (up to the level of work assignments for the direct objects of work transformation) for achievement of the planning goals, c) Resource defined by type and quantity (planned activities should be implemented over them) s and d) Specifying of the ways for providing resources to SMEs support;

F2. Execution of providing support plans, where other three classical phases of management could be found:

a) Organization for plans execution - where the decomposed goals and other elements of plans (like: information about planned activities and the authority for managing necessary quantity of planned resources for planned activities perform) are assigned to individuals or groups (organizational units); b) Realizations of SMEs support plans where the availability of necessary recourses is provided through purchasing and supplying (at the each relevant (work) place and at all planned horizons). In this phase planned resources are used to obtain the output - planned support (with planned quality, planned costs, in planned moment, with optimized values of output characteristics, for planned users); c) Controlling the execution of support plans through all goals and tasks, time horizons, management objects (resources, processes, functions) and indicators of the quality/ success of business operations, through the stages: 1) Identification of conditions of SMEs support management entity, 2) Determination of deviations between the real condition and planned values, 3a) Discovering of the deviations causes in parallel with, 3b) Operative removal of achieving goals obstacles and 4) recording of experience and recommendation for next cycle of management improvement.

SMEs support planning system in Serbia (as an illustration for possible of SMEs structure of support innovation and as an improvement object for planning process of the motioned support) is concretized with *"The Development Strategy of Competitive and Innovative Small and Medium Sized Enterprises for the*

period 2008-2013". The strategy is adapted every five years, and it includes the defined aims for SMEs support. More precisely, it is a strategic plan that is defined by the Serbian Government, which includes the aims that should be achieved by the government institutions and organizations through their activities in the planned period. The Strategy is document for SMEs policy development. That document defines the main priorities (goals) and ways (actions) for their realization in planned period. The main goal of Strategy is to develop Serbian entrepreneurial economy based on knowledge and innovation. It needs to create a strong, competitive and export-oriented SME sector and to significantly contribute the improvement of life standards in Serbia. The general goal of the Strategy is further decomposed into the five most important objectives – "pillars":

- Promotion and support to entrepreneurship and the development of new enterprises
- Human resources for competitive SME sector
- Financing and taxation of SMEs
- Competitive advantages of SMEs in export markets
- Legal, institutional and business environment for SMEs

For the purposes of meeting the defined five "pillars" or the main aims of the Strategy, the particularly activities are defined. Therefore, the strategy was defined according to the "top-down" principle - from the main goal at the state level towards specific objectives and activities designed for the SME sector.

Authors of this paper think that another complementary approach (a "bottom-up" approach that is based on concrete problems and needs of SME sector) is missing in defining Strategy. Based on the hypothesis conceptualized and proven dependence between the results of provided support (the success of SMEs) and its suitability with the problems and needs of SMEs, the authors present the concept (proposed methodology) to improve the planning of support system (as part of SMEs management support system), so that each individual support, meets demands and needs of SME in the best way. Additional contribution of this concept would be a better definition of support strategy for SME sector.

Support planning process should be initiated with "call for help" - that the owners/ managers of SMEs send to the particular SME support institution. However, in many cases, owners/managers of SMEs are not able to identify when they have problem, what is the problem and even does the problem really exist in their company. SMEs' owners/managers are also not informed well enough about the capabilities of many support institutions. Therefore, the support institutions often encourage SMEs' support demands with a numerous proactive programs and activities. It can be said that the institutions start the planning process for SME support. So, the beginning of the SMEs support planning process can have two sources of "impulses": Particular SMEs or institutions that provide support to them).

During the designing of SMEs support planning process, next things must be taken into considerations:

- *Structure of support* that is provided to the SME, which is in accordance to their problems and need. This element of support planning can include all important aspects of support (type, scope, intensity, quality, suitability and desired successfulness);
- *Resources* required for realization of support (money, people, knowledge, information, time, etc.). where care should be taken about their availability in different time-planning period;
- *Time period* in which the support is implemented. It must be in accordance with the SMEs support needs in the observed period, and with the resource availability of organization that provides support;
- *Institution* or organization that has task to implement support, because the organizations that planned support to SME, are often not the ones that implement support.

SMEs support planning process (stages S1-S9) cannot be regarded as isolated, but in the context of integral planning, and also in entire support management process (or at least on the level of operational management - in stage S7). Therefore **SMEs support planning process** can be conducted through the following stages:

S1) Investigate the problem of SMEs – i.e. do an accurate diagnosis of the SMEs' condition, problems and needs. It is necessary to define the SMEs' problems, because incorrectly defined problems can lead to inefficiency of the whole support system). Therefore, this phase is crucial for the further support planning and support realization process;

S2) Define the goal that will be achieved through the support. Well-defined SMEs' problems (in previous stage), may determine the purpose and goals of providing support to SMEs. While considering the goals the expectations of many stakeholders should be take into consideration;

S3) Define suitable structure of support which meets goal identified in stage 2. At this stage, with respect to the support suitability, structure of support that is intended to SMEs is precisely defined;

S4) **Define the necessary resources** by types and quantities and specify the dynamics of resource needs (which may be the major constraint to achieve support goals) for implementation of support. The goal is to make the greatest support effect with rational use of always limited resources;

S5) **Define the support intensity** in accordance to the SMEs' needs and support providers resource constraints;

S6) **Define indicators for monitoring the support results** – while support planning, the indicators that will monitor the achievement of planned support and successfulness of realized support forms are also defined. Those measurable indicators could be: a) degree of plan achievement, b) degree of resources utilization, c) degree of support needs satisfaction and g) degree of particularly stakeholders' satisfaction;

S7) **Implement the support** – according to strict classification it is not included in the planning stage because it is a realization phase. However one part of realization stage (transformation, i.e. direct providing support activities), cannot be separated from operational preparation of support planning, and even less from the operational preparation of providing support. They are so close that they are not even separate from the operational management of SMEs support activities realization. Information about validity of the applied planning process, and ideas for SMEs support planning process improvement come from this stage;

S8) **Analyze the performance indicators** of the provided support structure. Indicators for measuring success of planning and support providing are analyzed after the execution of support. If the results meet expectations, it can be concluded that the support was successful and that the plan achieved the goal. According to Omerbegović-Bijelović et al. (2010, p. 151) "measure or degree of planning objectives fulfillment is the quality of planning. It can be defined as: effectiveness - an indicator that measure the achievement of planning purpose and efficiency - as the ratio between the benefits and cost of planning process", Otherwise, it is necessary to work on further improvement of the planning system of SMEs support (primarily, here observed structure of support);

S9) **Define further actions** – SMEs support planning process usually does not end after the successful or unsuccessful completion of the planning and plans executing cycle,. New cycles of providing support are defined and planned towards a further SMEs problem solving and improvement of their success. Continual improvement activities of the system for monitoring SMEs' needs, problem solving and successfulness, are defined through the following: measurement, analysis of the results, determining deviations, further planning of improvement and implementation of SMEs support activities. After one cycle of improvement, next cycles should be repeated.

An important characteristic of the SMEs support planning system is the structure of that system, in addition to the process of providing support. Organizational structure for SMEs support planning objectives achievement is defined in accordance to the decomposition of those objectives. Theoretically, that process goes through: 1) Delegation of (planning) goal's components to individuals and/or to organizational entities of the complex SMEs support planning system (i.e. assignment of specific goals to groups and individuals) 2) Allocation of authorizations for: a) use of necessary resources to achieve assigned planning goals and b) initiating and managing the activities of planning goals. Although the organization of planning is just one phase of SMEs support planning management, it is necessary to consider the time horizon, and to synchronize the organization ("activities assignment") with that aspect of planning (and the entire management) SMEs support. However, this topic will further be discussed in another paper.

5. CONCLUSION

Providing support to SMEs is a serious social and professional task. The role of science is to make decisions in this area be based on the facts. The result of the survey of the relationship between the suitability of SMEs structure support (SSS) and the effects of providing that support (in case of SMEs support in the Republic of Serbia) is presented in this paper. It was found that the effect of the support depends on its suitability with and the actual needs for environmental support (at least as the owners/managers of SMEs saw those needs). It is shown that the success in providing support to SMEs (including the SMEs' business success) is higher if the provided support is more suitable with the one needed.

Based on the proven hypothesis and the innovated way of SMEs structure of support (SS) designing, the authors made an improved concept of SMEs support planning process. Through this new concept, the authors want to direct the institutions and organizations that provide support to SMEs towards the real needs of practice – that during the process of SS planning and providing support they have to consider the real needs and problems of SMEs, in order to achieve greater success.

The concept of SMEs support planning has many benefits. It can serve as a guide to:

- *Small and medium enterprises* – for better planning of their own support needs and learning about the available support forms from their environment;

- *Government and its institutions* – for better understanding of the SMEs' problems and their needs for support (with the aim of defining more adequate forms of support provided/coordinated by the Government of RS);
- *Institutions and organizations that provide support to SMEs* - for better planning of: support, necessary resources and support activities.

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ENTREPRENEURSHIP AS MARKET VALORIZED CREATIVE POTENTIAL

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Abstract: *The transition period of the society has left us richer for certain immediate experiences that will not remain without influence on future generations. The transition from the old paradigm (socialist society) to the new one (entrepreneurial society), is an uncertain and a long-lasting process, merely due to its radicalism. Thus, this study aims at determining the quantity of entrepreneurial resources for those who manage and operate organizations, institutions, and companies in the Republic of Macedonia, through determining the extent of some of their personal characteristics that are considered part of the profile of any successful entrepreneur. Inventive and creative potential, reliability, attitude toward change, attitude toward risk-taking are the personal traits, in which we are interested in terms of management of human resources. It is said that they broadly represent, but not fully cover the entrepreneurial personality. The research comprises a sample of 132 respondents from different levels and activities in the Republic of Macedonia and the conclusions have been reached according to their results on the TTS test by Eugene Rodsep, the test for determining confidence, the MI 1 test for measuring the attitude toward changes, and the questionnaire assessing the level and attitude toward risk-taking. The results of the research have shown that the managers in the Republic of Macedonia possess, more or less, the tested characteristics, but they are very unevenly distributed among individuals. In conclusion, this research aims to help managers of different organizations to become aware of their "entrepreneurial spirit", to help HR managers and the state authorities to develop it and give directions for further development of entrepreneurship.*

Keywords: Entrepreneurship, entrepreneur's profile, inventive- creative potential.

1. INTRODUCTION

The period of transition of the society has left us richer for certain immediate experiences that will not remain without influence on future generations. The transition from the old paradigm (socialistic society) into the new one (entrepreneurial society), is uncertain and long lasting process, by the mere fact of its radicalism. Collectivism, averaging, closeness, redistributive ethic, rigidity, maintaining of certain social justice, require to be replaced with the values of the modern times. Market economy, pluralism of ideas and opportunities, private initiative, entrepreneurship promotion, etc., are the clear objectives that we have targeted. From here, the context of all contemporary developments, as much it seems hard to understand and accept, represents confrontation of the individual with reality and often means certain discontinuity of living. Thus, on the one hand, a process of rejection of the negative baggage occurs from the past, which is a measure of convergence towards the new. And on the other hand, it becomes more clearly that this change requires time - but not empty and unorganized, but filled with thought-out steps that will mean success. Hence, it is understandable that the period in which we live is a challenge to professional profiles of different facets of human activity. All of them from their own aspect are trying to observe and explore the entrepreneurship.

2. THEORETICAL FRAMEWORK AND DEFINITION OF THE KEY VARIABLES

Inventiveness and entrepreneurship are part of the key concepts, determinants of the development of any society. They can be understood if presented as interconnected elements, characteristic for those individuals who make change. Entrepreneurs are basically innovators, and innovation is the core of entrepreneurship. Hence, the determination of entrepreneurship inevitably will lead by setting the remaining terms, which constitute its essence. We start with innovation.

Innovation is a process of creating something new and as a phenomenon is a key determinant of the development of any society. Certain need that appears in a certain area of the human life can become a problem, inevitably requires adequate innovation (content, product, service).

“The term innovation under the proposed definition of the OECD include transforming an idea into a market product or service, new or improved production or distribution process, i.e. new way of social service.” (Petkovski, K. & Sulejmani, N., 2001:11)

“The innovativeness would mean:

- Renewal or expansion of the assortment of products and services, as well as, connecting the markets;
- Establishing new ways of production, supply and distribution;
- Introduction of changes in management, organization of work, working conditions and skills of the workforce.” (Krale, T., 2001:32)

Previous determinations of the innovation put the emphasis on the outcome of the process. In another words, they focus on the consequences of it, while listing to what the innovativeness has led and where it is needed. However, we think that for practical reasons that would function in a certain meaningful treatment of the field of innovativeness fostering and development, in the determination of this term it is necessary to include some other more fundamental determinants (processes, capabilities, features) that will allow more accurate and bigger understanding of the innovativeness. Explaining the scheme of “the process of creative problem solving” by defining the characteristics of the person who does it - creatively solve certain problem, is the essence of the innovativeness, which, as was told, is the core of the entrepreneurship. (Figure 1)

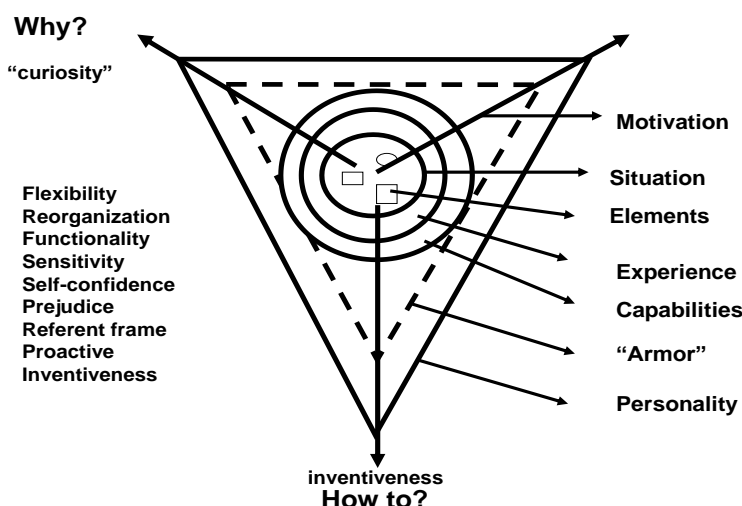


Figure 1: Process of creative problem solving (Gruevski, D., 2010: 119)

Hence, the phenomenon of creativity is not reduced only to a divergent production of ideas, but the process of creative problem solving fully and very concretely explains the essence which may have practical implications. As the professor Lj. Madzhar says: “In fact, the entrepreneurship by definition is capability and current practice of solving completely new, very nonstandard problems on which from the previous experience can be drawn only poor or no lessons.” (www.yuorpe.com / Republic, Sources of entrepreneurship in transformed Serbia, pg.1)

Thus, is started from some emerging unmet needs, which by themselves represent a particular problem whose solving through a creative process answers the following questions: “why”, “what” and “how to”, in a certain constellation of structural elements of a particular creative person, acting in suitable conditions, leads to innovation that he or someone else, the market, may valorize. In fact, **entrepreneurship is only applied and market valorized innovativeness - creativity.**

Actually, if we recall the development of scientific thought and aspects that were crucial in explaining the concept of entrepreneurship, given in the review made by professor Petkovski, we will get to the following: “the risk taking”, as the main determinant of the entrepreneurs: “the ‘entrepreneur is one who takes risk, unlike the person who provides the capital.’; “development carriers”, not only about “risk carriers”: “the entrepreneur is an innovator and instigator of growth.”; “The entrepreneur has the ability for creation and situation assessment.”; “The entrepreneur takes initiative, organizes social and economic mechanisms and

assumes the risk of losses in the activity that he realizes.”; “The entrepreneur is one who sees the opportunity for gaining a profit.” etc. At the end we will come to the determination which is most acceptable and understanding to us – the explanation of Peter Drucker, who emphasizes “the economic valorization of creativity”, as crucial: “Entrepreneurship is based on recognition of the opportunities for innovation and their fastest market and economic evaluation.” (Petkovski, K. & Jankulovska, P., 2001)

Of course, what is not completely clear is the answer to the question whether the process of creativity and the process of its economic valorization is identical and is present as personal category in the same person to call him entrepreneur or it is about two processes - one of generating creative ideas that later someone else manages until their economic valorization? Or, we can speak about the entrepreneur only when the two abilities (creating and management until the economic valorization of the creation), are clearly expressed?

Thereby, the answers to this question are probably already given by some authors. Yet according to us, they are not clearly defined. For example, according to Ljubomir Madzhar: “Entrepreneurship is very heterogeneous and complex mixture of ingenuity, the ability to predict or even presentiment about future events, the ability to accept unusual and unconventional ideas, courage, persistence and other natural gifts, and on the other hand it is the result of some favorable ambient conditions largely related to factors and constellations that reduce the uncertainty.” (www.yuope.com / Republic, Sources of entrepreneurship in transformed Serbia, pg.1)

On the other hand, indeed there are many ambiguities and misconceptions regarding the determination of the essence of the matter, which have negative practical implications for the attempts to systematically encourage and develop, reminds professor Vlado Petkovic, who summarizing the various definitions and understandings of entrepreneurship talks about misconceptions about the term:

First delusion: Entrepreneurship is not just forming a new company, but also introducing a new activity, creating a new product or service. Entrepreneurial may be even those enterprises established in the past century, if in their work are introducing major innovations which are of general importance and interest.

Second delusion: Relating of entrepreneurship to small commercial ventures. The large firms, even the largest state enterprises, may be entrepreneurial. It is about making something new, unknown or not used in the practice.

Third delusion: Refers to the ownership of the entrepreneur. The entrepreneurship can be developed in all enterprises regardless of their ownership status.

Fourth delusion: It refers to the relating of entrepreneurship only to commercial enterprises. The entrepreneurship also exists in the non-profit activities (science, education, health, information, etc.). (www.ekof.bg.ac.yu / Economic chronicles, Entrepreneurship and entrepreneurs, pg. 1-2)

Besides the economic and social aspects in defining of the entrepreneurship, retention to the characteristics of personality and behavior of typical entrepreneurs would mean special approach and contribution. Through the literature can found lists of characteristics of individual entrepreneurs (profiles). They highlight various characteristics among which dominate the following: high level of motive for achievement, small fear of failure; strongly expressed sense of self-control and self-criticism; capability of dealing with uncertain situations, great confidence, optimism, determination - commitment, great energy, emphasized individualism, etc.

This, it can be said that for the entrepreneurial person is characteristic a certain set of manifesto and recognizable behavior, which would amount to: orientation to goals setting, commitment to those goals, persistence in their achievement; constantly decision making, calculated risk, acceptance of responsibility, innovativeness.

Quite understandably, besides defining of the concept, the next crucial question that arises and which is of special interest for each country refers to the possibility of a systematic approach to any organized attempt to **encourage the development of entrepreneurial consciousness and culture**.

Namely, if we know that the development of entrepreneurship is an essential factor for acceleration of the economy and rapid development of every country, every state must to encourage its development with various measures. The factors - determinants that affect the development of entrepreneurship, various authors divided into: “objective - subjective, internal - external, personal factors of the environment. Some have divided them into: economic, psychological, sociological, legal, information, technical - technological.” (Ibid, pg. 1-2)

According to Professor V. Petkovic, it is more useful to elaborate the basic conditions for development of entrepreneurship, which are exhausted by the existence of a) Free market; b) State deregulation in the economy; c) Innovative culture, climate, tradition. Also other authors listed factors, activities that can be placed in the previously mentioned, conditions.

“There are various forms of state aid for development of entrepreneurship. These include: providing legal certainty to entrepreneurs, infrastructure and above all, stability of the economic system and democracy. Also, one of the forms of state aid is the promotion of entrepreneurship and stimulating of young talents to pursue a career in small business, the establishment of institutes and special forums, which should contribute to removing barriers that hinder the development of entrepreneurship. Particularly, the state should help in creating of a stable and reliable framework for managing.” (Ibid, pg. 4)

“It is necessary first to create conditions for competition in the economy, which represents the most favorable climate for entrepreneurship development. That would mean building a market infrastructure, institutional and public infrastructure, which includes primarily agencies and funds for development of entrepreneurship and running a stable economic policy.” (Ibid, pg. 5)

On the other hand, the professor Lj. Madzhar lists the as well the international sanctions and the economic blockade, as appropriate mechanisms and environment for entrepreneurship development. Of course, not forgetting this phenomenon to be named as “often mistakenly targeted and exploited entrepreneurial energy and resources”, characteristic for him is that he does not believe in the possibility of systematic development of entrepreneurship through the forms of any formal education: “Unlike the management in the business and other organizations, the entrepreneurship is not a factor that would thoughtfully and meaningfully grew through learning and educational activities, least through some formal education, where courses in the area of entrepreneurship would have a central place.” (www.yuorpe.com / Republic, Sources of entrepreneurship in transformed Serbia, pg.4)

Of course, this attitude is extremely questionable and calls into question concepts and theories of education and socialization. And precisely this dilemma opens the question that we have set as a problem. Namely, who is an entrepreneur, those who are creative, or those who successfully and quickly manages a creative idea to its economic valorization, or both? It seems interesting because both of them through education and socialization processes surely can be systematically developed and encouraged.

3. PROBLEM – SUBJECT FRAMEWORK OF THE RESEARCH

The fact that all proposed activities, concepts, strategies, methods of development of entrepreneurship are based on the assumption of the existence of individuals with their personal characteristics apart from others and who can properly use such opportunities given and constructed, leads to the question of personality of the entrepreneur and the possibilities for systematic action in the direction of fostering, encouraging and developing certain abilities, traits, values, attitudes and beliefs from their early age through the education system and families.

Because, the inventiveness, creativity is defined as the core of entrepreneurship, for which we said that it is nothing else than “applied creativity found its market valuation”, we think that nurturing, encouraging and maintaining the inventive-creative potential through thoughtful treatment represents a form of support and development of entrepreneurship. On the other hand, also the confidence of the person, as characteristic of the image for himself, the “self concept”, over which can be directly acted and it can be shaped through the process of socialization and by imitation and which is mentioned as characteristic of the entrepreneurs, represents a point of interest in this study.

The support and attitude toward change is another important dimension which is different for entrepreneurs (initiators, leaders, innovators, non-conformists, flexible) and the others that hinder, and prevent the development, and that is the goal of this research. Hence, it is focused on: determining the extent and certain diagnosis of the inventive-creative potential, reliability, attitude to change and the attitude toward risk taking of those who successfully manage, operate with organizations, institutions, companies in Republic of Macedonia and for who exist indicators of their entrepreneurial trait, with the main goals:

- To verify which of the personal traits that make “the entrepreneur profile” given in the literature are present in individuals who manage their own business or manage with other organizations in Republic of Macedonia;
- To set the foundation for building of an experimental model - system for encouraging and developing of the inventive-creative entrepreneurial potential in children and adolescents of school and adolescent age;
- To test the use value and validity of some psychometric instruments and procedures used in this research.

4. METHODOLOGY OF THE RESEARCH PROCEDURE AND INSTRUMENTS

In terms of methodology, the research can be placed in the group of preliminary researches with the main objective to verify, determine the level, to diagnose the situation and as such it is part of a wider activity towards trying to establish a system to encourage and develop entrepreneurial awareness and culture where the values obtained will be useful for certain profiling of the local entrepreneurs as the basis for future recommendations and analysis.

In the research was used the test procedure by using validated instruments such as: the TTS test of Eugene Rodsep (test for determining the confidence), the MI 1 test for measuring the attitude toward the changes, and the questionnaire referring the level and attitude toward risk taking.

The test for measuring the **attitude towards creativity – TTS** is authorship of Eugene Rodsep and it has been already used in research on creativity in Republic of Macedonia. It is quite extensive with 50 offered attitudes and a few words that are chosen through several alternatives. The processing and scoring is made according to a key on the given scale of creativity: from 21 to 14 / uncreative, from 15 to 29 / under average creative, from 30 to 55 / average creative, from 56 to 84 / above average creative, from 85 to 109 / highly creative, from 110 to 140 / extremely highly creative.

The test for measuring the **confidence CC/C** is adapted to the needs of some researchers in Macedonia (K.Petkovski, 2001). Its metric features are not fully tested on our soil. It contains list of given statements with which the respondent may agree or not, the test is easy to check and evaluate by elaborated key. It provides rough indicators on the extent of one's confidence – non confidence on the confidence scale: from 0 to 15 / unconfident, from 16 to 24 / confident, from 25 and more / very confident.

The test for measuring the **reaction towards change - MI-1 (RTCI)** is proposed as a simple and fast tool for identifying the degree of acceptance / repulsion towards change (Smilevski, C., 2000: pg. 529). It contains 30 words referring the change. The preference of certain words that are most often associated with some changes, allows using prepared key and scoring system, to calculate the certain score which then is seen on a scale of acceptance of change: 40 and over / strong support, from 20 to 30 / moderate support; from 10 to -10 / subjection to change, from -20 to -30 / moderate resistance to change; of -40 and less / strong resistance to change.

The **attitude towards risk taking** recognized through direct response to the question “To what extent do you take risk?” on a scale from 1-7, where the rounded answer no. 1 means: “I often take risks by exceeding the positions that are previously defined, set out, agreed”. And the other extreme under no.7 means: “I almost never take risks by not going beyond what I had previously scheduled, planned, conceived”.

5. DYNAMIC AND STREAM OF THE RESEARCH

As previously mentioned, the study is focused on sizing the entrepreneurial resource of those who manage, operate with organizations, institutions in the Southwest region in the Republic of Macedonia (municipalities of Bitola, Prilep, Demir Hisar, Krusevo, Resen), through determining the extent of some of their personal characteristics that are considered part of the profile of every successful entrepreneur. Hence, the sample consists of 132 managers, owners of private companies and a number of heads of public sector organizations. The choice has been made based on several criteria: a) persons who started and run their own business (in any area); b) persons who applied and participated in the realization of projects connected with the promotion and development of entrepreneurship; c) people who were / are customers of business start - up centers or other development foundations, associations, NGOs working in the area.

Given the nature of the research, the type of research procedures, the usual closure of the business world for the researchers - especially with this type of research, the field work of the research was done on several occasions and it is mainly done in part of the free sessions at several training, seminars, in whose realization we participated. Hence, the overall process of collecting data, with certain interruptions, lasted several months in 2010 and 2011.

6. RESULTS FROM THE RESEARCH

This research focuses on sizing the entrepreneurial resource for those who represent certain example of successful individuals who manage, through determining the levels of their inventive - creative and confidence dimension, as well as the attitude towards risk taking and acceptance of change.

After the conducted research, the results obtained are presented qualitatively and quantitatively, and is used a statistical methodology for concluding by calculating the indicators of the descriptive statistics (measures of central tendency and measures of variability and dispersion) (Table 1). These indicators clearly show the extent to which each of the examined entrepreneurial characteristics is present among managers from private and public sector in Macedonia, which actually is the aim of the study.

After processing of the results a ranking of the respondents was made, separately for each test and for all tests together, collecting the achieved scores for each respondent. The results indicate that there are certain variations in the range of respondents on different tests. Given the deviations in the scores we consider that they are significant and show that very few (about 15% of the total number of respondents) are those who achieved high scores on all tests. In others there is variation in matter that on some tests they achieved extremely high, and on others - extremely low scores.

Table 1 Descriptive statistics' indicators of the examined variables

	TTS	SS/S	MI 1	Risk
Measures of central tendency				
\bar{Y} - Arithmetic mean	60.64	15.13	17.42	4.09
Me - Median	60.00	15.00	20.00	4.00
Mo - Mode	59.00	17.00	30.00	6.00
Measures of variability and dispersion				
Min. - Minimum	29.00	5.00	- 30.00	1.00
Max. - Maximum	95.00	24.00	50.00	7.00
Range	66.00	19.00	80.00	6.00
σ^2 - Empirical dispersion	122.03	16.04	381.10	3.43
σ - Standard deviation	11.05	4.00	19.52	1.85
Kv - Coefficient of variation	18.22	26.47	112.04	45.25
Ka - Coefficient of asymmetry	0.41	- 0.09	- 0.34	- 0.11
n - Sample size	132	132	132	132

From table 1 is obvious that when speaking of the first variable - the **attitude towards creativity (TTS)** the largest part of the respondents fall into the category of "creative above average" ($\bar{Y} = 60.64$). It is confirmed by the graph (figure 2) in which 64% of respondents fall into this category. The relatively high value of standard deviation, however, is a sign that the scores of the most respondents are different i.e. have major deviations from the arithmetic mean value.

In the results for the variable - **confidence (CC / C)** the average score achieved $\bar{Y} = 15.13$ indicates that most respondents are on the limit between "unconfident" and "confident". Most respondents, 53%, were unconfident. As for variability and dispersion can be said that exists pretty high variability, especially considering the values of standard deviation, variance and the empirical coefficient of variation.

As for the **reaction towards change (MI 1)**, the average achieved score $\bar{Y} = 17.42$ indicates "moderate support for change" as characteristic of most respondents. Majority of the - 46% have that attitude towards change. From the range of sores it is evident that with respect to this variable there are big differences from "strong support", to "strong resistance" to change, confirmed by the fairly high value of standard deviation.

The indicators for the fourth investigated variable - **the attitude towards risk taking** - indicate that the most respondents have average willingness to take risk ($\bar{Y} = 4.09$) on a scale from 1 - 7. Here, respondents are fairly divided by "often taking risk" to "not taking risk at all", for which speak the indicators of variability.

All this is concisely presented in the following graphs:

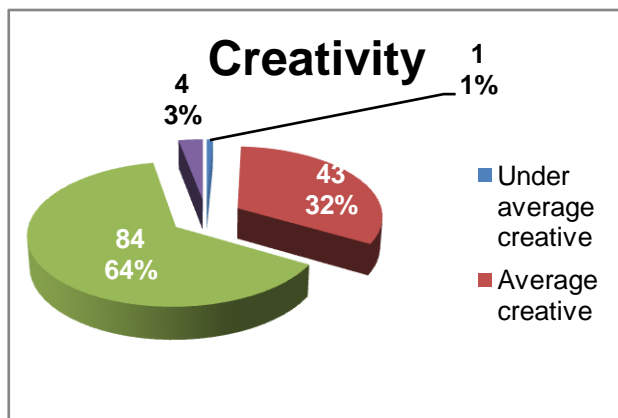


Figure 2 Distribution of "Creativity"

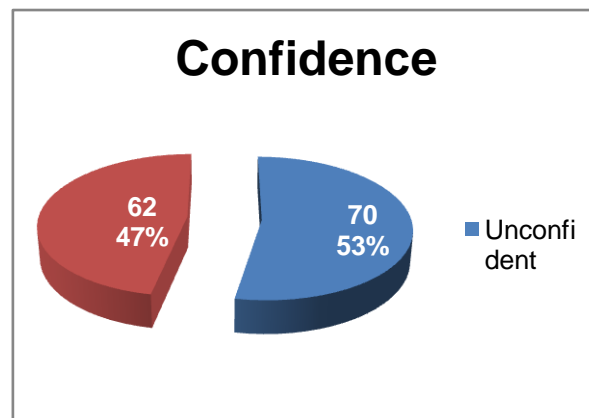


Figure 3 Distribution of "Confidence"

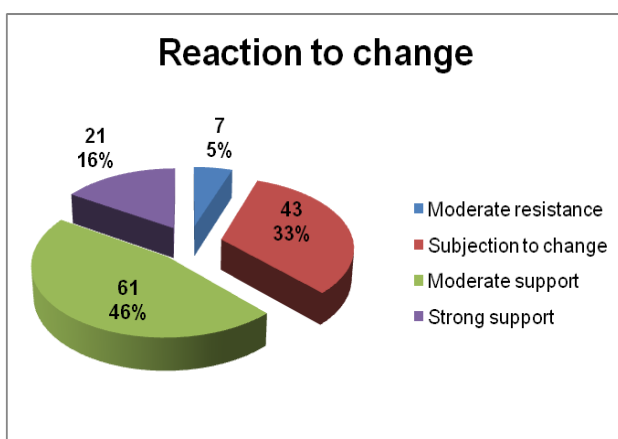


Figure 4 Distribution of "Reaction towards change"

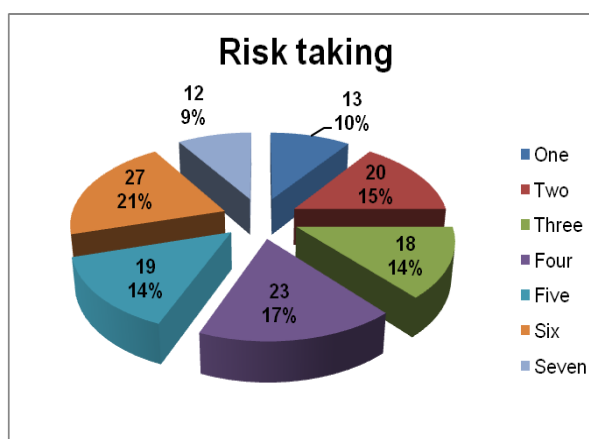


Figure 5 Distribution of "Attitude towards risk taking"

7. CONCLUSION

Given the fact that in Republic of Macedonia do not exist similar researches aimed at determining the levels of these delicate personal parameters, our discussion will remain focused on the indications of some authors from which indirectly can be drawn certain conclusions.

In addition, although it was not subject of this research, however lacking in other studies related to other parameters that we measured, we intentionally focus on the exploration of "the achievement motive" realized in our country. We say intentionally because:

- It is a subject that is of scientific interest since the time of socialism and offers certain comparison;
- It is known that it is a gained motive which is subjected to development and change;
- It is a key of the entrepreneurial profile and
- Its structure includes the attitude towards risk taking and towards change which are variables of our interest. (McClelland according N.Rot, 1987).

Namely, the research conducted in the former Yugoslavia pointed to its low level, compared with levels in the population of developed countries. (Havelka & Lazarevic, 1981) and (Nikolovski, 1991). But its more recent measurements suggest that living in the transition has not remained without influence on the socialization of new generations. Specifically, it is claimed that it has an upward growth and tend to be equalized with the same levels set in the same population of the Western countries. (Donevska, 2010)

Hence, it appears that the issue regarding the risk taking, based on our results, as it was expected, the propensity to take risk is average - $\bar{Y} = 4.09$.

Finally, we can conclude that:

- The results indicate that it is necessary every eventual strategy for encouragement and development of the entrepreneurial potential to contain adequate, adjusted contents and activities which will be implemented under the supervision and guidance of specially selected and trained individuals - synergists, mentors, especially in the structure of values and attitudes (attitude towards change and risk taking). Even more, given the model and structure of the human capital in which, among other, are distinguished the values for which the famous author and researcher in this field M.Rokic spoke as for "cognitive represent of the connotative." (according Kolevski, N. & Kotevska, M., 1992: 331)
- There are individual cases in the group of respondents who possess personal characteristics regarding all investigated parameters, which can be considered as positive role models that might try to establish certain future cooperation, and the modeling system to encourage and development of the inventive - creative and entrepreneurial potential in our environment.
- By registering of the relatively high score in the attitude towards creativity, in Republic of Macedonia is reinforced the conviction that entrepreneurship is nothing but "market valorized creativity" and is easily explainable with some contemporary concepts and models of the relationship of creativity with other variables (Renzuli) .

Taking into consideration the opinions of the authors Petkovic and Madzar, regarding the definition of the concept and its differential separation from something it is not, which is summarized in the text as "delusions about the concept " we consider that the criteria " successful business " and even more "wealthy boss" often used in the context of determining the level, development, directions, tendencies, etc. of the entrepreneurship, are not fully appropriate in situations when is needed to identify or distinguish models of people - entrepreneurs. Of course, this is due to the existence of many other intervening variables that is obviously difficult controllable in an attempt to define "success, wealth," and ways of getting them. Hence, we believe that our attempt: the models of successful entrepreneurs with who in the future we would like to cooperate, on the way of fostering and development of the entrepreneurial awareness and culture, to choose the group of those who meet a certain level of characteristics described throughout the literature is entirely justified and appropriate. Of course, the variables emphasized in this research are one of the key in that profile.

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FINANCING ENTREPRENEURSHIP IN TIMES OF CRISIS – CASE OF SERBIA

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Abstract: *The paper elaborates on the current situation in the field of financing entrepreneurial venture in Serbia in times of crisis. The global financial crisis significantly hit the SME sector in Serbia, reduced the liquidity and solvency of the enterprises, reduced the amount of available funding and loans for SMEs, increased the cost of capital and generally made existing financing problems even more difficult. The number of registered enterprises and entrepreneurs is constantly dropping, while the number of those ceasing to work has been going up since 2008. In times of crisis, SMEs are more vulnerable, since it is very difficult for them to downsize. Also, their weak financial structure is heavily dependent on external financing.*

Financing entrepreneurial ventures became one of the key challenges entrepreneurs are facing today and one of the major barriers to the rapid development of SMEs. Therefore, this paper aims to give an overview of available instruments of financing in Serbia, as well as to emphasize missing options. Regarding debt financing, since costs of credits and banking services in general are relatively high, SMEs are not profitable enough to be able to afford significant levels of debt financing at the existing interest rates in Serbia. Collateral requirements are still high, the procedures for obtaining guarantees and loan approval are too long, and loan amounts limited. Loans, although available, are not accessible to SMEs. Equity financing is in the initial stage of development. Venture capital companies are generally focused on large companies, while the segment of informal investors (business angels), who can substitute bank financing or venture capital at the early stage of a firm's life cycle in particular, is the missing piece of the puzzle. Serbian entrepreneurs are not quite familiar with the advantages and disadvantages of equity financing, and more training and education are necessary in order to introduce this kind of financing. Investment readiness programs could be an excellent opportunity to clarify business angels' expectations and entrepreneurs' perception of investors' requirements. Confronted with this gap and realizing that the existing market failure inhibits the provision of appropriate financing for SMEs, the Serbian government plays a very active role in providing subsidized loans and grants.

The analysis was mainly based on existing surveys conducted by Serbian and international institutions. The problems were analyzed from different perspectives using available statistics and we tried to provide relevant inputs of value to Serbian SME policy makers, entrepreneurs, banks and potential investors. The development of new financial instruments, especially in times of crisis, in order to support innovative SMEs and provide access to equity-based investments, has been envisaged as the priority of SME policy in Serbia. It is necessary to develop regulatory and funding mechanisms for encouraging formal and informal venture capital investments in SMEs.

Keywords: entrepreneur, SME, bank, debt financing, equity financing

1. THE LATEST DEVELOPMENTS IN SME SECTOR IN SERBIA

Since 2000 significant progress has been made in creating an institutional and legislative framework for business development in Serbia. The SME sector became the most efficient segment of the Serbian economy and the key generator of income and employment. In terms of SME developments, Serbia has managed to catch up with other countries in transition.

Table 1: Key development indicators of the SME sector in Serbia

	SME sector		Share of SME sector	
	2009	2010	2009	2010
No. of enterprises	314.827	318.540	99,8	99,8
No. of employees	872.540	814.585	66,7	66,4
Turnover (mil. RSD)	4.380.545	4.677.933	67,8	65,3
GVA (mil. RSD)	778.108	817.417	57,1	55,9
Export (mil. RSD)	275.378	339.845	50,5	46,4
Import (mil. RSD)	627.147	680.549	60,9	54,3
Investments (mil. RSD)	259.796	...	52,6	...

Source: MoERD, NARD: Report on SMEs and entrepreneurship development (2011), adapted by authors

Number of SMEs and number of employees generally has the positive trends in the period 2006-2009. It is worth mentioning that the *number of new jobs created in the SME sector in the period 2005 – 2008 was higher than the number of jobs lost due to the restructuring of large enterprises (MoERD, RDB, RASMEE, 2009)*. In 2010 the SMEE sector accounted for more than 99% of total number of enterprises, 66.4% of the employment, 65.3% of the total turnover and 55.6% of the gross added value of Serbian economy (MoERD, NARD, 2011). Micro business entities - entrepreneurs and micro enterprises account for the highest share in the number of SME sector entities, whereas small and medium-sized enterprises are dominant according to number of employees, total turnover and GVA, total export and import.

Decrease of foreign and national demand and investments had a negative impact on the business operations and the overall entrepreneurial climate. Slower development dynamics of the SMEE sector in 2009 and 2010, made the development problems of the sector more visible. The structure of SMEE, due to dominant share of micro enterprises and entrepreneurs and insufficient number of medium-sized enterprises (which are the key drivers in all developed countries), is unfavorable in a longer period of time and reflects pretty slow transition of micro into small and especially small into medium-sized enterprises. Secondly, prevailing position of low-tech industries is evident within the manufacturing sector (64% of all SMEs, 59% of total number of employees and 55% of GVA were realized in low-tech industries) while, medium-high-technology industries and high-technology industries encompass only 10% of all SMEs, 17% of number of employees and generate 21% of GVA.

Table 2: Indicators of SME sector in manufacturing industry in 2010 by technological structure (%)

Industries	No. of enterprises	No. of persons employed	Turnover	GVA	Export	Import
Manufacturing industry – SMEs	100,0	100,0	100,0	100,0	100,0	100,0
Low tech industries	63,6	59,0	55,6	54,4	54,6	40,6
Medium-low-tech industries	26,4	24,1	23,5	25,3	24,8	24,9
Medium-high-tech industries	6,6	12,8	13,2	14,1	15,8	17,6
High-tech industries	3,4	4,1	7,7	6,3	4,8	16,8

Source: MoERD, NARD: Report on SMEs and entrepreneurship development (2011), adapted by authors

Relatively low level of competitiveness is crucial problem of SMEE sector in Serbia which generates significant trade deficit. Low level of production and financial capacities produced increased investment dependency of this sector on the external sources of financing. Preliminary results from the *Business Environment and Enterprise Performance Survey (EBRD, 2008)* clearly showed increased reliance of SMEs in Serbia on bank borrowing as compared to the findings of the same survey run in 2005. Bank loans are the most important external source of financing SMEs (40%), whereas significantly less important sources are loans from friends, relatives or partners, leasing, government funds, foreign loans, guarantees and donors' support.

2. IMPACT OF FINANCIAL CRISIS ON SME SECTOR

At the present time, SMEs have been especially hard hit by the global crisis. *These firms are more vulnerable now for many reasons: not only has the traditional challenge of accessing finance continued to apply, but new, particularly supply-side, difficulties are currently apparent (OECD Centre for Entrepreneurship, SMEs and Local Development, 2009)*. There is the evidence that since 2008 SMEs in Serbia are being constantly faced with a clear decline in demand for goods and services. In this context, it is very difficult for micro and small enterprises as well as entrepreneurs, which are the dominant segment of SME sector, to downsize business operations as they are already small. Two related factors were of special importance for the SME sector: increased payment delays (which produced the decrease in liquidity) and increased insolvency and bankruptcy rates (due to weaker financial structure, lower or no credit rating and inability of SMEs to obtain short-term financing).

The number of registered enterprises and entrepreneurs has been constantly dropping, and the number of business entities ceasing to work has been going up since 2008. The ratio of established and closed enterprises, has been declining every year indicating less newly established enterprises compared to

number of closed enterprises. In this context, constant negative trends can be found in decrease of birth rates and increase of death rates of enterprises.

Table 3: Established/closed ratio and birth rate vs. death rate

	Established/closed ratio		Total	
	enterprises	sole traders	Birth rate	Death rate
2006	7,5	1,7	22,3	10,6
2007	5,9	1,5	20,7	12,1
2008	3,7	1,3	18,0	13,2
2009	2,8	1,1	15,7	12,7
2010	1,0	0,9	14,2	14,9

Source: MoERD,NARD: Report on SMEs and entrepreneurship development (2011), adapted by authors

According to Survey of small and medium-sized enterprises and entrepreneurs (*Republic Statistical Office, 2011*), 60% of respondents are coping with challenges of the current economic crisis, among which there is a small number of enterprises that do not feel the effect of the crisis (14%). There are 21% of respondents faced with decisions on dismissal of employees, and as much as 19% of them are faced with uncertain perspective in terms of further survival. Share of surveyed enterprises that feel stronger impact of the economic crises was reduced compared to the findings of the surveys in the previous years (40% compared to 51% in 2010, and 48% in 2009). Most of enterprises in 2011 intend to continue working with the increased (44%) or the same scope of business activities (48%) in the following three years. Negative outcome was considered by 8% of respondents, where 4% is related to reducing business activities, 3% to closing the business and 1% to transferring the business to somebody else.

Table 4: Orientation and plans of SMEs in times of crisis

	Business expansion	The same workload	Reduced workload	Closing the business	Transfer business to others
Micro	32,2%	55,6%	6,1%	4,7%	1,5%
Small	45,9%	47,2%	3,8%	2,0%	1,1%
Medium	58,7%	37,6%	2,4%	0,9%	0,5%
Entrepreneurs	29,1%	59,1%	4,6%	5,3%	2,0%
Total SME	43,6%	48,5%	3,8%	2,9%	1,2%

Source: MoERD,NARD: Report on SMEs and entrepreneurship development (2011)

In the similar survey conducted in 2006, there was much more enthusiasm among entrepreneurs: 66% of respondents intended to expand their business, and 26% planned to keep the existing level.

Governments generally responded on financial crisis by three types of measures aimed at: *supporting sales and preventing depletion of SMEs' working capital, enhancing SME's access to liquidity and helping SMEs to maintain their investment level* (OECD Centre for Entrepreneurship, *SMEs and Local Development*, 2009). Serbian Ministry of Economy and Regional Development in 2009 initiated the scheme and put in place anti-crisis packages, through the Serbian Development Fund in cooperation with the commercial banks, which enables subsidized loans for businesses covering investments, liquidity maintenance, financing of long-term working capital, export activities and financial leasing.

3. FINANCING ENTREPRENEURSHIP IN SERBIA

3.1 Debt financing

SME sector has become an important segment of interest of banking sector and an increasingly attractive customer group although the banks in Serbia have been traditionally cautious with lending to SMEs due to high risks associated with the sector. Consisting of 33 banks with network of 2.432 organizational units at the end of 2011, the banking sector in Serbia provides the range of both standardized as well as specially tailored banking products/services. Banks became more aware of the importance of the SME sector in Serbia and majority of them have separate departments dealing with SMEs. In this context, banks that are a part of international banking groups have changed the terms of access, the risk analysis and risk

management practices for SMEs. Concerning banks' operational management, the small enterprises became the part of retail lending while the medium enterprises became the part of corporate lending. The existence of financial infrastructure, such as credit Bureau of the Banking Association and the Solvency Centre in the NBS, have been of major importance to allow introduction of modern credit risk appraisal techniques.

Serbian banking system operates under very strict and tight legislations and regulations. Although the bank lending conditions have significantly tightened, growth rate of credit potential of banking sector in Serbia had increasing trend in 2008 and 2009, but slower than in the period 2005-2007, indicating the direct impact of financial crisis. Deposit potential had a negative growth only in 2008 as a direct consequence of the first wave of financial crisis.

Table 5: Indicators of banking sector in Serbia

	2005	2006	2007	2008	2009
Number of banks	40	37	35	34	34
Growth rates of credit potential (in %)	40.0	26.2	38.7	21.4	7.2
Growth rate of deposit potential (in %)	35.2	52.2	45.4	-2.7	14.2

Source: NBS and ECB, 2010

From the bank's perspective, profit potential from SME lending is high, but some obstacles, basically policy related, were identified (<http://siteresources.worldbank.org>). The most serious obstacle is the legal and contractual environment (including weak protection of creditors and property rights, problems with contract and collateral enforcement, judiciary inefficiency and slow and costly bankruptcy procedures). Banks in Serbia are trying to deal with these inefficiencies by demanding high levels of collateral for practically all types of credit products. Macroeconomic factors related to regulations were also recognized as obstacle to SME finance. Due to very tight monetary policy implemented by National Bank of Serbia and high cost of compliance, the cost of credit and of banking services generally in Serbia has significantly increased. It is widely recognized that SMEs are not profitable enough to be able to afford significant level of debt financing at the existing interest rates in Serbia. In the field of bank's policy, they frequently try to avoid providing loans to certain types of SMEs particularly start ups and very young firms without track records that typically lack sufficient collateral, or firms whose activities offer the possibility of high returns but at a substantial risk of loss (OECD, 2006). In this context, loans although available are not accessible for SMEs in Serbia.

On the other side, SMEs' perspectives elaborated in the Survey on current situation, *problems, and needs of the SMEE (MoERD, RASMEE, SSO, 2009)*, conducted on a sample of 3,000 enterprises, provided insight into the existing situation and problems encountered by the SMEE sector. Entrepreneurs found very limited possibilities and poor assortment of sources of finance on the domestic financial market. Commercial banks' offer is still not stimulatory enough and unreachable for the majority of SMEs. High interest rates are the main problem regarding loan arrangements of small enterprises, banking costs as well as collateral required are still high, the procedures of obtaining guarantees and approving loans are complicated and too long, and loan amounts limited. Serbian Business Registration Agency and the Serbian Development Fund have a fully operative system for the registration of movable assets allowing firms to use movable assets as collateral in their efforts to access bank finance. Additionally, it should be emphasized that some opportunities for reduction of collateral requirements through credit guarantee schemes exist in Serbia. The Serbian Guarantee Fund and Vojvodina Guarantee Fund issue guarantees for SMEs, entrepreneurs, start-ups and agricultural producers. Export credit and Insurance Agency is focused on export oriented sectors and provides credit guarantee schemes. There is an idea that credit guarantee schemes should be privately managed in order to achieve efficient allocation of resources through the incentive schemes.

3.2 Government intervention

Due to existing market failure that inhibits the provision of appropriate financing suitable for the SMEs, Serbian government still plays an important role in supporting the SME sector. There is a number of government-sponsored programs aiming to stimulate the SME development. Existing financial infrastructure at the national level that directly or indirectly provides financial support to SMEs and entrepreneurs from government sources consists of several institutions.

Table 6: Government support

	Institution	Types of support
1.	Ministry of Economy and Regional Development	<ul style="list-style-type: none"> • Subsidies for quality certification, cluster development, entrepreneurship development and innovations • Subsidies within Program for stimulating investment in innovations in Serbian companies • Loans for development of enterprises and entrepreneurship in under developed municipalities • Loans for improvement of the quality of tourist products in SMEs • Low interest rate loans for start-ups
2.	Ministry of Science and Technological Development	<ul style="list-style-type: none"> • Subsidies for innovation projects
3.	Ministry of Agriculture	<ul style="list-style-type: none"> • Financial support to entrepreneurs and NGOs in the field of agriculture for developing safety and quality systems for agro products in 2009 as well as for providing consultancy work.
4.	Development Fund of Serbia	<ul style="list-style-type: none"> • Low interest rate loans in order to facilitate SME start up and development (including investments in new programs/innovations, reconstruction and modernizing, and in working capital)
5.	Development Fund of Vojvodina	<ul style="list-style-type: none"> • Long term and short term loans for SME development and export finance
6.	Guarantee Fund of the Republic of Serbia	<ul style="list-style-type: none"> • Approves and guarantees for company loans parts approved by the banks and other financial institutions. Guarantee Fund approves 30% and the banks 70% of the loan.
7.	Guarantee Fund of Vojvodina	<ul style="list-style-type: none"> • Issuance of guarantees to banks as the collateral of regular bank loans repayment by individual farmers, private entrepreneurs, small and medium enterprises
8.	National Agency for Regional Development (former Republic Agency for SME Development)	<ul style="list-style-type: none"> • Low interest rate loans for start-ups (as implementing institution within the government program) • Subsidies for quality certification, entrepreneurship development and innovations (as implementing institution within the government program)
9.	Export Credit and Insurance Agency of Serbia (AOFI)	<ul style="list-style-type: none"> • Short –term financing, export credit insurance, factoring, foreign buyer financing, refinancing of a foreign buyer via commercial bank and financing from other sources.
10.	Serbia Investment and Export Promotion Agency (SIEPA)	<ul style="list-style-type: none"> • Subsidies for the participation of Serbian companies at international fairs, creation of business linkages as well as organization of trade missions for the foreign companies interested in doing business with Serbian companies
11.	National Employment Service (NES).	<ul style="list-style-type: none"> • Subsidies for job creation – mostly for the ones listed in the NES's database as unemployed and other incentives for job creation.

As far as state-funded credits are concerned, the Development Fund of the Republic of Serbia is the principal channel, providing (subsidized) financing for different programs related to economic, regional and SME development, increasing competitiveness and related activities. This Fund has a number of credit products including: Long term credits up to five years at an annual interest rate of one per cent, funded by the Ministry of Economy and Regional Development; Short-term credits (6 months), with annual interest rate of 3.5% from Fund own resources; Long-term credits of up to five years at 4.5% annual interest and with a grace period of one year; Credits for financing development of production trades (craftwork) and services – entrepreneurial credits (4 years) with 1-year grace period and annual interest rate of 1-3%.

Banks were very positive about the need for the Government to take an active role in trying to facilitate lending to SMEs (<http://siteresources.worldbank.org>). Although the subsidized programs have provided interest rates that were significantly smaller than that of banks, when asked to evaluate the Government-sponsored credit programs, banks responded that the programs have little or no real impact on the market or the SME development. One explanation for such an opinion can be that the total volume of funding available from the government-sponsored sources is actually rather small to affect the market rates, which is partially true. More importantly, there is no reliable impact assessment of the incentives to SMEs put in place by Serbian government. It should be the very clear indicator of efficiency of SME policy in the context of financing entrepreneurship. Therefore, it is necessary to design clear monitoring processes for all government-sponsored programs aiming to finance and stimulate the SME development.

3.3. External equity financing – the missing piece of the puzzle

Financial markets in Serbia are generally underdeveloped and there are limits for SMEs to use other financial instruments coming from the capital market and corresponding financial organizations. The Law on Investment Funds (2006) was a first step towards allowing the establishment of private equity funds in Serbia. The *OECD report "Progress in the Implementation of the European Charter for Small Enterprises in the Western Balkans: 2009 SME Policy Index"* (2009) states that several private equity funds are operating in Serbia. But, these funds confine their investments to the acquisitions of stakes in larger Serbian enterprises. Existing Law on Investment Fund does not impact substantially on innovative SMEs nor venture capital companies investing in them.

Despite the importance of innovative SMEs, having in mind that they represent higher risk than traditional SMEs or large firms, they face particular problems when attempting to access traditional bank loans. On the other hand, SMEs are also disadvantaged having in mind that investors (who provide risk capital in return for the equity share in the company), are generally focused on large companies. Financing innovative SMEs is additionally complicated by the fact that these firms require different financing at different stages of their development.

Business angels can be a substitute for bank financing or venture capital which can be difficult to attract at the early stage of a company's life. In contrast to bank finance, venture capital companies and business angels do not seek scheduled repayment, but for a minority stake in the share capital of a company in return for cash. Business angel, as private investor who brings not only capital but also experience and know-how in company management at the early stage, is generally interested in the high-risk and high-reward business opportunities that the venture creation offered. Business angel tends to operate on a smaller scale than formal venture capital companies and probably concentrates more on start-ups than in expanding enterprises. For these reasons venture capital companies and business angels are usually regarded as separate categories.

Although, there is no formal representative association of business angels in Serbia, in the end of 2009, the first informal network of business angels was established in Serbia, called "Serbian Business Angels Network" (SBAN). SBAN provides an opportunity for entrepreneurs, through the web portal that serves as a type of matchmaking platform, to place their business ideas and to search for potential investors. Investors, business angels, members of the network, can see all the projects and browse through projects according to their field of interest or value of capital needed as investment. SBAN also allows the investors a potential joint investment. It is of vital importance for entrepreneurs in Serbia, through attending trainings, conferences, workshops and lectures, to improve knowledge on designing business plans, project documentation, marketing and finance as well as to improve their communication and negotiation skills in order to prepare themselves for the business meetings and negotiations with potential investors. Investment readiness programs will be an opportunity to eliminate some misunderstandings and to clarify business angels' expectations and entrepreneurs' perception of investors' requirements. Also, it is necessary to promote the equity financing and to develop regulatory and funding mechanisms for encouragement of formal and informal venture capital investment in SMEs.

4. CONCLUSION

Slower development dynamics of the SMEE sector in the times of crisis, made the development problems of the sector in the fields of financing entrepreneurship venture more visible. Weak financial structure of SMEs is heavily dependent on external financing and due to lower or no credit rating (especially in case of start-up firms) they have limited external financing options.

Existing scope of financial support to SME sector in Serbia, although significantly improved, is not enough specially in times of crisis to contribute to faster growth and development of SMEs and entrepreneurship.

Regarding the debt financing, the cost of credit and of banking services generally increased. Although available, loans are not accessible for SMEs in Serbia having in mind the SMEs are not profitable enough to be able to afford significant level of debt financing at the existing interest rates in Serbia. Start-up businesses are in particularly difficult position. Banks frequently hesitate or try to avoid providing loans to them because they have no track records or sufficient collateral.

External equity financing in Serbia is in the initial stage of development. Venture capital companies are generally focused on large companies, while the existing Law on Investment Fund does not impact substantially on innovative SMEs nor venture capital companies investing in them. Informal investors (business angels) can be the substitute for bank financing or venture capital especially at the early stage of a company's life. But, in Serbia this is the missing piece of the puzzle, and more training and education is necessary in order to promote and introduce the essence of this kind of financing. Very first initiative to establish the network of business angels in Serbia was implemented via SBAN web portal enabling entrepreneurs to present their business ideas and projects on one side and investors to better allocate their investment decisions in the area of their interest.

Development of new financial instruments which will support primarily innovative SMEs and provide access to equity-based investments, was envisaged as the priority of SME policy in the area of financing SMEs in Serbia by the Strategy for Development of Competitive and Innovative SMEs 2008-2013. Besides providing direct financial support to SME sector, it is also necessary, in the conditions of a financial crisis, to work more actively on improving the knowledge of SME owners and entrepreneurs in the field of availability of funding, information on how to access these sources as well as how to manage them efficiently.

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MANAGEMENT PRACTICE, SUCCESS AND/OR GOOD PERFORMANCE OF SMALL BUSINESSES

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Abstract: *One of the main goals of this paper is to define formal management practices, as well as to define success, i.e. good performance of small businesses. Current dilemmas in the cited triangle are of immediate interest because of different research results on this subject. Initiating critical thought on the subject creates necessary conditions for further research within the framework of the defined field, increases the understanding of the research problem and contributes to better dissemination and usefulness of future research results. Considered from the aspect of future research intentions, this paper is a necessary step on a defined path, that is, a necessary condition for further research.*

Keywords: management practice, success, good performance, small business

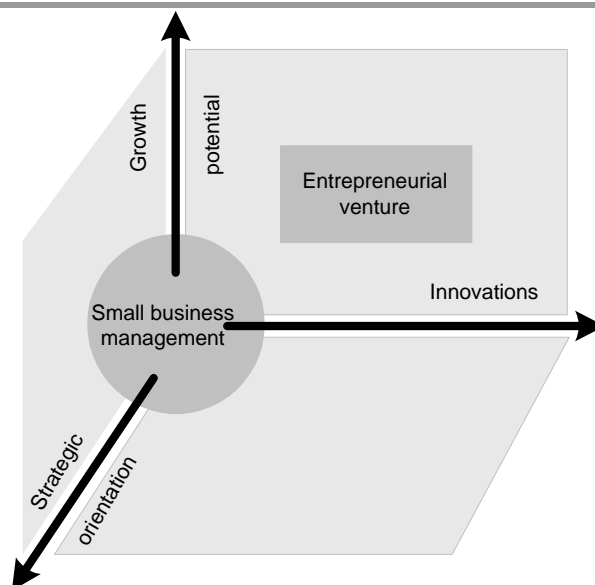
1. INTRODUCTION

Numerous works published in academic publications, as professional journals, including research results on management practice and success and/or good performance appeared about 50 years ago. At the beginning, significant part of this sort of researches related to large enterprises, therefore, most management practice was founded on methods and procedures developed for large enterprises, where operative and financial goals were very precise and clear and could be very easily turn into concrete actions (Simpson M., Padmore J., Frecknall-Hughes J., 2007). Recently, the realized balance and part of attention have been paid to small business. This change of behavior relationships have been caused by the opinion and a very logical attitude that **management practice is the principal culprit for success/failure of large companies and everything good for large companies is also good for small ones**. This attitude is confirmed by many researches where managerial practice was on the top as a critical factor for the success of small business. Significant research space within the framework of this subject after five decades of current importance has been present for opposite results of authors when researching in this field. The previous statement should be accepted very carefully. Results of the cited researches can be hardly compared because there is some dose of relativism when determining how an author understands the key variables of researches as managerial practice, success, performance and indices for indicating these variables. The work, as part of a wider research project will enable the adequate starting points and the realization of planned researches to determine the interdependence of management practice and success/performance of small business. The main result, the practical result, of these attempts should be the managerial framework in the form of managerial recommendations for success, i.e. good performance of small business, as well as the adequate way to disseminate these results with a view of advancing practice in the field of researching. It is also very important to emphasize the necessity of clearing up the starting points and complete understanding of some categories so the results of this research can be definite, unambiguous and completely useful. This means, firstly, that we must determine precisely the categories of formal management practice, as well as to limit the categories of success and good performance; these will be some of the key variables in the research.

2. EXISTANCE OF MANAGEMENT PRACTICE

As the beginning phase in the life cycle of an enterprise, i.e. development, considered from the aspect of its size, small business, as the social-legal entity – societies have a significant distance in relation to medium enterprises, when speaking on management practice and the level of its application. Management and intention for the long-term existence, as well as the realization of its own mission make small business an officially accepted entity of the economic activity. The existence of management orientation clearly divides small business from the entrepreneurial undertakings, as visually explained in Figure 1. In the same way, starting management practice, largely, qualitatively divides small business from medium enterprises, as the next phase in development, where management is present at one higher, professional level.

Figure 1. Differences between entrepreneurial investments and small business management



Source: Wickham, P, 2004.: «Strategic entrepreneurship», Prentice Hall, p. 103.

Therefore, small businesses divided from the segments of medium ones, where the category of micro enterprises is turned off, represent one homogeneous entirety, i.e. one qualitatively precise and clearly limited field of researching. As seen in the previous part of the work, as selected research field appears a subgroup of small businesses where the category of micro enterprises numbering until ten enterprises is excluded. Reasons are exclusively of the substantial character and they significantly exert influence on the quality of researching. The basic set of small businesses without micro enterprises, defined in this way, is completely compatible and comparable with the same segment of economic societies as defined in EU and the surrounding countries. It is not the case in our country. In the analysis of interpreting and usability of research results based on the realized compatibility of the research field, we get the broader field, in the time and space sense, for medium enterprises dissemination. Except micro enterprises, the sub-segment of medium enterprises is also excluded because small businesses have specific features in relation to the medium ones, as for the attained level of management practice. As obliging in the next part is the precise determination of key research variables in order to interpret causes, relationships and connections of some results with a dose of reliability and usability. One of the main independent variables in this research is certainly management practice in small businesses. There are different approaches and determinations in the scope of this part of the research field. According to Wickham and the model illustrated in Figure 1, the existence of small business management within entrepreneurial undertakings is confirmed with the strategic orientation and it represents the basic indicator of management practice in small business (Wickham P., 2004, p. 41). The substantial strategic orientation means the existence of the long-term determination with small business for realizing business activities materialized in strategic goals, defined mission and business vision. The presence of formal small business management is mostly identified with planned activities. The dominant activity within the framework of strategic management is planning. Planning as the first phase of management process is definitely the key subject of small business and management practice. Some authors connect planning with the advancement of performance, others treat planning as the key factor of success. Connecting management practice for planned activities exclusively points to some indications that it is about the beginning phases of management system and its development in small businesses according to the level of business activities of economic entities as small businesses. The following citations speak about the importance of business planning for small business. If the beginner entrepreneur asks for advices to advance business, the most often answer is "Start with planning" (Brinckmann et al, 2010). In addition, most university in the U.S. A. having study entrepreneurship programs, teach students on the importance and carrying out business plans (Brinckmann et al, 2010). Seventy-seven schools of 100 business schools in the U.S.A. have courses for carrying out business plans (Honig, 2004). Many leading professors of entrepreneurship consider business plan development as the most methodical unit in entrepreneurship

instruction (Hills, 1988). In many countries, business plan is one of the leading instruments for entrepreneurship development and regional development (Russell et al, 2008; Lange et al, 2007). In addition, in many countries, hundreds of people participate every year in the government instruction programs for carrying out business plans (Brinckmann et al, 2010). Citing these attitudes in detail, we have not yet defined precisely how we understand management practice in small businesses. According to the previous question, there are two opposite schools: the planning school as opposed to the learning school (Wiltbank et al, 2010). Supporters of the planning school emphasize that learning generally advances efficiency, therefore the performance of small business (Ansoff, 1991). As the main components of business planning, they cite strategic goals, strategies, evaluation and decision-making as part of control implementation (Armstrong, 1982; Porter, 1985). Supporters of the learning school focus dominantly on learning, strategic flexibility and resource control, not on the predefined behavior in the form of formal plans (Mosakowski, 1997; Mintzberg, 1994; Waters, 1985). In addition, one of the researchers who connect management practice of small business with the survival and good performance is Johan Maes et al (2005). He cites, in his work, the following activities proving the existence of management practice and their influence on financial performances in small business.

Figure 2. Relationships on performance

	Financial performance
Owner–manager characteristics	
Education	+
Knowledge of cost accounting	+
Financial knowledge	+
Experience	+
Company characteristics	
Size	+
Age	+
Internal factors or management practices	
Equity above minimum level	+
Percentage of time spent on administrative affairs	-
Use of external professional advice	+
Planning horizon	+
A priori screening of clients	+
Avoidance of cash credits	+
Gathering of non-financial information	+
Standard costing	+
Actual costing	+
Factors used in costing process	+
Budgeting	+
Quality control	+
Supporting use of informatics	+
Percentage of jobs as a subcontractor	-

Source: Johan, M., Luc, S., Filip, R., (2005), *Modelling the Link Between Management Practices and Financial Performance Evidence from Small Construction Companies*, *Small Business Economics* 25: 17–34

The list of business activities is illustrated in Figure 2, being identified as the form of management practice, unambiguously points to the beginning steps in building the management structure, which is typical of enterprises in the beginning phases of development as small businesses. The cited activities in this research cause the interdependence with financial performances and are very important for the survival of small business. From our standpoint, only their presence and the form in which they appear are interesting. In this way owners/managers confirm the thesis about intentions and efforts on the long-term survival, building the organized business system; all this has the characteristics of strategic orientation.

2. SUCCESS AND/OR GOOD PERFORMANCE

In all the fields of social and economic engagement, participants try to realize success. Success is not always the end goal in undertaking some activities, but it becomes the resource for realizing many other goals. Success is something to which owners/managers/beginners of small businesses also gravitate. For economic activity and enterprise management, success can be measured and expressed by a large number

of indicators, but an overall expression of success is realized by means of synthetic indicator called profit. Besides this representative indicator, success can be considered in different business segments where success can be presented in different ways as productivity increase in production, winning a new part of the market, sale volume increase, introducing a new product on the market, increasing the number of employees, production increase, etc. Most attitudes, presented in the literature considering success, define successful enterprise in the following way: to be considered as successful, the enterprise must realize at least average profit of its economic branch. However, as for small business, is it the same? For success in an entrepreneurial undertaking, it is necessary to satisfy all the conditions so business activities can result in successful business results. These conditions relate to knowledge, skills and capabilities of the entrepreneur who, as a person, should have them, then good business ideas, as well as conditions ruling in the business environment. There is no guarantee for entrepreneurs. Simply, there is no way to eliminate all risks connected with starting small businesses, but the chances for success can be increased by good planning, preparations, evaluation of strengths and weaknesses of potential owners/managers of small businesses. Except of all these usual legalities, there are exceptions as many successful owners of small businesses are who, in the age of adolescence, were team players, athletes, leaders at school, excellent students, never considering status quo. However, it is quite usual to meet many successful entrepreneurs inclined to be rebellious people, and inclined to taking risk, as well as those having tendency to be "off beat" and it is considered as necessary for successful carrying out an entrepreneurial undertaking. Obviously, there is not a well-known formula for success, but there are numerous open questions and dilemmas what it represents and how to measure it in small businesses. To treat the problem of performance categories and success of small business represents one of the key points in this work. There is not firm determination what the previously cited categories mean, as there is a wide range of variables for measuring performance/success. Most management practice is based on methods and procedures being developed for large companies, where operative and financial goals are very precise and clear and which can be easily transformed into concrete actions (Simpson M., Padmore J., Frecknall-Hughes J., p. 1). As for small businesses and the relationship between management practice and success/performance (Rue and Ibrahim, 1998; Perry, 2001; Gibson and Cassar, 2006; Simpson et al, 2007; Wiesner et al, 2007), there are some difficulties mostly relating to objective measurement. But, in most researches, a significant part of success/performance of small businesses is connected with management practice, illustrated in Figure 3. According to some authors, success is interpreted as a specific aspect of performance (Brush and Wanderwerf et al, 1992, p. 159); others equalize success with high performance (Brooksbank et al, 2003), while some authors bring it in touch growth and profitability (Perren, 2000).

Figure 3. Relative importance of the factor of small business failure

Causes	%
Lack of management skills	29.1
High interest rates	15.6
Economic recession – inflation/unemployment	11.4
Taxes	10.1
Competition	5.8
Money flows	5.8
Laws and other bylaws	5.0
High business costs	3.6

Source: Peterson, R., Kozmetsky, G., Ridgway, N.: « Perceived Causes of Small Business Failures », *American Journal of Small Business*, 2003., p. 15

Some authors connect small business success with the survival itself, i.e. avoiding failure. As for **defining small business failure**, it may be the simplest way when it equalizes with its **formal bankruptcy** (Cochran, 1991). Using different sources of information on small business failure, there is a possibility to widen the previous definition by the category of conscious retreat from business, including here small businesses that stop working because of the loss financial resources, which also means bankruptcy, as well as conscious retreat, leaving nonpaid liabilities to creditors (Dun & Bradstreet, 1999).

Because of different understanding of success and performance, and the way of measurement, there is the necessity of precise limitations and defining. As for owners/entrepreneurs/managers of small businesses and the wide spectrum of their goals, as quality independence and life style (Jennings and Beaver, 1997, p. 63)

speaks enough about the complexity of problems. The illustration of success by means of financial indicators, as the total income per employee, profit per employee or the period of investment return is not enough to apply in the context of small businesses, disregarding they are easy to measure because they ignore the alternative criteria of success based on personal goals of owners/entrepreneurs/managers. Personal goals of owners/entrepreneurs/managers should not be harmonized with business goals, financial indicators do not often state them, and it additionally complicates the current situation. Some financial categories, total income, profit, property, as quantitative statements are differently calculated because they, in their structure, include different elements, and it makes the category of financial indicators and their values relativistic. According to Frecknall-Hughes et al (2007), the main shortages of accounting and financial indicators of performance are:

- Ratios give meaningless figures if the company has generated a loss;
- There is no absolute definition as to what constitutes a “correct” ratio;
- Given (ii), they may be calculated almost as one likes, which means that they are capable of manipulation;
- Compounding (ii) and (iii), ratios are often just presented as figures, without any supporting calculations or definitions;
- Ratio analysis deals only with financial numbers and does not take account of other factors which may affect company performance; and
- If they are calculated over a period of years to provide longitudinal data, then the value of currency in later years will not be the same as that of earlier years, owing to the effect of inflation, etc.

For the concept of small business success, i.e. owners/entrepreneurs/managers, we can say that it is a subjective-absolute category as a measure in realizing the set goals of the company, which can be simple and having one meaning; therefore, they can reflect individual, personal aspirations and motives. *Performance represents the relative-objective dimension of success as a multi-dimensional, qualitative and quantitative, the expression of success compared to other enterprises or relevant groups of enterprises.* Performance itself represents the attained level of realization, i.e. the principal result of business activities of the company, in this case, small business. Such defined limited categories of success and performance point to the fact that the company can be successful in realizing the set goals, but also it finds itself in an unsatisfactory level of performance- good, high, optimal), for instance , regarding to growth and development, as a multi-dimensional term of success (Jennings and Beaver, 1997, p. 68). When the analysis is oriented toward small businesses, as the pattern and the basic set defined within the framework of this research, the main resource of mutual comparison to the dimension of relative success is certainly performance expressed by selected indicators, which unambiguously represent this category. The selection of indicators for stating the level of performance is certainly the key factor of success of all the efforts expressed in this and similar researches, which have performance as an independent variable. Lumpkin and Dess are very precise when researching the multi-dimensional nature of performance, deciding for traditional indicators of growth, market participation, profitability, stakeholders’ satisfaction, etc. (Lumpkin and Dess, 1996, p. 153). In this research, indicators of survival, growth, development and profitability are selected with a view of measuring small business performance. The cited selection represents one consensus on the subject of performance indicators, and it is seen in the research carried out by Murphy with authors within the framework of 51 works, where he identified 71 different performance measures, classifying them into nine principal groups, where growth and profitability are the most frequent (Murphy, Trailer and Hill, 1966, p. 16).

3. CONCLUSION

Based on the previous attitudes, determinations within the framework of this research are as follow. Documented business plans do not represent strategically oriented management practice in small businesses, but the formal planning is part of a strategic management process. Learning a lesson from the previous sentence, for management practice, we mean planning and documented business plans, as well as management activities in all the phases of management processes with formal documentation.

As for measuring and business result statements in small businesses, there is a significant distinction between the categories of success and performance. For the category of small and medium enterprises, we can say that it is a specific aspect of performance characterized by subjectivity and the personal dimension of owners/managers/entrepreneurs, which should not be in accordance with realized business results, i.e. performance. As a qualitative statement, it is very hard to express it by means of numerical indicators, and it represents the basic shortage of financial success indicators, when talking about small business. Performance measuring, as an objective statement of business success, does not point to the level of

realized business goals of owners/entrepreneurs/managers and it points to the need of inclusion of qualitative indicators of the entrepreneur's business success. If we want performance indicators to express the real measure of business success and realized results in the form of selected financial indicators, some mutual comparisons within the framework of some related groups of companies in the same economic branch are necessary. It is also necessary that financial indicators are uniform to relative relationship of selected categories and being compared and in this way; they make a comparable ratio structure. In any case, the volume of management activities, according to all the phases of management process and the degree of its formality in the form of written documents, is connected with success, i.e. small business performance. The former researches partly and contradictorily covered such a defined problematic orientation, opening the space for intentions set in this research.

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SMALL AND MEDIUM SIZED ENTERPRISES OWNER PROBLEMS AND INFLUENCE FACTORS

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Abstract: *This paper describes the role of owners of small or medium sized businesses as the main pillars of business functioning, and outlines potential impacts (positive or negative) on owners of SMEs. The objective of this research is theoretical understanding of the problems SME owners face every day, and possible identification of local SME owners (in Serbia) with foreign or domestic problems abroad. Specific methods used in writing this paper were confrontation of views of various authors on the same issue, and the synthesis of the authors' own findings, or the findings of others. The authors have gained insight into the quantity and quality of problems and factors affecting owners of SMEs, and the daily amount of tasks which an owner has to deal with. The limitation of this study may be a lack of practical research, but it can certainly be a good impetus for further work. The paper has revealed a strong correlation between owners of SMEs and ways in which they are introduced to problems, or whether they will succeed in minimizing side effects. This theoretical study may serve to existing or future entrepreneurs and researchers, to elaborate on the topic.*

Key Words: *small, enterprise, owner, influence, business*

1. INTRODUCTION

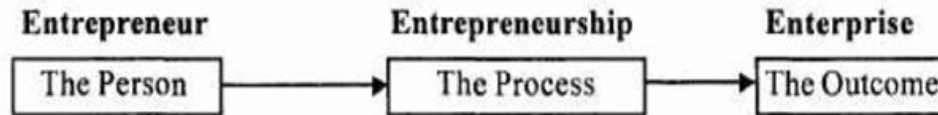
Concept of entrepreneurship now basically covers the design and organization of business activities with the ultimate goal of profit making. An entrepreneur is a person who is constantly looking for changes, and responses to changes in the environment, using them as an opportunity for further development. Entrepreneurs innovate constantly in order to keep up with market conditions. Within-entrepreneur (intrapreneur) is a person working in a company apart from other activities, and the company is actively involved in innovation, as well as in revitalization / diversification of business. Entrepreneur has to feel the freedom of action in order to explore and implement ideas, although the outcome effect of that work will be greater than the whole company can withstand, but also the entire company has to take over the risk that comes with such actions. Entrepreneurs usually play a major role in developing the economy of a country, or to increase the GDP of a country. Social development of a country or region is also marked by the influence of entrepreneurial activity.

2. THE ROLE OF A SME OWNER

In business there are no guarantees. There is simply no way to eliminate all risks associated with start-up businesses - but it is possible to increase the chances of success with good planning, preparation and close examination of business conditions. The owner must have a good idea to assess the strengths and weaknesses of his small business. It must be carefully considered including all concerns, such as:

- Do you venture into everything yourself (i.e., whether each project, organizing, monitoring, just go through the owner or someone else),
- How well is the owner getting along with the environment (the owners have to develop working relationships with a variety of people including customers, vendors, bankers, lawyers, consultants, etc...)
- How well and how does the owner plan to organize a business (a good finance organization, storage, distribution, production can help avoid many downfalls),
- Is the urge to own a business strong enough (business management can significantly emotionally downfall on owners, so many owners burn out quickly, precisely in order to submit all the pressure, all liability for (non) success of their business).
- How will the business affect the family of the owner (the first few years can be very difficult for the family life of the owner, so it is important for family members of owners to know what to expect, but for the

owner it is very important to know that they will have the support of family members when it comes to difficulties in business) (Morgan, 2007.).



Picture 1 (Saroj and Mehndiratta, 2009.)

Ideas to the new business owner can come from various sources. Some owners run the business and develop existing ones, according to some of their personal interests. Any specialized knowledge or skill may be the owners to indicate, and the possibility of turning it into a business. Through time, as companies reduce, or require more external services (outsource), so the opportunities for entrepreneurs are born. Any task or responsibility that large companies do not want, or do not have time to do it, can be the basis of the owner of an SME to be involved in cooperation (and Saroj Mehndiratta, 2009.).

The role of the SME owner is to learn all aspects of his business potential, to make such a good knowledge that could lead to good functional and business decisions. There are entrepreneurs who are very inventive in their work, including developing new or improving existing products which can interfere with much larger "players" in the market. There are some advantages in developing your own business. Again, the owner is the main pillar of that development. It is less costly to start and develop their own business, rather than to buy someone else's which already had numerous disadvantages encountered. Most people who start their own business are good at what they do, so it is easier for their colleagues to rely on them in the process of developing a business (and Saroj Mehndiratta, 2009.).

When owner family members are involved in the whole story, then it is possible to develop their own management style and approach, their own policies, ways of treating the problem (and of course there are risks that cannot stop the realization of the process of business development) (Saroj and Mehndiratta, 2009.).

The characteristics that a SME owner has (at least most of them) to meet are:

- Ability to take initiative - an entrepreneur is a person that identifies an opportunity, trying to extract the best outcome from it, if he doesn't have this capability, the entrepreneur cannot continue to progress,
- Self-confidence,
- Possession of leadership quality- an entrepreneur would have to be able to influence the behavior of his employees so that they achieve the objectives of the organization,
- Ability to assume the risk- an entrepreneur would have to be able to analyze the opportunities and calculate risk factors before taking the next step,
- Originality,
- The ability to predict- an entrepreneur must try to understand future trends and to plan for their outbreak,
- Creativity- an entrepreneur must be able to generate new ideas and designs, to depart from ordinary products, and to open new markets,
- The inner drive to succeed- entrepreneurs set big goals in front of them, they tend to behave very ambitious, removing obstacles to success,
- Dynamics- entrepreneurs recognize the importance of coming and staying "on top", and the only way to achieve this is to change and grow depending on the situation in the region,
- High Motivation- high standards and objectives that need to be achieved by looking for entrepreneurs to be motivated and to motivate their employees,
- Acceptance of constructive criticism-good entrepreneurs must know how to receive criticism, hurdling obstacles are a part of the picture in business conduct, so they have to be treated, with analyticity,
- Good interpersonal relations-Entrepreneurs with good interpersonal relationships can more easily find their way to market, to develop a network with its suppliers, etc. retailers. Good relationships help them work more efficiently,
- Appropriate strategic planning-, medium-term and operational planning must be present to access business opportunities in the best possible way, to be implemented (and Saroj Mehndiratta, 2009.).

3. SME OWNER PROBLEMS

The work and the type of work performed, the fear of job loss or employment, fatigue, short deadlines, lack of parent support, a sense that he cannot manage their time or work performance, inability to influence the way or work organization, sense of alienation other employees of the company, a sense or feeling excessive exploitiveness unused in connection with work tasks set before the owner, any gap in the work, monotony, and numerous physical, biological, or chemical influences at work - these are all potential problems that arise in entrepreneurial life.

On the other hand, Brixia (2011.) defines several key limitations that owners of a major problem and obstacle to the initiation and maintenance of entrepreneurial ventures, including its:

- High tax rates;
- The inefficiency of tax administration;
- Advanced obtaining permits and licenses;
- Corruption;
- Poor infrastructure.

Stress is a daily companion, a certain feature of organizational life and largely associated with the execution of duties and tasks at work, daily routine, relationships with other people, control and performance management processes, as well as a variety of unplanned and unforeseen circumstances which business owners face with, during their company's life cycle.

While between all the employees in any organization exists a normal, natural, level of stress, the business owner's situation is slightly different (Lovelace et al., 2004.). Directors of large systems generally are under increasing pressure over the short-term problems, while the main stress of SME owners are about the long-term planning, financial investment, job security, as well as the status of their business (Fassin et al., 2011.).

Leaders of organizations are more prone to experiencing different problems because of the position and level of responsibility demands that are expected of them to meet. In order to create a healthy and motivating work environment, the owner is the one who needs to develop leadership skills and autonomy of thinking of other employees.

The practice of „self-leadership“ is the development of personal motivation and desire for achievement of organizational goals, but in a way that will help reduce stress and increase job satisfaction or easier coping with problems (Lovelace et al., 2004.). .

The biggest motivation for almost every owner of a SME is a possibility of prosperity and growth of his small business. According to Ward (2004)., owners of small and medium businesses cited six major problems for long-term development of their business, which in some way motivate them in a positive (or negative) direction:

- Maturation of business life cycle and increasing competitiveness;
- Limited capital for business growth;
- Next generation of business owners (if inheritance is between family members);
- Ownership changes dependently and inflexibility;
- Conflicts between the heirs;
- Incompatible goals of family values and needs.

4. INFLUENCE FACTORS ON SME OWNERS

The authors believe that the owners of large businesses seek to achieve the highest possible profit, while the owners of small businesses do not think that way. The main fact is that the profit level is satisfactory and constant, to maintain their business, and to preserve the pleasure of owning their own business (Sarasvathy et al., 2011.).

What can spoil the plans is a bad tax system, and the inability to find and retain good employees and loyal customers. The advantage of entrepreneurs is primarily in that they are doing what they love, and to affect

their satisfaction is knowing that they are independent, free to create their own money (Alstom, 2009.). On the other hand, risk and responsibility is often a big negative impact on entrepreneurs. All this with long working hours, or the lack of working time leads to stress.

What is not discussed here, that there are some very important reasons why entrepreneurs of the enumerated factors of influence haven't seen as something negative, but in spite of them engage in creating their own business. For this it would primarily be required a study of the psychological characteristics of entrepreneurs and the way of thinking where you might be concluded that these entrepreneurs are simply people who love challenges and do not like to be a self-controlled part of the organizational hierarchy.

Lussier and Halabi (2010). Cited several factors as reasons for failure of a family business, of which the most important are:

- Planning-companies that do not have a business plan are more likely to fail than those that have (a business plan),
- Parents (owners) whose parents had had a family business are less likely to experience failure of their business,
- The age-young people who start businesses are more likely to experience failure than older colleagues,
- Management-owners who have no experience in management are more prone to failure than colleagues who have managerial experience.

As for relations in firm size and success of entrepreneurship is the only association seen in the influence of the duration of a company. Entrepreneurship has a stronger and better impact on the longevity of small businesses, while the major factor in the company is weaker and negative (Ha-Brookshire, 2009.).

The family business firms can be improved and some of the factors that influence is not directly related to the job. This is primarily done to reduce tension among family members, living in families with two or three generations, devoting more time to the detriment of business and holiday hiring temporary help, during a turbulent period. The family has a stronger impact on business than on the family business (Olson et al., 2003.).

Threats, such destabilization operations, which follow from the specific personalities owners of SMEs, can be activated by the subjective, knowledge, personal values and beliefs, perceptions and experiences of the owner as an individual who cannot easily be replicated, and are therefore an important factor (un) successful business (Kor et al., 2007).

Factors threats coming from outside are often unable to reach owners and small businesses would usually resort to strategies of avoidance, is often faced with insufficient institutional support their enterprise. But also, too little capacity resources is an important factor that may determine the success of an SME (Welter and Smallbone, 2011.).

So often employed in an MSA does not really look favorably on new employees who come right out of college in business, since they are a potential threat due to a higher level of education. Employees of SMEs, if they are employed because of nepotism, additional pressure will be done by the owner to not only recruit graduates (Gao et al., 2011.). SME owners need to further fight against it, because otherwise it could not be expected to increase the capacity of its business.

A Portuguese study has proved the claim that the slowdown in the rate of growth of SMEs is under the increasing influence of the economic crisis, but because it affects the growth of large companies (Amorim Varum and Rocha, 2011.), and therefore the economic crisis should be appreciated as an important factor impact on SMEs also.

Companies that do not invest in R&D projects will inevitably experience a nearly complete or total slowing growth rates. As an additional factor appears the lack of quality human resources to participate in such R&D projects, while larger firms have such capital (Macas Nunes et al., 2011.)

There are several major factors that influence the barrier to a stable rate of growth of SMEs, such as the inability of entrepreneurs to establish an appropriate organizational model in the company. This organizational model would imply a professionalized management system and development of methods, techniques and processes to support development (Barbero et al., 2011.)

Several factors influence the operations of an SME should be further explored in other papers, as well as their role in everyday relations in such organizations. Factors which influence the following (below), can in some cases represent a barrier to normal functioning and development of SMEs, but also can contribute to stimulating the owners of SMEs in certain situations for the sake of achieving greater efficiency.

Motivation is any influence that causes, or maintains a direct human behavior. In the management of family SMEs, motivation plays an important role because with a higher level of owner motivation they are trying to meet the desires of their business environment, so that it contributes to the realization of various benefits for the owner.

There are various emotional (psychological) factors affecting the owner of small or medium businesses, which will certainly affect his motivation for running the business. They can be classified into:

- Autonomy in work;
- The power of decision making;
- Challenges;
- Continuity of operations (Zellweger and Astrachan, 2008.).

For the owner of an SME, he may be affected by the three environments:

- Home;
- Business;
- Personal career flow.

Considering the first environment, it is related to marital status, number of working hours, responsibilities towards children, living expenses, work at home. The business environment influences the owner through the available resources, employee behavior and performance of employees. The third environment that may affect the owners of SMEs is reflected in the transition from economic inactivity into entrepreneurship, family business management experience, and age (Jayawarna et al., 2011.)

5. CONCLUSION

It is difficult to choose what problems most affect a small business owner. That is, each owner is dealing during his career in the SME sector, with various problems, never (or seldom) repeating the same problem. What is really possible to show, that's the way the owners can deal with these problems. There is no universal pattern, but there is a certain mindset, that can overcome most of the risks and problems. As for the impact, the implications are too many and it would be pointless to compare them, or even by a classified order. But what can be concluded, it is that any "attack" on the company, each factor of instability-is surely preventable, or at least can be mitigated so it makes no major problems. This story can be repeated in circle until the owner of the company, as the main pillar of the link between all sectors of the company, can fit in and integrate the parts into a whole so that external influences are not the reason for the decrease in profits, or business-shutdown.

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ENTREPRENEURIAL TEAM IN NEW VENTURE CREATION: THE KEY CHALLENGES FOR MANAGEMENT

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Abstract: *When starting a new venture, entrepreneurs usually select founding team members with skills and expertise closely matching their own. In choosing cofounders it is wise to focus on complementary aspects when it comes to the knowledge base, but on similarity in terms of personal characteristics and attributes. Once the appropriate founding team is assembled, these individuals must work together effectively if their venture is to succeed. The main research focus of this paper is to analyze principles of building effective business relations within a new venture along with establishing an optimal team structure and size. As a new venture grows and the number of employees rises, new skills and capabilities enhance performance. Founding team diversity is prerequisite to innovativeness and creativity that result in a successful new venture.*

Keywords: *entrepreneurship, team, new venture, management*

1. INTRODUCTION

People tend to feel more comfortable to work and cooperate with persons who are similar to themselves in various ways, and therefore, entrepreneurs usually select cofounders with skills and expertise closely matching their own. Nevertheless, since variety and diversity of knowledge, experience and training is significant advantage to new venture, it is reasonable to select members of founding team on the basis of complementarities rather than similarities. In other words, in choosing cofounders it is wise to focus on complementary aspects when it comes to knowledge base, but to similarity with respect to personal characteristic and attributes. In order to choose excellent cofounders, entrepreneurs must perform the task of social perception well, which is not an easy task since others don't portray themselves accurately, but engage in various tactics designed to impress and present them in favorable light. Therefore, entrepreneurs should be careful when choosing cofounders and double check information provided by other contacts. They often confront deception, or other efforts by others to actively mislead them, and if they make wrong decision when choosing founding team, that can lead to disastrous results.

Once the appropriate founding team is assembled, these individuals must work together effectively if their venture is to succeed. One of the key ingredients in establishing strong working relations is development of clearly defined roles, responsibilities and jurisdiction. Because of the self-serving bias and other factors, individuals often perceive that they are not being treated fairly by others – that they are not receiving a share of rewards according to their contributions. Reactions to such perceived unfairness range from demanding more or doing less. Because of potential problems that may arise, entrepreneur should take active steps to assure that all the members of the founding team feel that they are being treated fairly. Another ingredient in strong working relationships is effective communication. Entrepreneurs should deliver constructive criticism, or otherwise he will face atmosphere of conflict and hostility (Baron & Shane, 2005, pp. 107-128).

As new venture grow, requirements for additional human resources increase. Often these new employees are hired through the founding team's social network. Evidence suggests that the greater the number of employees in new venture, the greater success, due to the quality of the opportunity being exploited. The choice between hiring temporary and permanent employees is a complex one, since both offer advantages and disadvantages. Ultimately, this decision must depend on the situation and specific circumstances.

2. THE ROLE OF OPTIMAL HUMAN RESOURCE COMPOSITION IN THE NEW VENTURE CREATION

The beginning of new millennium brought knowledge economy, globalization of competition and increasing expectations of Internet commercial use. During the last decade initial *dot.com* enthusiasm has dwindled and investors realized that there is much more sense to invest in industries where intellectual property rights are legally protected and consequently new ventures based on radical entrepreneurial ideas came to the spot of

the light. The most prospective ventures are in the field of high technologies since they bring investors multiple returns on investment, either through acquisition or initial public offering (Stojanović Aleksić, Šapić, & Erić, 2010).

Schumpeter was the first one who described *new venture* concept in 1934. arguing that “entrepreneurs have need to compete; they are overwhelmed with activities providing encouragement for launching radical innovation that cause irreversible turn of events and structural market change” (Busenitz, 2007, pp: 183-185). *Entrepreneurial new venture creates added value through innovation of products, services, markets, technology, distribution channels or business strategy* (Allen, 2009, p. 9). Ventures can have legal form of independent enterprise or they can be incorporated in organizational structure as dependent business unit, established as a result of corporate entrepreneurship process (Babic, Eric & Nikolic, 2010). Entrepreneurial venture and small enterprise are two related concepts, but are not synonymous. Entrepreneurs tend to disrupt the existing market equilibrium and present new products or processes that change the way business works, while small business owners are focused to provide their own existence and lifestyle. The latter should not be neglected because they are the backbone of any national economy. Those entrepreneurs are emotionally involved with their company survival and growth, but only to the point of meeting personal needs. The most successful new ventures were initially founded as a small business.

Employees create innovative ideas, overcome rigid organizational hierarchy, make necessary modifications and strive to obtain key resources and support for their implementation (Stojanovic Aleksic & Eric, 2011). The success of a new business venture depends on the quality of human resources: knowledge, experience, skills, capabilities and the network of business relations of not only the founder but the team of his or her associates as well. Although the largest number of ventures is started by teams, there are relatively few attempts to explain the process of their effective creation and management. The team consists of two or more individuals who jointly create a venture they have a business interest in. (Kamm, Shuman, Seeger, & Nurick, 1990). There are two reasons for which they are the subject of research; the first one is that new ventures are much more frequently led by teams rather than individuals, and the second one is that their performance is determined by the successfulness of the venture.

Several significant researches conducted in the 1990's showed that 55-80% of the analyzed ventures had been founded by teams (Kamm, Shuman, Seeger, & Nurick, 1990). The key reason lies in the fact that, in high-technology activities, it is not probable that an individual has all the knowledge needed for a venture to succeed. Recent researches (Davidsson, P., 2006, pp. 33-36), conducted by Ruef, Aldrich and Carter have accounted for the fact that 52% of new ventures are started by teams. In the largest number of cases, 74%, teams consist of two members, and in less than 5% of the cases, they consist of five members. Even 53% of teams of two members are spouses or partners, 18% are family members and only 15% of the ventures were founded by partners only related to each other through business. The conclusion of this research was that it is much more probable that a new venture will be started by a team rather than an individual. A similar research was conducted by Chandler, Honig and Wiklund, and they came to a conclusion that there is reverse proportionality between the number of new members joining a team and the time needed for a new venture to reach the desired profitability rate. The offered explanation is based on two theses: first, when a new member joins a team, it is a disturbing factor for the venture's functioning, and second, the venture has already been facing difficulties since it needs a new member, so, for that reason, profitability also suffers.

Teams have a much greater chance for success than solo efforts for a variety of reasons (Allen, p.154):

- The intense effort required of a start-up can be shared;
- Should any one team member leave, it is less likely to result in the abandonment of the start-up;
- Founding team covers major functional areas (marketing, finance, operations);
- A skilled founding team lends credibility to the new venture in the eyes of lenders, investors, and others;
- The entrepreneur's ability to analyze information and make decision is improved because she or he benefits from the varied expertise of the team, and ideas might be viewed from several perspectives;

In psychology, an individual is known to tend to feel the most comfortable when being with people similar to him- or herself. Such a tendency when the starting of a new business venture is concerned can have its negative side. If people are similar, that means their knowledge, experience and attitudes significantly overlap. Furthermore, this means that they lack the same or almost the same skills. The optimizing of the

personnel structure imposes a need for achieving complementarity by means of harmonizing various personal and business capabilities of all participants in a venture.

Finding partners with complementary skills means making sure that the team is not overloaded with people who all have the same expertise. A team of three engineers or three finance analysts is generally less attractive than a team with more diverse skills. Teams with more diverse skills make better strategic choices that lead to higher performance. In terms of skills sets, heterogeneous teams also tend to handle the complexity of new ventures better. Five factors that have great significance in team composition are: a) homogeneity, or similarity; b) functionality, or skills diversity; c) status expectations, or cultural bias; d) network constraints, or social contacts; e) ecological constraints, or geographic distribution (Allen, pp. 155-157).

When the start-up effort is collective, with a team that displays diverse capabilities, the new venture is more likely to be innovative. Evidence suggests that firms founded by heterogeneous teams are more successful than those founded by individuals (Bird, 1989). Lead entrepreneurs drive the development of new venture and serve as guardian of their vision. They have the ability to see what others cannot see and to identify ways to change marketplace rather than simply recognize an opportunity.

To make a perfect match between an entrepreneur as the initiator of a new business venture and right co-workers is a huge challenge. There are several activities (Baron, & Shane, 2005, pp. 107-127) which he or she must carry out to create the optimal personnel structure for the venture. First, they must consider if they are in need of partners to start their venture and which characteristics and knowledge they should possess. Second, they must start the process of searching for partners, which is a very complex process. Third, they must establish effective communication between their partners and other employees, based on clearly demarcated authorities and responsibilities and the principle of impartiality in awarding as well. Four, they must make a decision if and on which principles they will seek external consultants' help.

An entrepreneur must have the skill of *social perception*, i.e. assessment of one's personality, because only then can they recognize other people's potential and capabilities they need. That would not be difficult unless people had a tendency to show themselves in their best light, which usually does not coincide with their real capabilities. They hide their feelings and motives with an aim to impress their collocutor. For that reason, an entrepreneur must separate the external impression a potential partner has made on them and its essence. To be able to know what to expect from other team members, an entrepreneur must reconsider personal values and capabilities they are bringing to the venture. There are two reasons for this to be a challenging task. First, it is not always clear why an entrepreneur behaves the way they do. He may want to include someone in the team because he or she feels attracted to that person because of his or her personality, but could not provide a precise answer to what it is he or she exactly feels attracted to in that person. So, there are factors that have an influence on the behaviour of an entrepreneur which he or she is not fully aware of, which makes the self-evaluation process more difficult. The second reason is that an entrepreneur can become aware of his or her characteristics only through interaction with other people. An entrepreneur as leader should focus him- or herself on complementarity when his members' knowledge, skills and experience are concerned, and on similarity when their motives and personal characteristics are in question. The effectiveness of every type of leader behaviour directly depends on the nature of the situation and factors such as characteristics of the task, organization and employees (Stojanović Aleksić, Erić, Šapić, 2010).

3. CREATING THE FOUNDING TEAM

The manner in which an entrepreneur creates a team is an interesting piece of information for potential investors (Allen, 2009, pp. 153-158). New ventures are analyzed by investors from the aspect of their personnel structure. From their viewpoint, the team whose members have already had an opportunity to cooperate is of a better quality than it is the one being formed for the first time. An entrepreneur tends to achieve a high degree of business control and is worried about a possibility that he or she might employ a wrong person in the key position, so, for that reason, they are frequently not ready to employ staff who have experience in management positions. There are also those who are aware of their shortcomings and tend to form their team so that it consists of individuals complementary with each other with respect to their skills. The venture must have a strong management team, dedicated, competent, dynamic, and persistent, with relevant experience and highly flexible (McAleese, 2004, pp. 182-183). The investor would rather invest in a worse idea implemented by first-class management team, than vice versa (Eric & Nikolic, 2010). If team lacks certain competencies, investor provides assistance in overcoming difficulties (Gladstone & Gladstone, 2002, pp. 54-55).

Some authors (Franke, Gruber, Harhoff, & Henker, 2006), came to a conclusion that, when they are supposed to make a decision whether to invest their capital in a concrete venture, investors are significantly influenced by the so-called *similarity hypothesis*, defined by psychologist Burne in 1971. In brief, it says that the bigger the similarity, both professional and personal, between the founding team's members and the investor, the bigger a probability that a favorable decision on investing in a new venture. That means that the process of accessing external sources of financing has its psychological dimension as well, and an entrepreneur should have *the* dimension in view.

When creating a team, two sorts of problems appear: first, there is a possibility of a collision and conflicts, and second, a problem can arise with a need to define the formal organizational structure and hierarchy of decision-making. This process is additionally complicated when several partners found a venture. There are several factors that determine the quality of a team (Barringer & Ireland, 2006, pp. 127-129) on the basis of which differences between founding teams are possible to identify according to several different dimensions: their scope, the type of the venture, the pace of accession and the individual members' contribution.

A more recent research (Beckman, 2006) accounted for the fact that the composition of a team has an influence on whether exploitative or explorative behavior will be favored within the framework of a venture. Team members who previously worked together in another company know and understand each other well and have routine performance schemes, and for that reason they prefer a rather passive *exploitative* style of behavior. Contrary to that, team members who did not previously directly cooperate with each other on a business basis bring fresh ideas in a venture, force creativity and promote the *explorative* type of behavior. It can be concluded that there is a strong correlation between team members' previous experience and the degree of innovativeness promoted by organizational culture, so that a higher degree of knowledge and unique competences dispersion contribute to the creation of the ambience of innovativeness and change.

Analysis 161 of a high-technology company from the Silicone Valley (Beckman, Burton, & O'Reilly, 2007) only corroborated these statements, proving that higher efficiency is achieved by teams composed of members who used to work for a larger number of employers and have more diverse working experience. These differences lead to stimulating constructive discussions amongst the members reducing the probability of rash decision-making without considering relevant alternatives. Apart from that, the research suggests that the structure of the founding team has an influence on the capability of carrying out critical activities, such as the acquisition of the venture capital.

Although for a long time an attitude prevailed that, due to a high level of turbulences, a team in high-technology ventures should have the organic structure characterized by the adaptability and a low degree of formalization, a more recent research (Sine, Mitsushashi, & Kirsh, 2006) proved the superiority of teams characterized by a formal structure and high specialization in the venture founding stage. The shortcoming of the theory laid down by authors Burns and Stalker in 1961 is reflected in that they did not analyze ventures in their emergence stage, but in their mature stage, which significantly influenced giving advantage to the organic organizational design.

Choosing partners to start new venture is one of the most critically important tasks that an entrepreneur must undertake. It is a difficult task because it is often not possible to understand a person's character until that person has spent some time working in the company. The stressful environment of a start-up may bring out traits and responses that were not apparent when the person was originally selected. Everyone from investors to bankers to potential customers looks at the founding team of the new venture to determine whether its members have the ability to execute their plans. Thus it is vital to choose partners who have complementary skills and experience and who do not have a history that might be detrimental to the company.

There is another advantage to forming a team. Because members of an entrepreneurial team often invest not only their time but also their money, the burden of gathering resources is shared. The lead entrepreneur also gains access to the network of contacts of the other members. This vastly increases the information and resources available to the new venture and enables it to grow more rapidly. Of course, it isn't always possible or necessary to put together the perfect team from the start. The right person to fill a particular need may not have been determined, or the right person may be too expensive to bring on board during start-up.

3.1 Building effective business relations amongst team members

One of the latest researches (Eden, Hitt, & Ireland, 2008) led us to interesting conclusions when interpersonal relations within the framework of a venture are concerned. They suggest that the entrepreneur prefers to cooperate within a venture with his or her friends who he or she trusts; however, if that is not possible, due to a lack of trust, they establish business relations with absolute strangers rather than superficial acquaintances. These conclusions do, to a certain extent, coincide with the results of the research conducted by Fracis and Sendberg (2000), where they suggested that stronger interpersonal relations amongst the team members lead to more efficient decision-making, a higher level of participation, as well as the domination of cognitive rather than affective conflicts. Besides, top management teams characterized by unique dynamics and interpersonal relatedness, family ties among other relations, lead to a higher cohesion and a stronger strategic consensus in view of the future of the venture (Nordqvist, 2005, pp. 285-290).

Although there is no universal recipe how to build a team who will operate successfully, yet there are several aspects (Barringer & Ireland, 2006, pp. 129-131) which, in that view, can represent a stimulating but also limiting factor:

- a) *The demarcation of authority and responsibility* – the main source of conflicts amongst employees is a lack of clear authorizations. If it is not clear who has the decision-making authority, then probably there will be conflicts. When founding a new venture, partners should share responsibility according to their competences and skills, which means they must stick to the complementarity principle.
- b) *Showing respect for the principle of impartiality* – psychology has proved that every individual has a tendency to give themselves credits for work done successfully, and fault others for a failure or attribute it to external factors which could not be influenced. So, he concludes, their performance is not adequately valued comparing with the results of other employees. The entrepreneur must seriously approach this problem and promote the principle of *distributive impartiality* reflected in that the employee's contribution/award for performance ratio must be the same for all. A balance among different interests must be found and clear rules for all must be established.
- c) *Effective communication* – this is the key factor in the creating and maintaining harmonious business relations. Constructive criticizing other people, based on respecting their feelings and dignities, deprived of aggression and antagonisms, subjecting no one to condemnation and offering concrete proposals for improvement are always beneficial for all team members. A functional conflict is desirable because it brings to surface different ideas, motivates employees to observe things from another person's viewpoint and leads to more quality business decisions.

Although there are no perfect founding teams and no fail-safe rules for forming them, effective founding teams tend to display the following characteristic (Allen, 2009, p. 157):

- The lead entrepreneur and the team share the same vision of the new venture;
- The team members are passionate about the business concept and will work as hard as the lead entrepreneur to make it happen;
- One or more members of the founding team have experience in the industry in which the venture is being launched;
- The team has solid industry contacts with sources of capital;
- The team's expertise covers the key functional areas of the business: finance, marketing and operations;
- The team members have good credit ratings, which will be important when the firms seeking financing;
- The team is free to spend the time a start-up demands and can endure the financial constraints of a typical start-up.

3.2 Founding team extension

The entrepreneur and his or her team make maximal efforts, use their maximal knowledge and capabilities to provide the functioning of their business venture. However, it is impossible to create a team capable of having all necessary knowledge and information at any moment, which means that, sooner or later, the team will need services provided by experts and external consultants (Hisrich, Peters, & Shepherd, 2008, p. 282).

New ventures have significant difficulties when engaging quality personnel is concerned. They are unknown to a broader public, they have not built their business image and credibility yet, which is the case with

existing enterprises. It is a big shortcoming of theirs in the labor market, so entrepreneurs are forced to use their own business contacts to come to quality personnel. There are two basic reasons why entrepreneurs employ new personnel (Forbes, Borchert, Zellmer-Bruhn, & Sapienza, 2006): they either possess knowledge their venture is in need of or personal traits perceived as desirable by the entrepreneur. They employ people who they know in person or who have been recommended by another person, and, in that way, they save their time, energy and resources. Besides, it is easier for them to persuade people they know of the quality of ideas and their ideas' potential.

One of the key issues the entrepreneur has to deal with is the number of employees needed for the functioning of a new business venture. Although a larger number of employees has obvious advantages, brings new energy, ideas and information, there are certain negative sides as well, reflected for the most part in high fixed costs from salaries. The engagement of new personnel is a sword that cuts both ways; in the majority of cases, however, positive effects prevail. Neither is there any doubt about advantages from engaging a team because the team has a plethora of various skills, experiences and talented people with numerous professional contacts supporting and helping each other. There is general agreement about positive correlation between the number of the employed and a probability that a new business venture will be successful; however, it should not be taken for granted because it has not yet been proved empirically beyond any reasonable doubt.

The entrepreneur has a right of discretion to make decisions on the optimal size of a team. Sometimes it happens that a team is too small for the creation of a complex venture; however, it is more frequently the case that entrepreneurs make an even more dangerous mistake when creating too big a team. With the number of team members, the number of problems related to the functioning and interpersonal relations also increases. One question is asked: if a smaller team is better, why do entrepreneurs make this mistake? The uncritical application of the *the-more-the-better* way of thinking (Baron, & Shane, 2005, pp. 124-126) is one part of the answer; the main reason, however, is of psychological nature and lies in any individual's need to share their responsibility with as large a number of people as possible. In that manner the team becomes over capacitated and neither is capable of efficient operations nor does it demonstrate the necessary originality and inventiveness in managing a new venture.

Additional question which the entrepreneur must answer is: which employees should be engaged permanently and which ones from time to time? Both alternatives have their advantages and disadvantages. To engage personnel from time to time is, from the viewpoint of the project principle, more profitable and provides greater flexibility; on the other hand, of course, those employees are usually insufficiently motivated and are not loyal, which may be a problem, especially if they have access to the venture-related sensitive information competitors would like to learn about and are prepared to pay for. Permanently employed people are much more dedicated and more loyal to the venture; however, their engagement is a bigger cost. So, a choice the venture founder has to make is everything but easy. It is recommended that, in activities where flexibility and the fastness of response are important, the entrepreneur should engage personnel he or she needs at the moment, whereas in those branches where the environment is more stable, it is rather advisable that they should employ people on a permanent basis.

When the new firm is in its infancy, it generally doesn't have the resources to hire professional help such as an attorney or accountant. Instead, it must rely on building relationships with professionals on an *as-needed* basis. These professionals provide services and information not normally within the scope of expertise of most entrepreneurs, pointing out potential flaws in the business concept. There is hardly any aspect of starting a new venture that is not touched by the law. Attorneys are professionals who typically specialize in one area of the law – taxes, real estate, business or intellectual property. Within their area of expertise attorneys can: advise the entrepreneur in selecting appropriate organization structure and in preparation for acquisition of intellectual property rights and licensing agreements; negotiate and prepare contracts; advise the entrepreneur on compliance with regulations related to financing, etc. Another type of expert help entrepreneur can get from an accountant. The accountant may set up the company's books and maintain them on the periodic basis, or may hire a bookkeeper to perform the day-to-day recoding of transactions. Bankers, insurance agents, and other specialist today, more than ever will put the new venture in better position to compete on the market (Allen, 2009, pp. 160-163).

A growing number of start-ups are forming advisory boards to provide them direction and guidance. An advisory board is a panel of experts who are asked by a firm's managers to provide counsel on the daily bases. Unlike board of directors, an advisory board possesses no legal responsibility for the firm and gives

nonbinding advice. Some firms have advisory boards for specific issue or need, such as to help identify new products ideas or dealing with an emerging challenge (Baron & Shane, 2005, pp.134-137).

4. CONCLUSIONS

In organizations, there is never ending tension between need for stability, which implies effective performance of current business activities as prerequisite for maintaining current competitive position, and constant quest for new products and business activities that would provide superior competitiveness in the future. Entrepreneurs in their quest for independence often attempted a new venture as soloist. In this way they could retain sole ownership, make key decisions and not have to share profits. This approach is still common in small lifestyle businesses and among craftspeople.

However, in today's global and complex environment, most entrepreneurs find it necessary to start their venture with a team. It is rare for an entrepreneur to conclude that she or he has all the expertise and access to resources that are needed by the new venture. It is very important for entrepreneur to identify the essential participants for the initial launch. Not everyone involved with the new venture has to be an owner or employee. It is not uncommon to find that one or more members of an otherwise cohesive team had different expectations for the outcomes of the business or their role in it. These differences must be discussed and agreed upon before moving forward as a team. It will be far more costly in time and money, not to mention relationships, if these differences are ignored and cause problem later when the business is growing.

Creating optimal team structure is still huge challenge, and relevant research studies are yet to be done. Researchers must focus their attention more on how to manage heterogeneity and diversity within entrepreneurial teams, but in a way that will not jeopardize innovativeness, creativity and lateral thinking. How to select not best individuals, but individuals that will fit the best, remains the main issue and dilemma entrepreneur will face in the future.

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SMES INNOVATION AND GROWTH IN EU

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Abstract: *The focus of this paper is the analysis of the most important factors for SME performance, survival and growth in the EU.*

The main objective is to consider what determines potential failure of young companies to innovate and grow. The importance of innovations and growth for new, young and thus often still small firms is commonly claimed. Therefore, factors that would inhibit these small, young companies from achieving their goals can have a huge public impact.

The research results show that the age of the firm (which reflects its reputation) is important to the degree to which the firm feels financially constrained. Also, finance barriers can be associated with market failure. Risk and informational asymmetries create capital market imperfections and a firm's lack of reputation and collateral become crucial elements.

Conclusions reveal that the ability of SMEs to grow depends highly on their potential to invest in restructuring, innovation and qualification. All of these investments require capital and, therefore, access to finance. Recent policy initiatives aim at improving the financial environment for European entrepreneurial activity and, more specifically, supporting newly-founded innovative firms in order to increase their global competitiveness and spur innovation.

Key words: *SMEs, financing, innovation, growth.*

1. INTRODUCTION

We are living a period of financial and economic crisis. It is accompanied by widespread pessimism and lack of confidence and trust. Under these circumstances the focus on long run growth and innovation may appear out of place. This paper is an argue against such a perspective. It is important to take a long run perspective precisely in moments of crisis and turmoil. From the earliest period on record up to the eighteenth century, the standards of living have been quite stable over the long run. Sharp variations in standards of living were associated with disease, famine and war. Nevertheless, they would not persist over the very long run. The Malthus / Ricardo model was able to reconcile long run stable standards of living with technological progress over time (Lucas, 2002).

The engine of growth is a capitalist society based on competition and change. Joseph Schumpeter characterizes economic development as: "The spontaneous and discontinuous change [...] which forever disturbs the equilibrium state that previously existed".

Nobel Prize winner Robert Solow showed that for a sustained economic growth technological progress is more important than factor accumulation. For Schumpeter behind innovation (i.e. the economic application of technological improvements) lies entrepreneurship. Innovation involves the industrial or commercial use of something new: a new good or service, a new production method, a new market or source of supply, a new form of organization or a new method of financial organization. For Schumpeter innovation is fraught with difficulties. One of them stems from the need for external financing (Levine, 2005).

2. A SCHUMPETERIAN LOOK AT THE GROWTH PERFORMANCE OF THE EU

After a long period of technological catch-up since the WWII, the productivity gap between Europe and the US began widening again in 1995. Structural conditions necessary for Europe to catch-up with the productivity leader, the US, were present from the end of the war to the first oil shock and afterwards. However, conditions needed for creation, innovation and leadership in a knowledge economy worked against Europe (relative to the US).

The recovery of the US productivity growth in the post-1995 period and the corresponding decline in the EU reflects the influence of key technology and policy factors. Below are discussed three interrelated determinants: ICT (information and communication technology), innovation and firm dynamics.

2.1 The role of ICT as a general purpose in EU productivity growth

Sectional data suggest that the divergence in productivity growth between the US and the EU in the post-1995 period is primarily explained by differences in the pattern of production and use of ICT.

- Labor productivity growth in *ICT producing manufacturing* industries has been particularly high in both the US and the EU. However, the US benefited from a leading initial position and an increasing growth in the post-1995 period in high-tech industries such as office machinery, electronic valves & tubes, telecom equipment, TVs, and scientific instruments.
- *ICT using services* have been the focus of the most profound technological gap with the US, particularly in the retail and wholesale sectors and in banking and finance. On the other hand, more restrictive regulatory barriers in European countries have been detrimental to the diffusion of ICT.

More recent firm level evidence (Bloom, 2007) confirms that the US productivity advantage is not only related to a higher ICT spending by US firms (in ICT using sectors), but US firms as well as their subsidiaries operating outside the US-specific conditions reap a higher return from their ICT investments. This suggests that other firm-specific advantages are important, such as the quality of management practices.

2.2 The importance of knowledge production and diffusion

In the present context, we need to define the extent to which the example of ICT is an isolated case or is likely to be replicated in other high-growth, high-tech industries. This is a pertinent question if one accepts that the US's lead in ICT is not an isolated case.

Assuming that a failure of EU enterprises to recapture the full potential and benefits related to ICT is a credible risk, the following key questions arise: 1. Does the EU have specific problems regarding its innovation infrastructure?; 2. Does the US have specific features/framework conditions which make it more likely to be the locus for the next future breakthroughs in technology?; 3. Why is the EU less apt to creating and exploiting new technologies in general? In order to better understand the EU-US innovation deficit, discussion beyond ICT importance is needed.

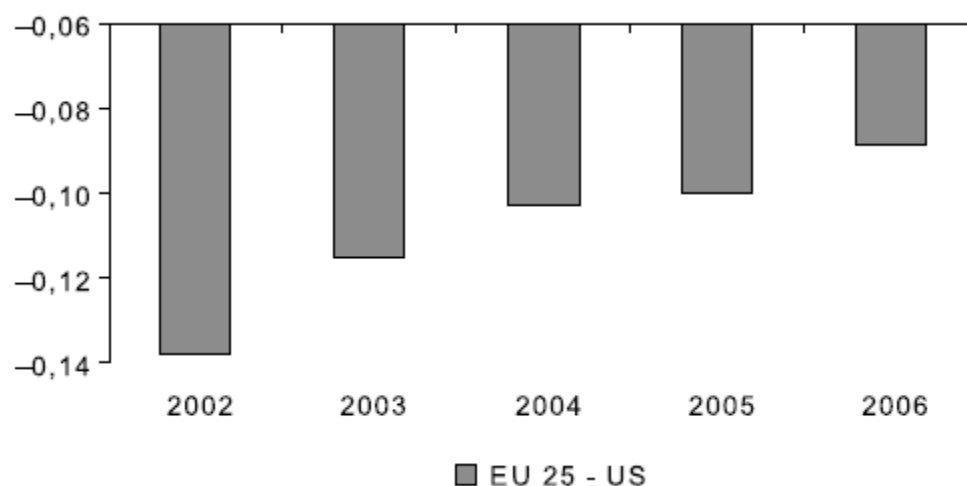


Figure 1: EU's overall innovation performance relative to the US

Source: EIS 2006.

Despite some signs of catching-up, Figure 1 confirms the presence of persistent innovation deficit in the EU. As this innovation indicator comprises several innovation input and output measures, the EU innovation gap goes beyond the deficit in R&D spending. The R&D deficit is a symptom rather than a cause of a weakness in the EU's capacity to innovate; the cause is rooted in the structure and dynamics of industry and enterprise (O'Sullivan, 2007).

A comparison of innovation inputs shows that SMEs represent a larger share of *R&D expenditures* in the EU than in the US and Japan. On the other hand, EU SMEs are less R&D intensive than in the US, although the SME gap is similar to the overall gap in R&D spending. The average R&D intensity of SMEs in Europe is 0.34% versus 0.53% in the US. This compares to an overall average R&D intensity in Europe of 1.17% versus 1.57% in the US (Results are based on DG RTD, 2007).

However, specific contribution of SMEs to innovation goes beyond the share of SMEs in R&D expenditures or in innovation output. SMEs have a very important indirect effect. Usually young small innovating firms create radical new technologies and markets, whose further developments are completed by large players. Baumol (2002) recognizes the complementarity between small and large firms, but at the same time notes the importance of small firms in large innovations. In 1994 the Small Business Administration Office of Advocacy prepared a list of breakthrough innovations made by small firms during the 20th century. It is impressive going literally from A (airplane) to Z (zipper) with many innovations that have been crucial to the economy. Other studies on the distribution of innovations certified as “significant” by industry experts, confirmed that small (as well as large) firms outperform medium-sized firms for the US (see OECD (2006) for an overview).

According to Baumol, private sector innovations in the US come from two distinct sources, firstly from the activities of large firms and secondly from the efforts of independent inventors and their entrepreneurial partners. Baumol asserts that the active presence of both groups enhances the overall innovation process since their activities are complementary. Independent inventors/entrepreneurs specialize in breakthrough innovations while R&D departments of the larger firms enhance these breakthroughs and add to their overall usefulness.

2.3 Firm demography and the creative destruction process in Europe

EU-US productivity growth differences can be additionally explained by (a change in) the firm’s demography. The *churning process* has substantial effects on labor productivity growth because large part of it results from reallocations from less productive to more productive firms. Industries and/or countries where the churning process is inhibited, exhibit lower productivity and employment rates.

All European industries exhibit a greater number of small firms and also a higher share in total employment than in the US. American manufacturing firms are larger and they display wider size dispersion, particularly in high-tech sectors and in wholesale and retail.

Figure 2 on aggregate entry, exit and net entry rates from the research work of Cincera and Galgau (2005) shows that although both *entry and exit rates* are lower in the EU than in the US, the differences in exit rates are substantially larger. The average *size of entrants* is much smaller in the US. Lower entry as well as lower exit (firing) costs in the US allow benefiting from the experimentation process supplied by the market. While there is a high positive correlation between the entry and exit in the US, correlation is insignificant in the EU and even negative in France, Italy and Portugal. A positive correlation reflects churning of firms within sectors as a part of the creative destruction process. A negative correlation reflects more traditional sectoral shocks (positive for entry, negative for exit).

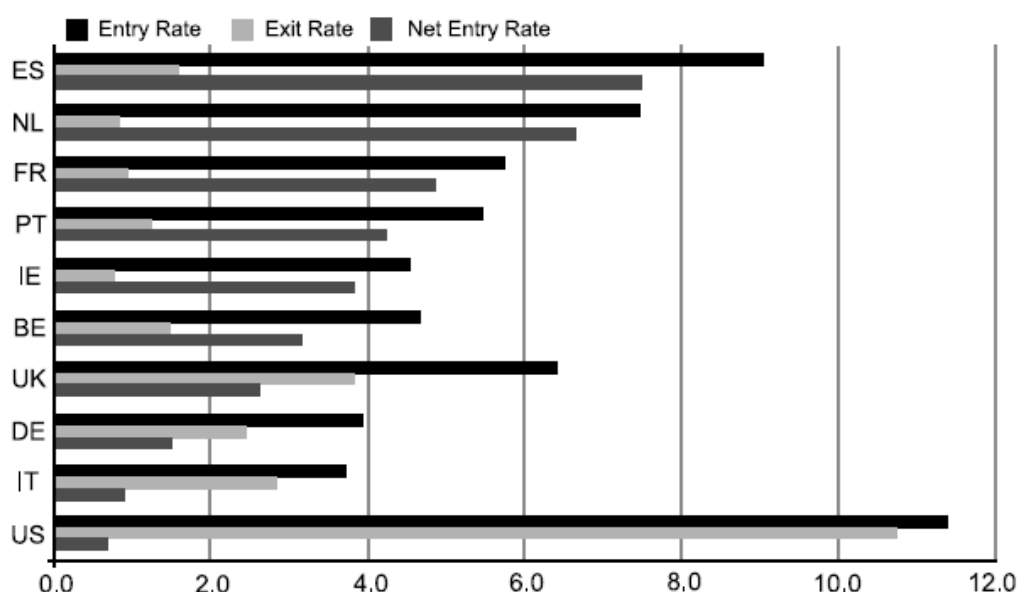


Figure 2: Aggregate entry, exit and net entry rates (in %) by country (1997–2003)

Source: M. Cincera and O. Galgau (2005), “Impact of Market Entry and Exit on EU Productivity Growth Performance”, EC Economic Papers p. 222

Post entry performance also differs between Europe and the US as shown in Figure 3: net employment gains amongst surviving firms at different limits, from the empirical research of Bartelsman et al. (2004). The short term survival rate (2 years) for American entrants is very low, but after this market experimentation period, the conditional survival rate of successful firms becomes high. In addition, the growth for firms that survive for 7 years is higher in the US than in Europe. These results are a clear indication that there are also higher barriers to growth for SMEs in Europe.

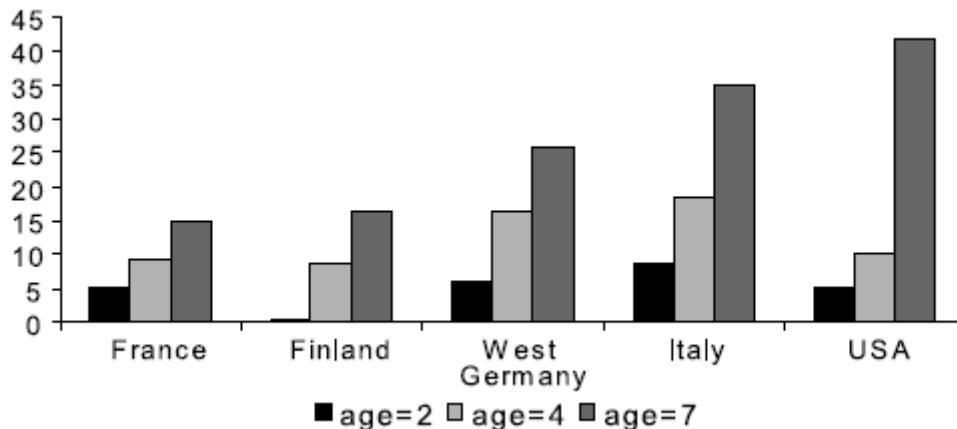


Figure 3: Net employment gains among surviving firms at different lifetimes (net gains as a ratio of initial employment)

Source: Excerpt from Bartelsman et al. (2004).

2.4 The impact of the creative process on productivity growth

The overall labor productivity growth originates mainly in growth of incumbent firms, both in the US and the European manufacturing sector. However, the EU-US differential growth performance can be explained by the reallocation effect between firms and the net entry component. This seems to be a clear indication that creative destruction process is less effective in European countries than in the US in both low and high tech industries.

- The *exit effect* is always positive, both in the US and the EU, which means that exiting firms are the least productive firms.
- The *long-run effect of entry* on aggregate manufacturing productivity growth has a smaller magnitude in the EU than in the US. Furthermore, the effect of entry depends on the industry's distance to the technology frontier. The positive effect of entry on productivity growth is more significant the closer a country or sector is to the technological frontier.
- In high-tech sectors, the entry effect is positive in all countries and this suggests an important role for new firms in more *technology intensive industries*. In these industries, the entry effect is much stronger in the US than in the European countries. Similar observations apply to exit barriers.
- New and small firms contribute to aggregate productivity growth directly through their own growth performance, and indirectly by affecting growth of large incumbents. Thus, the US firms' post-entry growth and productivity performance is higher. Moreover, beneficial interactions between small and large firms, especially in sectors where technical ideas and innovations are an important ingredient of growth, could be at the heart of different effects that entry has on aggregate productivity growth.

In summary, Europe's growth gap results partly from an inappropriate industrial structure in which small and new firms, occupying the main part of total employment, fail to play a significant role in the dynamics of the industry, especially in the high-tech intensive sectors. This is illustrated by their inability to enter, but most importantly, for the most efficient innovative entrants, to grow. The churning that characterizes the creative destruction process in a knowledge based economy encounters significant obstacles in the EU, suggesting barriers to growth for small innovating firms which ultimately weakens Europe's growth potential.

Economic analysis suggests the following "problem drivers" for the insufficient exit and low post-entry growth:

- weaker product market competition (e.g. barriers to cross-border trade in services, national regulations, etc);

- protection of inefficient firms through subsidies, bail-outs, etc.;
- labor market and other regulations that kick in when a firm grows beyond a certain size threshold;
- financial market developments.

3. FINANCING OF SMALL AND YOUNG INNOVATIVE COMPANIES

The literature generally supports the importance of new, young and therefore often still small firms for innovations and growth, even if they are small in number. Therefore, factors that would inhibit these small, young companies to innovate and grow can have a huge public impact.

In the analysis of the (failing) contribution of small and young firms to innovation and growth, *access to finance* is a priority issue. Survey data for the EU confirm the importance of access to finance. Excessively high economic risks are the major hampering factors for innovation for all types of firms, but somewhat more for small than for large firms. A second tier of barriers is formed by the *access to skills*, which again impedes both small as well as large firms. *Regulatory burden* is also included in the second tier of barriers. The empirical evidence suggests that this burden is somewhat stronger for small firms.

Table 1: Proportion of enterprises that regard selected hampering factors as highly important (% of all enterprises); by size class

	Excessive perceived economic risks	Innovation costs too high	Lack of appropriate sources of finance	Organisational rigidities within the enterprise	Lack of qualified personnel	Lack of information on technology	Lack of information on markets	Insufficient flexibility of regulations or standards	Lack of customer responsiveness to new goods or services
Small	16	21	16	6	13	5	5	10	8
Medium-sized	13	19	13	5	14	4	4	8	6
Large	18	21	10	6	13	3	4	7	5

Source: Eurostat (2004).

Analysis of survey data on firms' financial constraints perceptions show that the age of the firm, which reflects its reputation, is more important than its size in determining the degree to which the firm feels financially constrained. A possible interpretation of this result is that age might reflect reputation of the firm which, in turn, significantly affects access to finance.

The access to finance barrier can be associated with the *market failure*. Risk and informational asymmetries create capital market imperfections and a firm's lack of reputation and collateral become crucial elements. Existing literature demonstrates substantial differences between small and large firms in this respect. Hall (2005) shows that imperfections in capital markets usually affect small firms more than large ones which can rely on internal financing. Young firms are even more likely to be constrained than other small firms as reputation and collateral are important to mitigate capital market imperfections. More radical investment projects further exacerbate the imperfect, incomplete and asymmetric information problem. Thus, young innovative companies, which combine the disadvantages of a small scale, a short history, less retained earnings and more risky innovative projects, are even more likely to be financially constrained than other small, young and/or innovating firms.

Along with this financial market failure, particular for the EU, stands the highly fragmented nature of its venture capital market with 27 different operating environments adversely affecting both fundraising and investing. Complexity in operating across borders means that some funds have difficulties in expanding, growing and reaching a critical mass. This makes access to financing even more difficult and more expensive in the EU.

3.1 Characterizing YICs

Young Innovative Companies (YICs) are defined in the EU State Aid Rules as small enterprises, less than 6 years old, being "certified" by external experts on the basis of a business plan as capable of

developing products or processes which are technologically new or substantially improved and which carry a risk of technological or commercial failure, or have R&D intensity of at least 15% in the last three years or currently (for start-ups). The YIC dummy takes a value of 1 if an innovation active company is less than 6 years old, has less than 250 employees and spends at least 15% of its revenues on R&D.

Out of the sample of 1342 German innovation-active companies (A research done by the Catholic University of Leuven, 2006), only 51 companies qualify for YIC status, using the EU State Aid definition. This confirms the “rareness” of YICs, representing only 3.8% of all innovation-active companies in West-Germany in 2006. Even within the group of small innovators or young innovators, YICs are rare (4.3% and 24%, respectively).

A “typical” YIC has a micro size, with about 20 employees. This is considerably smaller than other innovating SMEs, as well as young innovators. Also on R&D intensity and basicness of its R&D profile, a “typical” YIC scores much higher than any of these reference categories. These statistics confirm that it is a combination of age, size and R&D profile that composes the particularity of YICs. YICs are not the same as innovative SMEs or young innovators. Finally, YICs are overrepresented in knowledge-intensive, technological sectors, specifically services (ICT and R&D engineering) while they are absent in more traditional manufacturing industries.

3.2 YICs and barriers to innovation

Table 2 presents the results on whether YICs perceive differently obstacles to innovation. Respondents were asked to give a score to each (potential) hampering factor on a scale going from zero (not relevant) to three (high). The first column indicates the share of firms that considered this factor to be relevant (i.e. firms that scored one or more), while the second column reports the mean score.

Table 2: Obstacles to innovation

	YICs		Other Innovators		
Barriers to innovation	%	mean score	%	Mean score	mean diff. with YICs
External financial constraints	95.65%	2.283	75.75%	1.234	−1.049***
Internal financial constraints	93.30%	2.457	66.42%	1.382	−1.074***
Innovation costs too high	93.33%	2.356	87.71%	1.862	−0.493***

Source: Schneider and Veugelers (2008)

As expected, YICs face, on average, higher obstacles to innovation than other innovating firms. When comparing across barriers, results confirm the presumption that financial constraints (both internal and external) are the most important barriers to innovation for YICs. Although this ranking also holds for other innovating firms, the YIC-differential is the largest and strongly statistically significant on both financial constraints. The evidence presented by Schneider and Veugelers (2008) show that young innovative companies, combining newness, smallness and high R&D intensity are rare in the sample of innovative firms. They view financial constraints, both internal and external, as an important factor hampering their innovation activities, significantly more so than other innovation active firms.

4. CONCLUSION

We have argued that innovation is an important determinant of competitiveness and important to address global challenges, such as sustainable development. The importance of innovation has been reinforced by a fast development of new technologies (ICTs in particular), which enabled new forms of competition and opened new markets for creation of innovative products. Nevertheless, despite importance of innovation, as well as new opportunities offered by globalization and new technologies, improvement in productivity in the EU, the EU seems to be lagging behind the US in this area.

We try to document the importance of SMEs and young innovative companies (YICs) for the innovation process. Both of them are source of dynamism and in particular, YICs are directly related with research activities and are a key component of the innovation system, facilitating the emergence of new products and

markets. However, evidence shows that in Europe small and new firms fail to play a significant role in the dynamics of the industry, although they account for a majority of employment. Not only they face significant entry barriers, but also successful entrants face difficulties to grow.

However, the ability of SMEs to grow depends highly on their potential to invest in restructuring, innovation and qualification. All of these investments require capital and therefore access to finance. Recent policy initiatives, such as the creation of the YICs status at the European level, aim at improving the financial environment for European entrepreneurial activity and more specifically to support newly-founded innovative firms in order to increase their global competitiveness and spur innovation.

Empirical research on access to finance for SMEs and young innovative companies has been limited, however, a recent analysis confirms the presumption that young, small, innovation-intensive firms are a very small but distinct segment in the group of innovative companies. Furthermore, access to finance is the most important factor that hampers YICs' innovation activities, significantly more than other innovating firms.

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THE IMPACT OF PUBLIC PROCUREMENT ON THE IMPLEMENTATION OF PUBLIC-PRIVATE PARTNERSHIPS

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Abstract: Increasingly evident is the public sector's interest in introducing new financial instruments intended for the financing of infrastructure projects and facilities. This conditions the need for the creation and improvement of the political, economic and legal framework that makes this possible. At the same time, private investors are becoming increasingly interested in the creation of conditions that allow for efficient and more regulated implementation of the public-private partnership concept. The paper aims to point out potential opportunities brought about by the new Law on Public-Private Partnerships in Serbia, relying on the guidelines established in the Law on Public Procurement. In essence, our wish was to point to the need for establishing institutions that would make the implementation process of a public-private partnership transparent and reliable for all of those interested in private sector investment. Improvements in communication between the local and central government authorities are also necessary, in terms of opportunities and potentials of the implementation of the public-private partnership concept, as a modality of financing infrastructure projects.

Keywords: Public-private partnership, public procurement, infrastructure financing, projects, Serbia

1. INTRODUCTION

The public-private partnership concept has a great number of interpretations and ways in which it is defined. Perhaps Winer (2012) gave the most precise definition when he said that "a public-private partnership represents a relationship between the public and private sectors, in which the risk is shared based on joint efforts to achieve a desirable result of the public policies". It is a form of cooperation that allows for the financing, construction, renovation, operation and maintenance of infrastructure works and/or provision of services (Commission of the European Communities, 2008). Therefore, a public-private partnership represents a contractual relationship signed between government authorities and private enterprises, whose subject is the realization of a project of public interest in which both parties contribute with certain resources, according to their abilities, and participate in the planning and decision making. The goal of a public-private partnership is the achievement of greater efficiency, easier access to capital in order to share the financial risks and risks related to deadlines, while at the same time respecting high standards of environmental protection and employee safety.

Private partners find public-private partnerships attractive from the commercial aspect (profits and investment opportunities on new markets), while the public sector finds them attractive because they create a better end product/service (for the same level of investment, the same level of quality is created at a lower cost). Financing, tasks, as well as the responsibilities and risks of the project, are allocated between the parties in various ways, but the contribution of each contracting party is for every project accurately determined. The basis of the public-private partnership concept is the idea that both the public and private sector need to gain potential benefits.

As an infrastructure development concept, public-private partnerships are at a different level of development and implementation within the EU countries, but as an infrastructure financing concept they have especially found their place in the sectors of transport infrastructure, public construction works, the construction and equipping of schools, hospitals, prisons, as well as conservation of the environment. In Serbia, for now, there is significant participation of the private sector in the financing of infrastructure development in the sectors of energy and telecommunications, where commercial interests provide sufficient incentives for the private sector. However, the full contribution of this concept of financing infrastructure projects and facilities is yet expected in the years to come.

2. THE SELECTION OF PRIVATE PARTNERS THROUGH PUBLIC PROCUREMENT

Public procurement within a public-private partnership implies a process in which a public authority enters into a contractual relationship with a private partner. Yescombe (2007) states that the public procurement phase is the period during which:

- Offers are requested and received, and a supplier is selected,
- A special-purpose project company is established in whose name the public-private contract is negotiated, as well as the various sub-contractors that are to be used during the construction, delivery of services, management, etc., i.e. all that is together known as the „project agreement“,
- due-diligence is completed (review and evaluation of the project company and its related risks, by the public authority and the creditor, independently of each other) by the public authority,
- equity is invested by the investor, and funds are borrowed from financiers.

It is important for public authorities that they are able to generate an efficient procedure for public procurement based on real competition in an open and transparent process. The public procurement process is governed by the law, and its respect and implementation are practically unavoidable when the financing or guarantees are provided by multinational banks, such as the European Investment Bank.

The World Trade Organization (WTO), whose members include most of the developed countries, has provided a framework for public procurement procedures in the Agreement on Government Procurement. The WTO allows three types of public procurement (Yescombe, 2007):

- **“Open procedure”**. This procedure allows anyone to submit an offer,
- **“Selective procedure”**. This procedure allows public authorities to reduce the number of prospective bidders through prequalification,
- **“Restricted procedure”**. In this procedure, the public authorities directly approach prospective bidders, without issuing a tender (with or without prequalification).

On the other hand, the Law on Public Procurement of the Republic of Serbia (Public Procurement Law, 2008) recognizes the following procedures: 1) open procedure, 2) restricted procedure, 3) negotiated procedure with publication of a public notice, 4) negotiated procedure without publication of a public notice; 5) design contest, and 6) public procurement procedure of low value. The most widely applied, however, are the restricted procedure and the negotiated procedure with prior publication of a public notice. Regardless of the type of public procurement procedure, all bidders must be provided with the same information, i.e. the principle of transparency and equality of bidders must be satisfied. The Law on Public Procurement of the Republic of Serbia stipulates that the contracting authority is obligated to provide an equal position to all of the bidders during all phases of the public procurement procedure.

Prior to making a decision on the best bidder, the public authority performs a comparison of the offers by: comparing the prices, contract terms, the level of support by the public authorities in the event that it is known that the service fees would not generate enough income to cover the costs of the project; by selecting the “economically best” offer by scoring various aspects of the offer (points for design, speed or project completion deadlines, reliability, service quality, prices, etc.). The completion of the public procurement phase is known as “financial closure”, which represents the moment in which the conditions are met to allow for the construction of the object to begin.

3. THE ROLE OF PUBLIC PROCUREMENT IN THE IMPLEMENTATION OF THE PUBLIC-PRIVATE PARTNERSHIP CONCEPT

The main reasons for the development of public-private partnerships are discontent with the traditional methods of public procurement as a result of the development of the financial market and project financing, as well as the introduction of the private partnership concept as a new form of management.

Under the existing Law on public-private partnerships and concessions (2011), these partnerships represent a long-term cooperation between a public and private partner that serves to provide for the financing, construction, reconstruction, management or maintenance of infrastructure and other objects of public importance, as well as the provision of services of public interest. Public-private partnerships can be contractual (i.e. a partnership in which the relationship between the public and private sectors is based solely

on contractual relationships) or institutional (a partnership that involves cooperation between the public and private sectors within special institutional bodies) (Prijić, Ristić & Šteković, 2011).

Contractual and institutional partnerships are different in their structure. In an institutional public-private partnership, the private partner enters into a partnership with mixed capital (local government and the private partner) in order to carry out the tasks assigned to him by the public partner through a public contract or concession. In a contractual public-private partnership the mutual relations, rights and obligations of the local authorities and the private partner are defined by a public contract, which is concluded for a definite period of time. Contractual public-private partnerships are most often seen in the construction of infrastructure and public facilities, because they (Prijić, Ristić & Šteković, 2011):

- can be contracted for a period of up to 50 years,
- define the responsibilities of the partners during all phases of realization of the project: planning, financing, construction, maintenance, use and closure of the project,
- define the output performance of the project and services, and
- transfer most of the project risk onto the private partner, except risks that the private partner cannot manage appropriately and which are taken on by the public sector.

Although these two approaches differ, their common characteristic is that the public-private partnership concept contains a segment of short term political attractiveness, which is sometimes so significant that it represents the main motive in the decision process of establishing a partnership with the private sector. Furthermore, the common attitude is that the provision of infrastructure goods and services would be more effective if handed over to the private sector rather than the public, where the public sector would have a role in monitoring and evaluating the development of the project, as well as the role of the only guarantee for the quality and availability of the infrastructure. The benefits of public-private partnerships are reflected in the better management of resources, and not in an increase of funds intended for the financing of infrastructure. Projects that are implemented through public-private partnerships can play an important role in enhancing the efficiency of procurement of goods and services that had formerly been primarily under the jurisdiction of the public sector.

A public-private partnership represents a more complex form of public procurement (The European PPP Expertise Centre, 2011), i.e. the key difference between the concepts of public procurement and public-private partnerships is the fact that the construction and management of business operations after construction are assigned to a contractor from the private sector. In the traditional methods of financing the construction of infrastructure through the public procurement concept, these used to be separate activities. The argument that stems from the above, which goes in favour of a public-private partnership as a concept of financing infrastructure, derives from the fact that, when a single legal entity is responsible for both the construction of a facility as well as its operation and maintenance after its construction, then the legal entity is likely to be more interested in investing in the project during its construction, seeing as how, in this way, it reduces the cost of conducting business in the exploitation phase (Grimsey & Lewis, 2004).

However, we should also acknowledge the argument that goes in favor of understanding and respecting all that the Law on public procurement implies, in order to implement a “transparent” and “equal treatment” that will contribute to the legitimacy and legal validity of the public-private partnership procedure, as well as its acceptance of by all of the stakeholders (The European PPP Expertise Centre, 2011). Well established and legally validly implemented principles of public procurement must be implemented from the moment that a tender is issued on the participation of private investors. All informal contacts and negotiations with potential private participants in a public-private partnership must be performed prior to the announcement of a tender. This ensures equal treatment for all of the participants that are involved in the bidding.

4. CONTRACTS ON PUBLIC-PRIVATE PARTNERSHIP IN INFRASTRUCTURE FINANCING

The development of public-private partnerships has accompanied a renewal of the public sector by the adoption of a new management culture (Pavlova, V, 2009). Public-private partnerships include numerous participants, and therefore an appropriate number of contractual arrangements that regulate the relationships among the participants in the project financing, distribution of rights and obligations, as well as risk allocation. Finance contracts follow the planning, construction and management of the infrastructure project, as well as its financial aspects.

Public-private partnership contracts belong to the category of 'incomplete contracts', since it is impossible for the contract to predict all the possible events in the future. The more complex the contract is, and the longer its duration, the less complete the Contract itself is (Petrović & Stanković, 2009). That means that only the projects which are expected to be long-term and stable, such as the construction of roads and road infrastructure, are suitable for the implementation of a public-private partnership as a concept of financing. In accordance with that, analysis of the legislation that monitors public-private partnership contracts is based on the analysis and study of individual contracts with the immanent project finance concept, as well as the elements that are essential for closing the contract.

The most important is the Project Contract, which defines the framework of the project. According to Yescombe (2002) there are two main models of this contract:

- contracts with predetermined buying conditions for project products/services, and
- concession contracts.

Contracts in which the buying conditions for project products/services are predetermined are contracts signed between a project company and the buyer of the project's final product, and they define the conditions of buying a product/service. According to this contract, the private partner designs, constructs, finances and manages the investment project, and, after that, sells the product/service (e. g. electric energy) to the buyer (e. g. the company that distributes electric energy) under the conditions in the contract. With this contract, the buyer ensures the supply of the needed product, and the private investor in the public sector ensures the sale of his products in advance, which enables him to plan his income more easily and, in that way, it significantly decreases possible risks in the sale of his products.

A concession, in the sense of this law, is the right to use natural resources and goods in general use or conduct business of general concern which the grantor cedes to a domestic or foreign person (concessionaire) for a period of time, under the conditions defined by law, for a concession fee. A concession contract is signed by the Government in the name and on behalf of the state, and the concessionaire. If the concession was granted to multiple persons, the concession contract is signed by each of the concessionaires or the person authorized by the concessionaires, with special proxy. When the subject of the concession is the construction of municipal facilities for municipal activities, the contract is signed by the concessionaire and the authorized government body in the name and benefit of the local government, with previous written consent by the Government (2011). The contract identifies project risks that are allocated between the grantor and concessionaire, and specifies the role of the state, as well as the supervision and procedure in the case of unforeseen circumstances.

Concessions are used more in the service sector than the product sector. A concession contract can be signed between a project company and the Government of the host country, local government, government agencies, public companies or special companies founded for the needs of the concession.

5. THE IMPLEMENTATION AND EXPECTATIONS OF THE LAW ON PUBLIC-PRIVATE PARTNERSHIPS IN SERBIA

In the countries of the Western Balkans, the capacities for successful implementation of public-private partnerships are still in the phase of establishment. Bearing in mind the current concept of financing infrastructure in many countries of Southeast Europe, which includes Serbia, the best approach to implementation of projects of public-private partnerships would be through the implementation of small-scale projects at the level of local government, rather than large-scale projects at the national level. In addition, experience has shown that the application of this form of financing must be organized, and not left to the market and the conditions that dominate it.

A public-private partnership enables local authorities, the business sector and civil society, to take responsibility for the development of their environment, and undertake joint action for its improvement. The need for the private sector to assume greater responsibility in the fight against poverty, and improve the quality of life of local communities, is widely recognized (United Nations Development Program, 2012). The Law on public-private partnerships and concessions, passed in November of 2011, is meant to encourage partnerships between the private and public sectors, attract domestic and foreign investors, and encourage financial institutions to participate in the financing of projects of common interest. Involvement of the private sector, however, can only be expected if the public tender is issued by the highest levels of public authority, and if it has a clearly defined legal framework that ensures transparency and equality for all of the

participants in the bidding, which is supported by the Law on public procurement. This is particularly suitable when it comes to smaller projects, which are of importance for the development of local government.

The Law in Serbia that regulates the question of public-private partnerships has to this date not yet fully provided the expected results in its practical application, thus it is necessary to do much more in the field of institutional improvements. This primarily relates to the securing of criteria for transparency and equality for all participants in the bidding process, which represents the basis of the Law on public procurement. However, the implementation of the law governing public-private partnerships itself is not the only condition that would make the development of infrastructure projects and facilities better. It also requires other preconditions such as the provision of: developed and modern corporate governance in the country, a more developed securities market and insurance market, regulated property right relationships within the public sector, a clearly defined division of institutional responsibilities, etc.

It can be concluded that, although the benefits of a partnership with the private sector are undoubted, the concept of public-private partnerships should not be taken lightly, bearing in mind the complexity of the procedure itself, its design, realization and management. This type of partnership must therefore be carefully evaluated in the context of the project, public benefits, as well as the relative gains that could be achieved by using different approaches. Showing to be the most serious in implementation of the concept of public-private partnerships in Serbia, at the local level, is the City Administration of Belgrade, which has with the support of international institutions and consultants decided to establish a public-private partnership model in public transportation, solid waste management, and the city's water-sewage system. Other local authorities have most often made investment decisions by applying the public-private partnership concept based on the expected value of the investment of the private partner, without additional analyses of the existing conditions of utility services, i.e. the financial and economic effects of the public-private partnership on municipal property.

It is expected, in the period ahead, that this financing concept has yet to gain on importance in the field of development of services and reconstruction of infrastructure. However, it should be noted that this will also imply solving an array of administrative and practical problems, as well as solving problems related to structural economic transformation, the volatility of market conditions, and growing competition.

6. CONCLUSION

The term public-private partnership covers various contractual forms of transactions, where the private sector is given the right to conduct operations over an extended period of time, and at the same time bear the responsibility that had traditionally fallen on the public sector. A partnership between the public and private sectors is based on best practices defined by the Law on Public Procurement, which implies transparency and equality of the participants in the bidding. Nevertheless, the evaluation of bids for a project through implementation of the public-private partnership concept is different from the evaluation of tenders in a conventional procurement. Here we evaluate the solution offered by the private partner in order to achieve ultimate performance of the facility and/or services, which are contained in the output specification of the project of a public-private partnership within the tender documentation.

This is why the phenomenon of public-private partnerships represents one of the most important modalities of funding and improving public services, infrastructure, as well as an array of other project activities related to the realization and improvement of transport, health, education, safety, and waste and water management in the countries of the EU. It is expected that its full contribution is yet to be provided to Serbia. However, this implies that, in Serbia, it will be necessary to establish institutions that will make the process of implementation of a public-private partnership transparent and reliable for all the interested investors from the private sector. At the same time, it will be necessary to improve communication between regional (local) and central government, in terms of the opportunities and potentials of implementation of the public-private partnership concept as a modality of financing infrastructure projects.

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POSSIBILITIES OF REAL OPTIONS APPLICATIONS TO MERGERS AND ACQUISITIONS

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Abstract: *The increasing volume, as well as the complexity of domestic and international mergers and acquisitions, has influenced the real option valuation method application. Traditional valuation methods of merger and acquisition analysis (such as the discounted cash flow method) these days are not enough because of uncertainties related to the time period determination, cash flow estimation and adequate risk-adjusted discount rate determination.*

The aim of the paper is to point out different real options applications to mergers and acquisitions. Real option analysis allows for explicit consideration of value-enhancing factors. In this way, decision makers can value the opportunity to alter their decisions further into the future and to actively search such opportunities.

Keywords: *mergers and acquisitions, real option, valuation, embedded option, acquisition, models.*

1. INTRODUCTION

An option is the derivative instrument which gives (provides) its holder the right, but not the obligation to buy or sell underlying asset at predefined price (i.e. exercise price) during the predefined future period of time or at the specified date (i.e. expiration date). In this way defined option is financial option. Besides this, there are (or may exist) options on real assets, or so-called real options. The real assets can be valued as call options if their current value exceeds the asset's current value and some predetermined level. On the other hand, real asset can be valued as a put option if its value increases as the value of the underlying asset falls below a predetermined level. In either instance, the option holder can choose to exercise (or not exercise) the option now or at some time in the future.

The term real option refers to management's ability to adopt and later revise corporate investment decisions. Since management's ability to adopt and subsequently change investment decisions can greatly alter the value of a project, it should be considered in capital budgeting methodology. If we view a merger or acquisition as a single project, real options should be considered as an integral part of merger and acquisition (M&A) valuation.

Traditional discounted cash flow techniques fail to account for management's ability to react to new information and make decisions that affect the outcome of a project. However, real options can be costly to obtain, complex to value, and dependent on highly problematic assumptions. They should not be considered unless they are clearly identifiable, management has the time and resources to exploit them, and they would add significantly to the value of the underlying investment decision.

Investment decisions, including M&As, often contain certain so-called "embedded options," such as the ability to accelerate growth by adding to the initial investment (i.e., expand), delay the timing of the initial investment (i.e., delay), or walk away from the project (i.e., abandon). Frequently, the existence of the real option increases the value of the expected net present value (NPV) of an investment. For example, the NPV of an acquisition of a manufacturer may have a lower value than if the NPV is adjusted for a decision made at a later date to expand capacity. If the additional capacity is fully utilized, the resulting higher level of future cash flows may increase the acquisition's NPV. In this instance, the value of the real option to expand is the difference between the NPV with and without expansion. An option to abandon an investment (i.e., divest or liquidate) often increases the NPV because of its effect on reducing risk. By exiting the business, the acquirer may be able to recover a portion of its original investment and truncate projected negative cash flows associated with the acquisition. Similarly, an acquirer may be able to increase the expected NPV by delaying the decision to acquire 100% of the target firm until the acquirer can be more certain about projected cash flows.

All these options exist in period prior to closing an acquisition, as well as in period post closing an acquisition.

In recent years the volume of M&A and the complexity of M&A activity have increased as financial systems have become more open with firms expanding not only domestically but also globally. Cross border mergers in particular tend to be much more complex, and the valuation of such M&As is more involved with additional elements of risk exposure. The analysis of any M&A goes far beyond the simple stand-alone value of the target firm, given that the acquirer now has many decisions that can be modelled using real options.

Traditionally, M&A valuation closely followed capital budgeting methodology, predominantly the discounted cash flow method with the focus on free cash flow. The cash flows are developed for a forecast period for the target firm, and then a terminal value is calculated at whatever is considered a reasonable time period. The valuation process involves parameters which are uncertain (the appropriate time horizon determination, free cash flow estimation, growth opportunities consideration and an appropriate risk-adjusted rate specification). Furthermore, many other factors influence the parameters (i.e. the timing of the M&A, competitor action, the flexibility of exploiting a target firm's resources, the leverage factor etc.).

Traditional capital budgeting techniques, such as NPV, fail to adequately consider uncertainties in future time periods with regard to decisions that management may undertake (Trigeorgis (1996)). In other words, firms typically have many opportunities to make other decisions based on the original M&A such as expanding into (or abandoning) new product or geographic markets. Also, the embedded options in an acquisition can have different risk levels. Theory suggests that the greater the number of adjustment opportunities in terms of management decisions, the more value can be added (Dixit and Pindyck (1994)). Through real option analysis, managers can more explicitly consider any added value a result of these future decision opportunities. Such knowledge can enable both the bidder and the target firm management to negotiate and capture more value in the transaction.

In this regard, real option analysis allows for the explicit consideration of a number of value-enhancing factors. Clearly, the ability to identify and evaluate options associated with M&As can be of great value to corporate decision makers. Decision makers have many options including timing of the acquisition, entry and exit options, growth options, options on managerial flexibility, and options involving the merger terms. Managers value the opportunity to alter decisions further into the future and actively seek such opportunities.

2. REAL OPTION ANALYSIS FOR M&As

Since the end of 1970s, there has been extensive growth in real options research in the standard financial option framework, as well as in Bayesian and game theoretic (competitive and cooperative) valuation frameworks. The earliest models include direct applications of standard financial options, such as the Black-Scholes model, but since then, models have evolved into more complex options, such as compound real options and other complex exotic options. These also include Bayesian learning models and game theoretic models with incentives and agency features. Real options applications are seen in various industries and business circumstances including forestry, oil and gas, M&As, pharmaceutical research and development valuation, information technology, and manufacturing, among others. More recent articles have investigated the deviation from all equity-financed firms and projects to those that have both debt and equity (Lambrecht and Myers (2007), (2008)).

Theoretically, real options have proven to be a powerful technique for analyzing investments under uncertainty. Researchers find the expected net present value criterion is inadequate in capturing the managerial flexibility to delay, grow, scale down, or abandon projects, exchange resource inputs, and incorporate learning or uncertainty resolution (when underlying asset values are uncertain). Thus, real options that combine strategy with valuation have increasingly attracted attention in the corporate finance literature.

Financial economists use various real option modeling techniques depending upon the problem structure. These techniques include continuous time models, multinomial (lattice) and finite difference techniques, and simulation.

3. M&A PROCESS AND REAL OPTION VALUATION

Typical M&A investments are embedded real options, which may include additional investment or growth (expansion) options, abandonment options, and wait-and-see (timing) options. Real option models can be classified as:

- (1) Standard M&A real option models,
- (2) Game theoretic M&A real option models and
- (3) Collaborative models.

3.1. Standard M&A real option models

Standard M&A real option models are used when the exercise decision does not directly depend on the actions of competitors or collaborators. These models have different focus. There are models which are focused on stock-for-stock M&A transactions, exchange ratios in M&A transactions, model oriented to strategic option valuation, model focuses on entry and exit possibilities etc.

In one of the earliest studies, Kogut (1991) presented the perspective that joint ventures are created as real options to expand in response to future technological and market developments. The exercise of the real option to expand accompanies the acquisition of the venture. The author provides counter evidence to the prevailing assumption in organizational theories that firms engage in cooperative ventures as buffers against uncertainty. He provides a real option perspective that joint ventures are designed to exploit the upside and not simply to buffer uncertainty.

Several researchers have developed models that investigate real option features in stock-for-stock exchanges. Stock-for-stock M&A transactions generally take more time to complete than transactions that are cash based (Gaughan (1999)). If a buying firm's and a selling firm's stock volatilities are high, the value of respective shares may fluctuate widely between the time a fixed exchange ratio is determined and the actual acquisition date. When a fixed exchange ratio is applied to determine a target's compensation, an acquiring firm would overpay when its stock price is higher on the merger date than on the agreement date or when a target's stock price is lower on the merger date than on the agreement date. Alternatively, a target would lose if an acquiring firm's stock price is lower on the merger date than on the agreement date or when a target's stock price has risen on the merger date.

Models focused M&A transactions have investigated how to exploit the fluctuations in the exchange ratios to increase the M&A deal value. These real option models provide more elaborate methods for structuring an M&A deal.

Herath and Jahera (2001) argued that explicit valuation of managerial flexibility in setting the final terms of an acquisition may enhance the M&A deal value in the process. Accordingly, the deal may be optimally structured to benefit an acquiring firm if the stock prices are highly volatile between the announcement date and the closing date. In a deal where the stock exchange ratio is fixed, the shareholders of an acquiring firm may have to pay a premium for the net assets of the target firm. This will happen if the acquirer's stock appreciates in value over this period because the deal value would increase. As a result, authors model the right of an acquiring firm to optimally switch between alternate purchase considerations: either swap stock or pay the target's fair market value (of the net assets) as a switching option. The premium is a hidden loss to the shareholders of the acquiring firm. They show that the value of managerial flexibility in deal optimization, which is traditionally ignored, can be significant and could increase the deal value to both parties.

The same authors (Herath and Jahera (2002)) developed an extension of their originally model and demonstrate how an M&A deal may be optimally structured as a real options swap. They argue that consideration of both buyer and seller expectations often results in fairer deals. Authors use real option analysis to model a stock-for-stock transaction as an exchange ratio swap when both the buyer's and the seller's stock prices are volatile. Hence, they show how to structure an acquisition to minimize the purchase price paid by a bidding firm and to maximize the deal value to a target. The theoretical value of an acquisition is defined as the deal value based on a fixed exchange ratio but dependent on the acquiring firm's stock price at consummation. Accordingly, in order to minimize the value of a deal, the authors suggest that an acquiring firm buy a call option or hold a cap, which guarantees a minimum deal value. On the other hand, a target should consider a put option or a floor, which ensures that the holder will receive the maximum deal

value. Consequently, when stock prices are volatile, the flexibility available to management of both parties can be valued as an exchange ratio swap—holding a cap and selling a floor with an identical strike price. Two years later the same authors (Herath and Jahera (2004)) investigated how to provide price protection to both acquiring and target firm shareholders by setting conditions for active risk management by managers. The authors investigate the contingency effects of managerial flexibility to renegotiate the deal and hedge the market price risk by specifying a range within which the deal is allowed to fluctuate as in a collar-type arrangement. To minimize the value of a deal, an acquiring firm could buy a call option or a cap, which guarantees a minimum deal value. On the other hand, a target could consider a put option or a floor, which ensures that the holder would receive the maximum deal value. Since the cap and the floor have different strike prices, the managerial flexibility to both parties can be structured as a collar arrangement, in essence going long on a cap and shorting a floor. Herath and Jahera argue that in addition to the valuation effects, the contingency effects also enforce favorable managerial behaviors.

More recently, Giacomello (2008) analyzed how M&A exchange ratios can be assessed when a firm's economic capital valuation is carried out within a stochastic framework. He develops a quantitative model for exchange ratio accounting. Assets and liabilities with stochastic cash flows represent embedded real options such as minimum guarantees that have incremental value over traditional deterministic balance sheet values. Hence, Giacomello introduced important differences in exchange ratios. When stochastic cash flows are assumed to be contingent claims on underlying traded securities, the author shows that the no-arbitrage conditions hold. In the absence of liabilities, stochastic capital reserves are shown to be equivalent to a portfolio of European call options with a guaranteed and call component. In multi-period settings, the options embedded in the merger contracts have multiple options such as ratchet or cliquet options. A ratchet or cliquet option includes a series of consecutive forward start options. The first option is active immediately and then the second becomes active after the expiration of the first option. The above stream of literature primarily focuses on the exchange ratios in M&A transactions.

Model oriented to strategic option valuation (Smith and Triantis (1995)) considered three types of real options that arise in strategic acquisitions and influence overall value. The first refers to growth options. Through acquisitions, firms can exploit strategic synergies, which, in the long term, may affect the combined growth options of the acquiring and target firms by lowering exercise prices, thus increasing upside potential and improving exercise timing. More specifically, a firm, through a series of strategic acquisitions over time, can change the acquirer's competitive position through development of growth options, which traditional DCF cash flow analysis tends to overlook in restructuring deals. Second type of real option refers to firms that have substantial flexibility in organization, marketing, manufacturing, and financing can benefit from acquisitions. The third type of real options is the divestiture (abandonment) option, which conventional acquisition analysis ignores. These divestiture options limit the downside losses to the acquiring firm. Although there may be an opportunity to divest assets soon after an acquisition, firms may decide to hold these divestiture options in hopes of a more optimal time.

Model focuses on entry and exit possibilities (Arzac (2008)) considered the application of real options to the entry and exit issue as well as to the foothold issue. That is, the timing of when to undertake a venture can be modeled in the context of real options. Delaying entry until a more favorable time can at first appear to be valuable, but this may increase risk exposure by allowing competitors time to enter the market. Likewise, the optimal time to exit a venture or project can be modeled as a real option. The foothold issue refers to the entry with subsequent opportunities to expand, including both geographically and in terms of production.

Besides these models, researchers considered the possibilities of real option application to accounting aspect of goodwill impairment as well as to explanation why information and communication technology firms might acquire early, as well as which of those firms are likely to do so (Baldi and Trigeorgis (2009), Warner and Fairbank (2008))

3.2. Game theoretic M&A real option models

Game theoretic M&A real option models or the models of strategic M&A interactions in a real option setting consider competition between parties. These models investigate how combining real options analysis and game theory can help resolve valuation problems that involve strategic interaction among firms. In this regard, various authors investigate the strategic interaction in research and development, the competitive interaction in real option valuation of M&As and, the early preemptive investment by giving up the option premium to wait (of a wait-and-see approach).

Smit and Trigeorgis (2001) modeled strategic real option interactions in research and development as a two-person game in which the growth option value depends on exogenous competitive reactions. That is, the firms invest in research and development to develop a more cost-efficient production process and then commercialize the product. This idea can be used in M&A valuation if the target and acquiring firms can combine resources to mitigate exogenous competitive reactions.

Toxvaerd (2008) developed a theory to explain the merger waves based on interaction between competitive pressure, irreversibility of mergers, and uncertainty when targets are scarce. Its real options game model is based on three elements: there is a relative scarcity of desirable targets; mergers can be viewed as irreversible investments containing considerable uncertainty (there is an embedded delay option or an option value of waiting to acquire a target); and imperfect competition for the target exists. Author derived a complete information model which has showed that waiting versus the preemption trade-off leads to a continuum of sub game perfect equilibrium. Furthermore, the author introduced noisy private information about merger profitability leading to a dynamic global model in a Bayesian setting.

Morellec and Zhdanov (2005) developed a dynamic real option model that jointly determines the timing and terms of takeovers by solving option exercise games between bidding and target firm shareholders. They examined the role of multiple bidders in the presence of competition and imperfect information on takeover activity. The authors based their model on the analogy between exchange options and takeover opportunities (takeover can be compared to an option to exchange one asset) and on the imperfect information. Firms have complete information but outside investors have incomplete information. Starting from this, the authors made certain predictions: returns to target shareholders are higher than bidding shareholders; returns to bidding shareholders are negative if competition exists for the acquisition; and competition affects returns on takeover deals and speeds up the acquisition process. These predictions are consistent with the empirical evidence.

Because of formal models inability to deal with takeover incentives, Lambrecht and Myers (2007) considered takeovers in declining markets. They develop a real option-based theory of takeovers and divestment for M&As and conclude that a firm can abandon a business voluntarily or be forced to do so by a takeover when product demand falls to a low threshold level. The same authors extended their research by developing a dynamic infinite horizon model that incorporates the option to abandon the firm and release the assets to investors. In this model, the managers decide when to exercise the real abandonment options either voluntarily or when forced by a takeover. The authors provide new theoretical results and testable predictions on the optimal payout policy, the role of golden parachutes, and the link between debt and takeovers. They show that debt service can reduce managerial rents and force managers to close the firm early. Thus, they claimed that debt financing plays an important role in hostile takeovers.

Almost immediately, another group of authors (Magsiri, Mello, and Rukes (2008)) has developed a model in which the acquisition price is endogenously determined as the outcome of a bargaining game between the acquirer and the seller. The authors analyzed the fundamental trade-off between internal growth and growth via acquisition. The opportunity to grow internally affects the price of an acquisition because it is a fallback option in the event negotiations fail due to lower price and other factors. If the negotiations fail, the acquirer has the opportunity to grow internally through investments, which is a real option to expand (which assumes that the acquirer has the flexibility to decide if and when to undertake the investment). Assuming that an acquisition investment and an internal investment represent mutually exclusive strategies, the option's value to grow internally at the time of negotiations becomes a bargaining game option. This model complements the findings of Morellec and Zhdanov (2005) and shows that competition is unnecessary to generate negative earnings announcements. Inclusion of the internal growth opportunity is shown to force early acquisitions (rather than at a socially optimal time), which contrasts the finding in Morellec and Zhdanov.

3.3. Collaborative M&A real option models

Collaborative or joint action M&A real option models deals with cooperative options. Unlike Smit and Trigeorgis, group of authors (Savva and Scholtes (2005)) distinguish between cooperative and competitive options. Cooperative options are exercised jointly to maximize the total deal value, while competitive options are exercised unilaterally to increase the payoff for individual parties. These collaborative real options fall within the boundaries of risk-sharing contracts. The authors considered cooperative options, which are partnership deals such as joint ventures with future flexibility. Cooperative options allow better understanding of real options in partnership deals with regard to fair splits of risks and return of a partnership. In partnership deals, the idea is to develop synergies by combining core competencies to form unique offerings that neither

party alone can provide. Thus, the exercise decisions are taken jointly with a view to maximizing the total value of the deal.

On the other hand, Thijssen (2008) examined a situation in which both parties in a transaction can make bids for each other. Assuming some agreement is reached, the firms then merge. Author considered a takeover to be different from a merger, with the role of both parties being endogenous in a merger. He concluded that any value associated with options in the merger is eliminated if the actions of each party are endogenous. Beside this, the author further developed a theoretical model to support its finding.

The presence of specific antitakeover defenses can create new options, many antitakeover measures are triggered by certain events with the intent of deterring a hostile takeover. In reality, defensive measures may not actually prevent a takeover, but they do have the effect of increasing the cost of a takeover. Hence, an acquirer could use the real option framework to incorporate the activation of various antitakeover measures a target would invoke if the attempt is hostile, that is, without board approval. A target could also apply real options to the valuation from its point of view in the context of activation of antitakeover provisions. Such an analysis may facilitate negotiations and result in a friendly rather than hostile takeover. The reality is that most takeovers are the result of negotiation between the boards of the acquirer and the target firm, even if the initial offer was a hostile offer.

4. REAL OPTIONS IN PRACTICE

The actual implementation of real option analysis into the corporate decision-making framework has been somewhat difficult. Triantis and Borison (2001) took a survey approach to gauge the actual use of real option methodology. They categorize the use of real options into three broad groups. The first is the qualitative use of options methodology as a thought process. Managers have long recognized that options or future decisions exist in almost any long-term investment opportunity. The second category is the analytical use of real options, while the third one is the use of real options in the context of much broader company planning. Based on their survey, they noted that some respondents had viewed the use of real options primarily as an endeavor of academic researchers while the other responses had indicated that the use of real options evolved as managers seek to make better decisions. The authors concluded that the acceptance of real option analysis in corporate decision making in general would depend upon its perceived value in terms of better financial outcomes.

Beside this, Damodaran (2005) provided an overview of the actual implementation of real option analysis in corporate decision making. According to Damodaran, many managers believe that accurately placing a value on the many potential embedded options involved in a corporation is impossible. He noted that others perceive that it is indeed possible to determine a quantitative value. The author attempted to examine various options that arise in business decisions and then to develop a methodology to use the appropriate inputs and develop a true value. With regards to investment considerations (including M&A), he focused on the timing option, expansion option, and termination option. The parameters for determining the option value include the cost, the variance, the exercise price, and the expiration period. While these seem straightforward, Damodaran pointed out that, in practice, developing these parameters is more difficult. In this regard, he argued that the investment may or may not be traded, meaning that obtaining a true variance may be difficult. The same issues he applied to expansion decision. Regarding the abandonment, the author argued that applying option models is complicated because abandonment value can change over time. Regardless of the difficulties, the inclusion of option values may transform a negative NPV acquisition into a value additive acquisition.

Barnett and Dunbar (2007) went one step further. They offered a different perspective by examining what they call real options reasoning. They discuss how this reasoning can lead firms to undertake many investments because each has some option involved for future decisions. Accordingly, firms may be motivated to assume many investments, given multiple options associated with each. They discussed how real option reasoning can lead firms to undertake many investments because each has some option involved for future decision. The authors concluded that this would result in abandoning many such investments.

5. CONCLUSION

Real option analysis can enhance the value of M&A because it takes into account the managerial flexibility. It enables managers to include the value of different options such as expansion, abandonment, optimal timing and resource flexibility. Furthermore, managers may use real option analysis in preparing the terms of

an offer. That means that the bidding firm's managerial flexibility should enhance value for the firm. Similarly, the managers of the target firm can consider managerial flexibility in order to increase a target's value. In this way, all parties in a transaction can potentially benefit from the identification and valuation of any embedded options, which may differ between the acquirer and the target firm. The present literature in this field shows that the number of papers and researches has increased in recent ten years, but they are still largely theoretical. Practical real options use in M&A process are partly limited because of their valuation complexity, which is related to option identification difficulties and the resources and time they require. This does not mean that the real options are not used. On the contrary, real options had been applied in different industries (pharmaceuticals, IT, oil, banking etc.).

The literature suggests that real option use in M&A valuation can raise the value of M&A. The main issue that still has not been resolved is the gap between the research and actual practice. Another issue that waits for solution is how to encourage managers to use real options. According to recent researches, we can expect the further use of real options in M&As, especially in decisions related to M&As timing, spin-off, divestiture etc. Practice has shown that although many managers realize the importance of applying real options in M&A, many of them are not capable to quantify the real option value in acquisition valuation process as a whole.

Further research is needed, so it could be expected the researches related to better option identification as well as real option valuation methodology creation.

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EFFECTS OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY IN SERBIA

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Abstract: *In the last decade, financial turmoil has triggered a need for more effective and efficient working capital management (WCM) in companies. A popular measure of WCM is the cash conversion cycle (CCC), i.e. the time lag between the expenditure for the purchases of raw materials and the collection of sales of finished goods. The longer this time lag, the larger the investment in working capital. That implies that companies with efficient working capital management have a relatively short CCC. This study aims to explore the relation between liquidity measures and profitability of Serbian companies. In particular, the survey addresses relation between CCC and return on assets, assuming these performance indicators as the most representative for liquidity and profitability. The survey of this kind has never been conducted among Serbian companies. Empirical data analysis is based on 51 Serbian publicly traded companies. Our findings show some inconsistencies with the WCM theory. Specifically, number of days accounts receivable is negatively correlated with return on assets, which may be of particular interest for both corporate managers and academics.*

Keywords: *working capital, cash conversion cycle, account receivables, accounts payables, inventory, profitability*

1. INTRODUCTION

In the last decade special attention is given to the issue of working capital management. Evidently, many authors suggest that the optimum level of working capital depends on the industry and the nature of its transactions (Walker, 1964; Outram, 1997; Ozbayrak, 2006). According to Johnson and Soenen (2003), in order for company to be able to achieve its aim of shareholder value creation, effective working capital management should be integral part of its corporate strategy. Net working capital is defined as the difference between firms' current assets (including accounts receivable, inventories, and cash) and current liabilities (including accounts payable and short term debt). These elements significantly influence company's liquidity and that is the reason why working capital is often used to evaluate liquidity of a company.

According to Deloof (2003) working capital management will have a significant impact on the profitability of companies and consequently WCM is a very important element of financial management. In order for working capital management to enhance value of a company, adequate balance between liquidity and profitability must be maintained. Same author also states that a popular measure of WCM is the cash conversion cycle (CCC), i.e. the time lag between the expenditure for the purchases of raw materials and the collection of sales of finished goods. The longer this time lag, the larger the investment in working capital. That implies that companies with efficient working capital management have relative short cash conversion cycles.

Taking all this into consideration, determining the optimum level of working capital in a company is not an easy task. It raises questions regarding appropriate amount of current assets as well as questions regarding financing these assets. Garcia-Teruel and Martinez-Solano (2007) point out that working capital investment involves a trade-off between profitability and risk i.e. decisions that tend to increase profitability tend to increase risk, and, on the other hand, decisions that concentrate on risk reduction will tend to decrease potential profitability.

This study aims to explore the correlation between liquidity measures and profitability of Serbian companies. In particular, the survey addresses correlation between various liquidity measures and return on assets. The relation between liquidity and profitability measures has widely been explored in the extant literature. This relates to corporations in both developed (Wang, 2002; Deloof, 2003; Lyroudi and Lazaridis, 2000; Garcia-Teruel and Martinez-Solano, 2007), and emerging markets (Luo, et al., 2006; Zariyawati, et al., 2006; Afza

and Nazir, 2007; Raheman and Nasr, 2007; Samiloglu and Demirgunes, 2007; Afza and Nazir, 2008; Sharma and Kumar, 2011).

However, to the best of authors' knowledge, the survey of this kind has never been conducted among Serbian companies. Serbian corporations have evolved in a different economic and political setting compared to other, both developed and emerging economies. The most important differences can be found in general economic conditions, the development of Serbian financial markets, managerial style of Serbian corporate leaders, corporate culture and leadership, managerial attitudes towards the risk, expectations from shareholders etc. Thereafter, the relationship between liquidity and profitability may prove to be interesting for management, shareholders, and other various stakeholders in Serbian corporate sector.

2. THEORETICAL BACKGROUND

The theoretical foundation for this paper derives from numerous research papers and surveys performed both in developed and emerging markets. Deloof (2003) conducted a survey among 2,000 Belgian corporations in order to determine what kind of effects working capital management has on firms' profitability. Deloof (2003) found that there is a significant negative relation between profitability of the firms, measured by gross operating income, and the number of days accounts receivable, inventories and accounts payable. He concluded that profitability could be enhanced by reducing the number of day's accounts receivable and inventories to some acceptable minimum level.

Wang (2002) studied relationship that liquidity management has with both operating performance and corporate value. This study is based on data for Japanese and Taiwanese firms. His results suggest that aggressive liquidity management will increase both operating performance and corporate value.

Lyrodi and Lazaridis (2000) examined liquidity of food and beverage industry in Greece and connected it to profitability, indebtedness and company size. They found that there is a significant positive relationship between the cash conversion cycle and quick and current ratios. Furthermore, there is a positive relationship between cash conversion cycle and both ROA and net profit margin. Hence, there was no linear relationship between cash conversion cycle and leverage ratios. According to Lyrodi and Lazaridis (2000), current and quick ratio had negative relationship with debt to equity ratio. Yet there is a positive relation of these ratios to times interest earned ratio. They found no statistical evidence of difference between liquidity ratios of different sized companies.

The study of Afza and Nazir (2007) examines the relationship between the aggressive/conservative working capital policies with profitability and risk. Sample consists of 208 public limited companies listed on Karachi Stock Exchange for the period of 1998-2005. Their results show that there is a negative relationship between working capital policies and profitability, and they also found no significant relationship between the level of current assets and liabilities with risk of the firms.

Garcia-Teruel and Martinez-Solano (2007) provide empirical evidence of the effects of working capital management on the profitability based on a sample of small and medium-sized enterprises (SMEs) in Spain. The research has been performed on a panel data of 8,872 SMEs covering the six year period. Their study showed that profitability can be achieved by reducing inventories and the number of days for which their accounts are outstanding. Also, their study proved that shortening the cash conversion cycle also increases firm's profitability.

Consistent findings can be found in research of Samiloglu and Demirgunes (2008) performed on manufacturing firms listed on Istanbul Stock Exchange for the period of 1998-2007. The results showed that accounts receivables period, inventory period and leverage influence profitability negatively, while growth in sales has reverse affect.

By examining different manufacturing, retail and wholesale companies from 1980 to 2006, Luo, et al. (2006) found that the efficiency of a firm's working capital management has lasting impact on firm performance. The future earnings increase follow improvements in working capital management. The same authors reveal that the firm value tends to increase when cash conversion cycle decreases. The consistent results can be found in Zariyawati et al. (2006). Covering similar period and using panel data of 1,628 Malaysian firms, these scholars found high negative correlation between cash conversion cycle and profitability.

Nevertheless, Sharma and Kumar (2011) reported inconsistent results obtained from similar study conducted in India. By examining 263 non-financial firms listed at the Bombay Stock Exchange, they find that working capital management and profitability is positively correlated. In particular, inventory and number of days accounts payable are negatively correlated with profitability, whereas number of days accounts receivables and cash conversion cycle exhibit a positive relation with companies profitability.

3. METHODOLOGY

3.1. Sampling procedure and data

Aim of this study is to test whether there is a correlation between liquidity and profitability of companies in Serbia. In order to properly determine significance of such a relationship, we have selected Serbian corporations that list on Belgrade Stock Exchange and that are included in Belexline broad market index. This index is chosen because it represents capital market movements. Our sample consists of 51 corporations. Index is based on price movements of 70 Serbian corporations. However, because of specific nature of their activities we have excluded banks and financial corporations from our sample. Also, corporations that have not yet submitted last year's financial reports have not been taken into consideration. Likewise, one corporation that has missing data for the year 2010, due to the fact that is founded in 2011, has been removed from the sample.

Our findings are based on liquidity and profitability measures, obtained from last year's financial statements that are publically available. Sample is described with descriptive statistics, more specifically: means, minimums, maximums and standard deviations. Interdependence of variables was examined using correlation analysis (Spearman's rho two-tailed correlation), conducted in SPSS 17.0.

3.2. Research variables

The basic objective of the study was to examine and explore the relationship between indicators of profitability and liquidity. Therefore, as a profitability measure the study used return on assets (ROA), defined as the ratio of earnings before interest and tax to total operating assets. This ratio was used in numerous studies (Afza and Nazir, 2007; Garcia-Teruel and Martinez-Solano, 2007; Uyar, 2009; Sharma and Kumar, 2011) as it provides the best insight into corporate profitability.

Liquidity and other performance measures employed in this study are number of days accounting payables (AP), number of days inventory turnover (INV), number of days accounting receivables turnover (AR), cash conversion cycle (CCC), size of the company (SIZE), and the sales growth of the company (GROWTH). Similar set of variables was used to examine the relation to profitability in numerous studies (see: Lyroutdi and Lazaridis, 2000; Deelof, 2003; Garcia-Teruel and Martinez-Solano, 2005; Nazir and Afza, 2009).

The effectiveness of working capital management was measured by number of days accounts receivable (AR), number of days of inventory (INV) and number of days accounts payable (AP). Number of days accounts receivables, inventory and accounts payable was calculated as 365 times accounts receivables, inventory and payables, respectively. Number of days accounts receivables indicates number of days that passes from selling the products and services to collecting the cash from debtors. Number of days inventory shows the period of time that passes from receiving raw materials and services from suppliers to the sales of goods. Number of days accounts payables denotes the duration from receiving raw materials and goods from suppliers to the payment time. Finally, the cash conversion cycle (CCC) is an additive measure of the number of days funds are committed to inventories and receivables less the number of days payments are deferred to suppliers (Johnson and Soenen, 2003). The size of the company (SIZE) was measured as the natural logarithm of the actual book value of assets. The logarithm approach was used as the original large value of companies might have disturbed the analysis (Nazir and Afza, 2009). The sales growth (GROWTH) was measured as the relative growth in sales $[(sales_{n+1} - sales_n)/sales_n]$.

3.3. Descriptive statistics

The descriptive statistics for both profitability and controlling variables is displayed in Table 1. The mean for return on assets was 6.7%, whilst minimum and maximum values for ROA are -7.8% and 62.6%, respectively. Hence, profitability is very volatile [standard deviation is approximately .1162]. The average cash conversion cycle of sampled companies was approximately 318 days. This means that in average it takes 318 days from paying suppliers to collecting the cash from buyers. This was affected by accounts

receivables of 364 days, inventory of 130 days and accounts payables of 175 days in average. This indicates that the average observed company in this study face myriad of problems with liquidity.

The mean growth of examined companies was nearly 10,3%, but the standard deviation indicates large differences between the sales growth among observed companies. Average leverage is 39,52%. It is noteworthy to notice that the maximum leverage is 123,9%, which means that some of the observed companies have losses in excess of equity. Finally, current ratio was in average 2,45, with minimum and maximum values ranging from 0,168 to 11,894.

Table 1: Descriptive statistics for profitability and liquidity measures

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	51	-,078	,626	,06703	,113346
AR	51	16,032	7317,019	363,74160	1238,827262
INV	51	,624	1025,223	129,61812	196,852837
AP	51	7,026	2632,100	175,09228	443,034048
CCC	51	-130,111	5710,142	318,26743	916,896296
SIZE	51	12,399	19,265	15,00557	1,210194
GROWTH	51	-,845	2,329	,04750	,435323
LEVERAGE	51	,057	1,239	,39516	,242466
CR	51	,168	11,894	2,40420	2,417818
Valid N (listwise)	51				

4. RESULTS AND DISCUSSION

As the objective of the study was to analyse the correlation between liquidity and profitability indicators, the results displayed in Table 2 represent the correlation matrix. Results show that there is a statistically significant correlation between return on assets and number of days in accounts receivable, number of days in accounts payable, growth, size and current ratio.

The weak negative correlation exists between ROA and number of days accounts receivable and ROA and number of days accounts payable. These findings suggest that if number of days accounts receivable and number of days accounts payable is reduced profitability of a company will increase. Therefore, the companies which more frequently collect cash from costumers tend to be more profitable. The working capital management theory suggests the same. However, negative correlation of number of days accounting payables and profitability is highly inconsistent with a working capital management theory. The theory suggests that delays the payments increases the profitability of the company. However, similar inconsistencies could be found in other empirical studies (Deloof, 2003; Garcia-Teruel and Martinez-Solano, 2007). These findings emphasise the fact that more profitable companies in Serbia more frequently respond to their commercial liabilities. Nevertheless, the shortcoming of Spearman's rho, or any other correlation test, does not allow identifying causes and consequences.

Study results also reveal a positive correlation between current ratio and return on assets (.389). With regard to other performance measures, relatively high values for correlation could be found between return on assets and both growth (.428) and size (.310) of corporation. Profitability is positively associated with growth in sales, as well as with size. Hence, larger companies tend to have higher profitability, which could also be found in Garcia-Teruel and Martinez-Solano (2007).

Table 2: Correlation matrix

			ROA	AR	INV	AP	CCC	SIZE	GROWTH	LEVERAGE	CR
Spearman's rho	ROA	Correlation Coefficient	1,000	-,338*	,053	-,384**	-,027	,310*	,428**	-,017	,389**
		Sig. (2-tailed)	.	,015	,710	,005	,850	,027	,002	,905	,005
		N	51	51	51	51	51	51	51	51	51
	AR	Correlation Coefficient	-,338*	1,000	,012	,454**	,478**	,211	-,364**	,000	,127
		Sig. (2-tailed)	,015	.	,936	,001	,000	,137	,009	,995	,375
		N	51	51	51	51	51	51	51	51	51
	INV	Correlation Coefficient	,053	,012	1,000	,132	,539**	,059	,183	,220	,213
		Sig. (2-tailed)	,710	,936	.	,356	,000	,681	,199	,121	,133
		N	51	51	51	51	51	51	51	51	51
	AP	Correlation Coefficient	-,384**	,454**	,132	1,000	,078	-,040	-,333*	,331*	-,332*
		Sig. (2-tailed)	,005	,001	,356	.	,584	,782	,017	,017	,017
		N	51	51	51	51	51	51	51	51	51
	CCC	Correlation Coefficient	-,027	,478**	,539**	,078	1,000	,188	-,049	-,062	,368**
		Sig. (2-tailed)	,850	,000	,000	,584	.	,186	,732	,664	,008
		N	51	51	51	51	51	51	51	51	51
	SIZE	Correlation Coefficient	,310*	,211	,059	-,040	,188	1,000	,002	,225	,158
		Sig. (2-tailed)	,027	,137	,681	,782	,186	.	,989	,112	,268
		N	51	51	51	51	51	51	51	51	51
	GROWTH	Correlation Coefficient	,428**	-,364**	,183	-,333*	-,049	,002	1,000	-,029	,308*
		Sig. (2-tailed)	,002	,009	,199	,017	,732	,989	.	,838	,028
		N	51	51	51	51	51	51	51	51	51
	LEVERAGE	Correlation Coefficient	-,017	,000	,220	,331*	-,062	,225	-,029	1,000	-,523**
		Sig. (2-tailed)	,905	,995	,121	,017	,664	,112	,838	.	,000
		N	51	51	51	51	51	51	51	51	51
	CR	Correlation Coefficient	,389**	,127	,213	-,332*	,368**	,158	,308*	-,523**	1,000
		Sig. (2-tailed)	,005	,375	,133	,017	,008	,268	,028	,000	.
		N	51	51	51	51	51	51	51	51	51

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

5. CONCLUSIONS

Extant literature provides a profound insight into effects of working capital management on corporate profitability in both developed and emerging economies. Different authors present contrasting findings of the relationship that exists between liquidity measures and ROA. This study analyzed profitability-liquidity relationship within Serbian companies listed at the Belgrade Stock Exchange. Our findings suggest that Serbian corporations suffer from severe illiquidity. Cash conversion cycle, as the most frequently used dynamic liquidity measure, tends to be too lengthy, and it does not have statistically significant relationship with ROA.

Our study reveals a negative correlation between ROA, and both number of days accounts receivable and number of days accounts payable. There is a positive correlation between return on assets and current ratio, and ROA and sales growth. Based on these results management can increase profitability by reducing number of days accounts receivable. On the other hand, delays in payments to suppliers are not necessarily a driver of profitability. However, it cannot be stated as a fact that liquidity affects profitability and not the other way around.

This survey did not explore all profitability drivers and also did not determine real nature of the relationship that exists between liquidity performance measures and various indicators of profitability, which could be suggested for further research.

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INTELLECTUAL CAPITAL - A CHALLENGE FOR ADEQUATE FINANCIAL REPORTING

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Abstract: *Modern enterprises of XXI century should be characterized by the ability to adequately use their intangible resources that have become much more significant in relation to material resources. With the spread of market uncertainty is greater, technologies are more sophisticated, competition is stronger, the lifetime of products is shorter. Therefore, successful companies need to be able to distinguish the continual creation of new knowledge and its dissemination to all parts of the company, building them into all processes, new technologies, new effects. Adequate knowledge management leads to improved performance of employees and becomes an important factor to parry competition. Knowledge is an indispensable strategic resource for companies, because it contributes to the achievement of its basic objectives. Use of adequate knowledge creates intellectual capital of a company that provides objective reports with additional financial reporting and is an important factor in parrying the fierce competition.*

Keywords: *intellectual capital, knowledge, financial statements, measurement, enterprise, International Accounting Standard 38*

1. INTRODUCTION

The present time is characterized by global competition, political turmoil, turbulent environment, uncertainty, marked fluctuation of qualified personnel, development of technology and others. Being surrounded with this kind of environment a company can hardly survive in the market without professional management and staff who possess modern knowledge, intelligence and ability to knowledge sharing in teams to improve company performance and to parry competition. Rapid technological and market changes that would require the company more flexible operations in order to adapt to this environment. Competitive advantage can only be held if the company has adequate experts from various fields whose knowledge is transformed into a intellectual capital as a pillar of defence against competitors. Therefore, the advantage can be maintained by adequate investment and motivating employees, because they are headquarter that is key factor of intellectual capital as a resource base for survival, growth and enterprise development, and increasing value of it. Company's ability to properly activate their intangible resources has become more important in relation to the management of material resources. The official financial statements present only part of the intangible assets, and only tangible part of it (research, patents, trademarks, licenses - governed by the International Accounting Standard 38 - Intangible assets), intangible and impalpably (i.e. intellectual capital) is not in the official financial statements but is in the additional company financial statements in some developed countries.

2. KNOWLEDGE AS A BASE OF INTELLECTUAL CAPITAL IN FUNCTION OF COMPETITIVE ADVANTAGES OF COMPANY

In the new economy based on the information technology knowledge gets a great importance in relation to the past. It became a crucial strategic factor for the development of enterprises, and thus society. The modern corporation operates in a knowledge society - it Peter Drucker recognized in his researches. Therefore, in the XXI century - century of knowledge, real information is not invested in the material factors, but in the knowledge of employees. Companies in the new economy have realized that their advantage toward competition is reflected through what it knows, how it to uses, what it knows and how fast it can learn something new.

Adaptation and learning skills is associated with enterprise intellectual capital. Intellectual capital can be defined as a combination of three integral segments, namely: human capital (skills, knowledge, skills, staff and management experience, the dynamic action of an intelligent enterprise in competitive conditions), structural capital (infrastructure support human capital including information technology, the company's

image, proprietary databases, organizational concepts, documents, patents and licenses) and customer capital (the ratio of companies and their clients) (Puloć & Sundać, 2008.).

The combination of qualitative and quantitative human, structural and customer capital merge into intellectual capital that is a source of competitive advantage. In fact, the intellectual capital comprises the knowledge involved in a dynamic process and transformed into added value for the company.

In order to gain insight into the intellectual capital and its various structural components one of the first was a Swedish insurance company "Skandia" in 1995. get down measuring the performance of intellectual capital. They added the intellectual capital report to traditional (official) financial statement. They made a pioneering step in terms of more comprehensive financial reporting. An additional report called new reporting model is made to provide a balanced picture of the intellectual and financial capital. This model is a step beyond traditional accounting presentation of value added.

One should not misunderstand their model. Skandia's intellectual capital measurement model is not a replacement of traditional accounting, nor it is complete. Regardless the above, it represents an important step forward compared to the traditional way of displacing of accounting the value added. It is in fact incentive, the driving force for the development of other methods, techniques and models of monitoring measurement and management of intellectual capital.

Numerous studies and analyzes show that knowledge and its externalization in many companies are not shown in the financial statements, and also is present insufficient attention in the management of these resources. It also means that the intellectual capital is under-utilized in these companies because they own success, or failure, calculated using the old principles and methods.

For modern enterprises sources of competitive advantage are related to information, the process of organization and relations with external stakeholders. Infrastructure of companies, relationships with customers and business partners, innovation efforts initially incorporate intellectual capital.

The sum of knowledge of all individuals in the company, as well as the practical translation of this knowledge in a competitive process, trademarks, masks of products, actually makes intellectual capital. More detailed studies relating to intellectual capital are tied for second half of the nineties of last century and the beginning of the XXI century.

The intellectual capital of the company is really focused an increase in competitiveness in the future, a development of options, opportunities to make use of the environment and the future operations of the company. Therefore, the real value of the company is estimated over its potential for future opportunities and the ability to increase profitability, and therefore competitiveness. Intellectual capital is knowledge that can be transformed into profit. From this point of view in the focus are investment, approaches, processes, ideas and know-how.

Intellectual capital marks a new knowledge-based economy and become the most important factor of production, which drives all other production factors. The synergy of the components of intellectual capital is the basis of creating value-added company, positioning the company in the market creating competitive advantage.

The role of knowledge in achieving competitive advantage is a challenge to management. It is a fluid mix of experience, information, intuition of experts. Sveiby believes that knowledge has four characteristics (Sveiby, 1998).

- Knowledge is tacit
- Knowledge is directed to action
- Knowledge is supported by the rules
- Knowledge is constantly changing

To create innovative enterprise by transformation processes immanent is prominent place of the knowledge without which is impossible involvement in the contemporary development trends. Therefore, the knowledge,

skill, creativity and innovation are becoming the main generators of human intellectual capital of employees, which increasingly require new types of production.

Intellectual capital is intended to explain the origin of the differences between book and market values of companies. This way value of the companies is more precisely determined and is of great importance not only for the company, but also for investors. Intellectual capital is the knowledge included in the dynamic process transformed into a value-added of enterprises.

International Accounting Standards 38 - Intangible Assets prescribes the accounting treatment of intangible assets that are not dealt with other accounting standards. This standard defines the criteria for recognition of intangible assets, as well as way of the measuring of the book value of these and requires certain disclosures about intangible assets. Some intangible assets may have a physical form (for example a prototype, CD-ROM, documentation of patents or licenses, or film) and is considered to be tangible intangible assets of its definition, recognition, initial measurement, the measurement after recognition is regulated by this standard. Intangible immaterial assets are not regulated by acts of professional regulations and also are not integral components of the official financial statements on, but are integral components of the additional financial reports from some companies of countries with developed market economies. The company chooses its accounting policy that it will use the cost model or revaluation model.

Intangible immaterial property i.e. investments are not regulated by the International Accounting Standards / International Financial Reporting Standards to the financial statements show a true picture of the property, financial and profitability position. We should as soon as possible incorporate as the official position of the financial statements, which implies the adoption of new standard that will govern the quantification of the so-called intangible immaterial property so called intellectual capital. Or will complement the existing International Accounting Standard 38 with the necessary elements related to the intangible asset that is intangible immaterial property i.e. investment. The pointed will require a change of the Accounting and Auditing Law and Company Law and accompanying documents.

3. MEASUREMENT OF INTELLECTUAL CAPITAL

Company after setting up knowledge management strategy of its employees faced a new challenge i.e. the question is how to measure the effects of complex activities. Some companies (Skandia, Dowchemical, Buckman Laboratories, Canon, etc.) twenty years ago made a pioneering step and began measuring intellectual capital, and were deeply convinced that the growth of intellectual capital leads to a positive financial result of the company, and contrary - his fall is a sign for the future problems.

Present are the following methods for measuring intellectual capital, namely: (Šijan, 2007).

1. Market to Book ratio
2. Tobin's Q
3. Calculated Intangible value

1. Relation of the market and book value is based on calculating the difference between the market capitalization of the company and its book value. This method is simple to use, but it is difficult to embrace complexity. Of the multitude of economic indicators and speculation in the markets in which the company cannot influence with the results of its operations depends the market value of companies. Therefore, in order to implementation of this method provided adequate results it is very important to anticipatory define the criteria of determining and quantifying the market value of the company, which is not an easy task.

2. Tobin's Q was initially developed for the analysis of financial markets by James Tobin. This method uses the value of the reproduction costs of corporate assets in order to predict investment decisions independent of interest rates. Tobin's Q is the ratio of enterprise value and reproduction cost of its assets. Market value is the most probable price that would be provided a means to achieve a competitive and open market under conditions necessary for a fair sale.

If the Q ratio is greater than 1 (if the reproduction costs of corporate assets is lower than its market value), then the company earns monopoly profits and, conversely, if the coefficient of Q is less than 1 (if the reproduction costs of corporate assets is higher than its market value) then achieved a normal return on their investment.

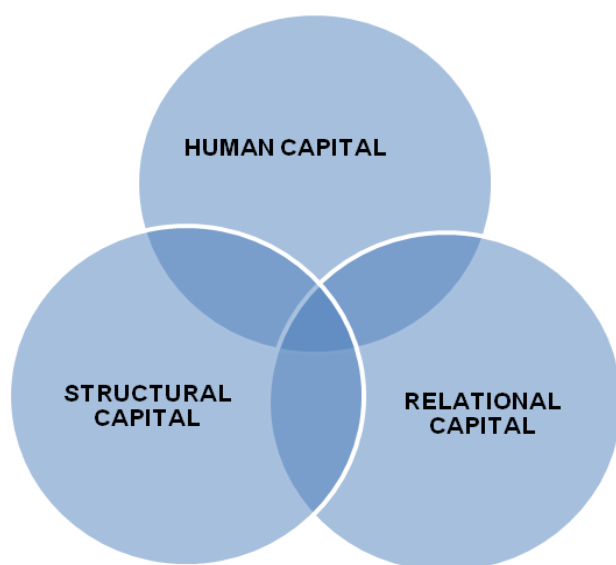
This method provides insight into the current market and financial situation of enterprises. Important is dynamic approach to management of skills (knowledge) performances of employees who will point out the

positive activities to highlight and the negative to be avoided or minimized. It is an important indicator that the company should focus on creating new value and achievement of competitive advantages continuously.

3. Method Accrued intangible value developed by NCI Research Illinois, to calculate the fair value of intangible assets of companies. This method calculates the excess return on fixed assets and use this figure as a base for a certain proportion of return attributable to intangible assets.

A prerequisite for calculating intellectual capital makes the availability of data of the profit of entire capital within their own business. Intellectual capital is calculated in relation to the achievements of the average competitor, compared with an average that type of industry to which it belongs. For a period of time is necessary to average company revenues divided by the average of its material resources. Then this result (which is repayable funds) compared with the average in the industry.

There is a need for linking intellectual capital with the objectives of the company that will be manifested through competitive advantage, which is why many companies are experimenting with the management of intellectual capital in order to achieve this. Because of it appeared many methods of measuring and managing intellectual capital. One of the models of intellectual capital developed together Leif Edvinsson, Hubert St. Onge, Charles Armstrong and Gordon Petrash and called it a platform of values. Platform values (see Picture 1) describes the intellectual capital through three main components that are interconnected to form a value that is created in the cross section of these three components, i.e. human, structural and relational capital. In the framework of human capital considered to be people's ability and capacity to learn. Structural capital is the infrastructure, intellectual structures and cultures. The relational capital are among customers, brands, and contracts.



Picture 1: Platform of values

1. INTELLECTUAL CAPITAL MANAGEMENT USING THE MAGIC PROJECT

QPR software developed by the European MAGIC Consortium (measurement reporting on intellectual capital) has created a technology that supports the methodology and model for measuring intellectual capital. This project is funded by the European Commission.

Many companies have realized the importance of creating a measurement system to monitor the most important resource of the company so called intellectual capital. Seen from this aspect intellectual capital can be defined as:

- Proportional value added to all intangible resources of company and
- Dominant knowledge necessary to provide the competitive advantage

If we measure the intellectual capital by methodology MAGIC project, its structure consists of human capital (which includes all the skills, competencies, expertise, so that he can react to market demand and customer needs, including leadership and management decisions and skills), organizational capital (including ability of the company, its infrastructure and organizational processes related to creating products and services for the market), market equity (the company's ability to communicate with the external environment, customers, suppliers and other stakeholders), and innovation capital (referring to the company power to innovate, improve and develop the untapped potential and create wealth in the long run).

Development of methodology of measurement system for determining the intellectual capital was actually the goal of this project. QPR Software from Finland, Institute for Human Factors Technology, Management IAT from Germany were partners MAGIC project.

5. CONCLUSION

Continuous adjustment of the market, technological and organizational changes in the century based on knowledge and intellectual capital the focus is adequate management skills of employees, i.e. intellectual capital. Only satisfied and adequately motivated employees are essential and primary resource of companies to innovate and achieve competitive advantage. Presented methods focus on measuring intellectual capital as a whole or its parts. The classical financial indicators are not able to cover all the results of knowledge management and intellectual capital. It is necessary to strive to develop new, more adequate methods for monitoring the economic effects in order to achieve competitive advantages. The invention enough precise methods will allow quantification of intellectual capital not only in the supplementary financial statements, but also in official statements, which represents a major challenge for theorists and for practitioners, and policy makers for acts of professional accounting regulations.

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COLLAPSE OF THE AMERICAN MORTGAGE MARKET

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Abstract: *The first wave of the global economic and financial crisis in the U.S. spread to the European Union and worldwide. Very quickly, the crisis from the mortgage market spread to stock markets, government bonds, the labor force. The crisis has brought with it the decline of economic activity, insolvency and losses, primarily in the financial sector and then in the real sectors of economy. Problems in credit and savings that were accumulated in the past have reached the peak with the collapse of over a thousand banks. Those were the first signs of emergence of the current crisis, but they were ignored. A few years later, company corporate scandals followed (for example Enron, WorldCom, Adelphia, Global Crossing), which realized the suspect accounting procedures, participated in accounting and financial fraud schemes for deceiving the public and illegal acquisition of large gains by individuals.*

Keywords: *prime mortgage loans, sub-prime mortgage loans, U.S. housing bubble, crisis, loss*

1. INTRODUCTION

Until the mortgage market crisis, the U.S. is considered to be one of the safest and most developed markets, which almost certainly guaranteed profits with little risk. In the frantic race for profits in the U.S. mortgage market, global financial markets lost ground.

Globalization has contributed to the spread of the crisis of global proportions, but its occurrence did not signalled. The cause of the crisis was irrational consumption without taking into account the traditional business models. The cause of the boom in the mortgage market, which is the cause of occurrence of the current financial crisis, was a seemingly easy access to affordable mortgages. Boom was not based on fraud, as the overvaluation of stocks and excessive speculation.

This paper will tell about sub-prime mortgage loans, compensation of lenders risk, U.S. housing bubble and its burst, possible culprits and collapse of the financial system, the help from outside, crisis spreading, and protecting the financial system.

2. SUB-PRIME MORTGAGE LOANS

At the beginning of the millennium two types of mortgage loans appeared in the market. Prime mortgage loans were offered by lenders to their best customers who are creditworthy to make a repayment of a mortgage loan and sub-prime mortgage loans were offered by lenders to customers who did not meet the requirements for obtaining this type of loans. Believing in the idea that the value of homes in America never fall, the U.S. bankers developed this system of high-risk loans, known as "sub-prime" mortgages which characteristics are that the housing loan is offered and approved without much checking of property of the borrower. Many of these instruments let families purchase homes without documenting their income, putting little down, and with potentially high loan-payment-to-income ratios if interest rates rose. Banks have been easily approving these types of loans because the growth of housing prices in the U.S. was constantly rising every year extending the value of collateral so after a few years the value of mortgage loans exceeded the amount taken. Many of the borrowers could now easily get mortgage loans from banks and that led to an increase in demand for housing due to a limited supply and an increase in property prices in the U.S. The financial institutions that where lenders of this loans where know working in a field of low liquidity and high leverage.

3. COMPENSATION OF LENDERS RISK

Being attracted by the low initial interest rates on "sub-prime" loans lower-paying Americans did not pay lot of attention to the clauses in loan agreements. There should be no doubt that lenders were at least somewhat aware of the risks they were taking. Therefore, in order to ensure against loss, the U.S. mortgage banks have put a clauses that in the case of irregular borrowers' payments their interest exponentially increase. Although it seems that the lenders did not take into account the riskiness of their given loans, they have already made this step with interest increase in order to compensate

the taken risk (Spiegel, 2011). On the other hand, U.S. lenders have started to repack mortgage loans into complex financial arrangements and resell them to investors around the world. Many central banks around the world had difficulties to monitor this whole process and they long had almost no insight into the rules of buying and selling these loans (Vujić, 2008)

4. U.S. HOUSING BUBBLE AND ITS BURST

This type of loan has directly influenced the increase in demand, and indirectly on the growth of housing prices, so many started to buy the property from the speculative purpose - to sell for higher prices, giving further speed to price rising. This phenomenon is called as a U.S. housing bubble, which is characterized by rapid growth in the value of real assets such as property until it reaches an almost unbearable level, compared with earnings and other economic factors. This was followed by bank securitization of subprime loans where they sold their debts on the market. Thus, unwittingly endanger the entire financial system. Of course, the price of a balloon at one point had to burst that happened in July-August 2007. Home prices had increased by an average of 124% from 1997 to 2006 (Kjelleren, 2008.). Real estate prices have started to fall rapidly so that the debtors faced with the situation that they owe more than their property really worth. Many who bought the property were not able to repay taken loans, and their number was growing rapidly and the entire financial system was potentially insolvent. When the U.S. housing bubble fully burst in 2007 and home prices dropped, 1.25 million subprime mortgages foreclosed, up 80% from 2006. In Phoenix, Miami, greater Los Angeles and Las Vegas, home prices declined by over 25% in 2008. and the national average declined 17%, with around 10 million families having negative equity in their homes (Kjelleren, 2008.).

Borrowers were not able to carry out their obligation and they were announcing bankruptcy. Banks unwillingly became owners of great amount of mortgages. Banks have tried to sell mortgages in the amount of debt but prices were constantly falling, so even if the property was sold it was not enough to service the debt.

5. POSSIBLE CULPRITS AND COLLAPSE OF THE FINANCIAL SYSTEM

Some authors suggest that the blame modern practice of securitizing loans, but some disagree with this opinion mentioning 1930s and the fact that there were no securitized mortgages then. It is also very hard to say that modern institutions are solely responsible for currently observed modification rates (Spiegel, 2011).

Going back to 1977 and Community Reinvestment Act it can be seen that the Government as one of its well-intentioned policies intentionally encouraged home ownership by low-income families and intentionally contributed to weakening of the whole financial system. In order to meet this Act, banks began to give loans in low- and moderate-income areas, softening credit policy with not so rigid requirements what automatically led to higher rates for those borrowers as assuring themselves from the taken credit risk. Lower and lower credit standards followed (Spiegel, 2011).

Consequences arisen

- Unrecorded wave seizure overpriced houses owned by the impoverished Americans
- drop in U.S. consumer confidence in their purchasing power,
- increase the local unemployment and inflation,
- Slowdown of economic growth,
- Balance of costs of too expensive war in Iraq

Running away of investors

- bad assets in banks' balance sheets
- withdrawal due to rising investor risk
- due to the low liquidity, financial institutions were forced to sell their property
- due to the crisis there is a lack of investors willing to buy property
- due to low demand prices decreased, and banks are forced to sell assets at a price that is lower than the purchase price which leads to the realization of loss
- Crises leads to deterioration of the balance sheets of banks, which represents an additional incentive for investors to withdraw funds

The disappearance of capital

- bad assets on the balance sheet of banks
- due to large creditor investments and the absence of regulation the banks have little capital ratio and a high leverage
- due to the crisis, banks are forced to sell assets (decrease leverage)
- due to the crises there is lack of investors wishing to buy property
- a decline in property prices influenced banks to sell real estate below price
- As the property was sold below price that led to deteriorated of capital ratio, which is an additional incentive to sell the property (Petković, 2009).

"The collapse of the U.S. mortgage market has caused a great financial crisis and all the big companies that played a key role in the process of securitization (the five investment banks - "Goldman Sachs", "Morgan Stanley", "Lehman Brothers", "Merrill Lynch", "Bear Stearns "; two financial conglomerates - "City Group", "JP Morgan Chase"; three companies dealing with insurance - AIG, MBIA, AMBAC, three rating agencies for risk assessment - "Moody's", "Standard & Poor's" "Fitch" and two big mortgage corporations - "Fannie Mae", "Freddie Mac") found themselves facing bankruptcy. But not only them, because the vast mass of "toxic" securities spread throughout the world. Banks in many countries around the world in their portfolios had higher or lower mass "toxic" securities, and was threatened with bankruptcy. Therefore, the crisis in the United States quickly passed on to the whole world. It should be noted that the crisis in the housing market was just a catalyst, not the underlying cause of current global crisis" (Dušanić, 2012).

6. THE HELP FROM OUTSIDE

In 2008 the financial markets froze. While the financial crisis created problems for firms reducing their profits, it also attacked banking system. Banks stopped lending to each other in fear they would never be paid back. The help from outside was indispensable so the Government officials asked Congress for funds to fill in for to save credit markets. In response to this crisis **Troubled Asset Relief Program (TARP)** was founded, as facility created by the US Government to buy distressed assets from financial institutions. The main purpose of TARP was to create liquidity in the credit markets by buying (and freeing up) assets tied to mortgages from banks. That way banks with the help of TARP could continue lending. Of course, those institutions participating in this program were under Government monitoring (Dušanić, 2008).

European Central Bank (ECB) as one of the world's most important central banks and someone who implements monetary policy can provide liquidity via open-market operations. As crises was spreading ECB had to intervene, but even though ECB's gave its best effort, the market still kept high rates for interbank loans. Every time ECB tried to do something it was reflected in totally different way. Conducting an aggressive politics to provide liquidity made lenders pull back from the market even more, as they were more suspicious of borrowers. Bad situation on the market made a condition in which every ECB liquidity injection required a new one (Spiegel, 2011).

When housing prices began their slide they even fell to about a third of their initial value what to a wave of foreclosures. Banks were also on the loss as properties were worth far less than the underlying mortgages were seized. Having a wish to solve this issues the Government intervene by providing funding to Home Owners' Loan Corporation (HOLC) as its main purpose is to refinance home mortgages currently in default to prevent [foreclosure](#). With these funds HOLC could purchase delinquent loans, refinance them, and thus give homeowners a chance to remain in their dwellings.

7. CRISIS SPREADING

There is a spill over of the crisis from the U.S. to Europe and on to other developing countries. Governments of most developed countries had to intervene. Their main goal was to restore confidence in the financial system which was at an alarmingly low level, ensure the liquidity of many institutions and to stop the sale of property at low prices. All of this was a reason that they approved a large amount of money. This funding was much easier done with the investitures and countries that could borrow money from investitures than those who could not. The other short-term measure was recapitalization of banks.

Capital increase led to a reduction in leverage. Reducing supply and recovering demand, and also getting

prices of real estate to more realistic level was possible with state's purchase of mortgages at risk from banks.

In order to prevent the deepening of the crisis, all countries are obliged to do everything in their power to stop the significant decrease in demand. There are some projections of IMF experts to expansionary fiscal policy should be conducted by all countries with low indebtedness and where in the earlier period disciplined policies was conducted. IMF experts estimate that the fiscal expansion should provide about 2% of global GDP to avoid a significant reduction in global demand.

The Federal Reserve at the last minute halts global "domino effect". U.S. central bank has decided to make a radical at the domestic financial market. Due to the fact that Federal Reserve authorities have the responsibility of state regulators, it had an obligation to try to stop a possible domino effect. The Central Bank of the United States and its move to persuade rival investment bank, "Jay Morgan" to take part of the business of "Bear Stearns's" which was in great debt on the U.S. mortgage market, and to try to save it bankruptcy was a great surprise for those who strongly believed in free market. Such intervene of the Central Bank of the United States in the arena of U.S. financial markets has not been recorded since the thirties of last century (Vujić, 2008).

8. PROTECTING THE FINANCIAL SYSTEM

To date, no one really knows how much money is imported into a failed scheme of risk mortgage loans in the U.S. Experts are mentioning trillion of U.S. dollars. Also, no one knows for certain how many commercial banks and speculative funds around the world invested in maintaining the collapsed U.S. financial system.

It is certain that after the crisis, the redraw of financial system and the monitoring and supervision in the world has to come. Harmonization of the regulations and national policies is necessary, and to provide common rules in the recapitalization of banks as national approaches. The role of the IMF must be redrawn. It takes redraw in order to ensure timely multilateral temporary liquidity.

In order to protect the financial system a policy of fiscal expansion should be maintained but as a consequence a growth of a country's debt will occur. If the US mortgage market stabilize after the crises, what is firmly believed, an increase in the value of property taken over by the state in times of crisis can exceed the value of net debt in times of crisis. Being in the position of a recapitalization need, banks gave a significant share of the property to the state, so should gradually withdraw from ownership and return the banking sector to private hands (Petković, 2009).

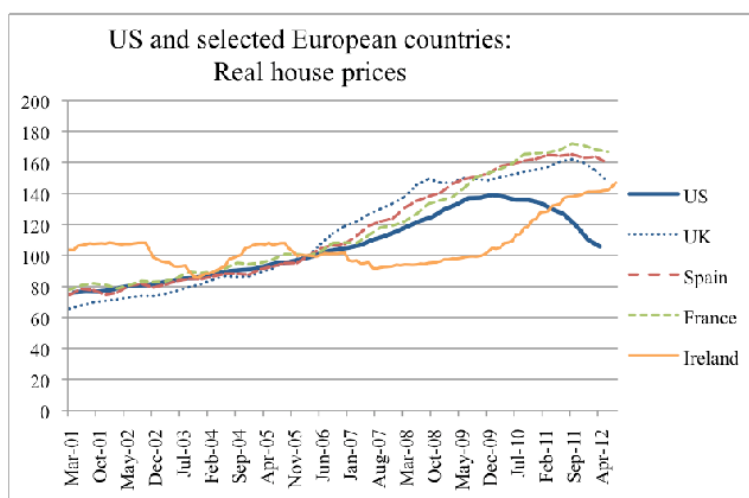


Figure 1: Real House Prices for United States and European countries: 1997 to present
("The Mortgage Meltdown and House Prices", *The B.E. Journal of Economic Analysis and Policy*, 2009)

Figure 1 shows real mortgage rates over the same time period. As real mortgage rates dropped more quickly in 2002, house prices demonstrated a commensurate rise.

Ted Forstman renowned billionaire who runs one of the world's biggest private equity firms said (July, New York Times), "We are in a credit crisis the likes of which I've never seen in my lifetime. The credit problem is considerably worse than people have said or know. I didn't even know subprime mortgages existed." (Kjelleren, 2008)

CONCLUSION

Mortgage market crisis had first attack on real estate market in the U.S. and then spread into the financial system and economy, and all of this did not occur by chance. The causes of the crisis can be found in irresponsible business policy of relevant state institutions which were supposed to control the financial markets and lack of professionalism in the work of rating agencies. Furthermore, weaknesses that existed for years in the field of financial control and regulation in the United States also made a great contribution. New situation created few very bad movements. Foreign capital started to melt; stock market indexes had a dramatic drop and there was also a lack of fresh capital.

The idea of liberalization of finance markets, giving sub-prime mortgage loans to those who had questionable credit power and who did not fulfil all credit requests with almost no regulation, caused disastrous consequences. Initial optimistic forecasts proved wrong and unjustified, and what is worst, it reflected to the whole world as the crises started to spread beyond US borders what is pretty much logical due to the fact that all parts of the world are connected and inseparable. The spreading of the crisis even hurt the economy of countries that had no direct involvement in creating this crisis.

Although the Governments of all countries persistently struggle to develop a perfect program to neutralize or mitigate the effects of the global economic crisis, it seems that the right solution has still not been found. All programs already adopted or future once are concentrated on harmonization and synchronization actions of the competent institutions, wanting to achieve harmony between monetary and fiscal policy. It is necessary to provide the required level of liquidity, economic growth and protect the most vulnerable sections of population from the impact of the crisis.

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BOT PROJECT FINANCING MODEL OF PPP: THE EXAMPLE OF THE ZAGREB PUBLIC UTILITY WASTEWATER COMPANY

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Abstract: *Through creating a public-private partnership (PPP), the supplying of goods and services traditionally provided by the public sector should be provided in the most economical way. The aim of this article is to examine ways of the BOT financing of infrastructure investment projects and to present the example of a project financial construction of the Zagreb PUC Wastewater. Research methods are content analysis and case studies. Users of this research may be more interested in the infrastructure projects that consider the application of the BOT model for financing infrastructure projects. The BOT model of PPP is a model in which the private sector finances partially (or completely) the construction and equipping of a facility, which through the use of the goods carries out the return on investment with a reasonable profit. In this model the role of the public sector is very significant, although it does not necessarily entail financial investment. It consists of providing an environment for the implementation of the project and investment, as well as monitoring and controlling services which have traditionally been the responsibility of the public sector. The private sector interest in such partnership is a commercial nature of the equity capital and services intended to make a profit. The structure of financing the BOT model consists of three sources of capital: First, the initial capital invested by the concessionaire of the project at the beginning of the establishment of a concession company, which is collected by issuing ordinary shares or payment of equity. Second, long-term debt capital, which may consist of a senior (superior) and junior (subordinate) debt, depending on the risk taken. A senior debt is covered by some sort of collateral, and is similar to ordinary bank loans with long maturities. Although it does not necessarily occur, a junior debt – as it does not fully secure – is often contracted through the sale of convertible securities with a possibility of converting into equity securities, in order to attract investors. Third, a reserve loan used as needed in case of breaking the project budget. The BOT model of PPP gives the best results in projects which are totally new investment, in cases where there is high certainty of collection services from the BOT project. Shortcomings of this model could be complex and expensive tendering procedures, the cost of private capital and a problem concerning the replacement of the concessionaire in cases of contract termination.*

Keywords: *Public Private Partnership (PPP), project financing, BOT model*

1. INTRODUCTION

In Republic of Serbia, there is a large gap between the needs and possibilities for financing infrastructure projects. This is way one of the real option is the use of a model public-private partnership. BOT model of financing infrastructure projects is one of the frequently applied model of public-private partnership in the world, with different effects application. BOT models of financing of such partnership is in the group of project financing, which is a relatively new way of financing intensively developed in recent years. The aim of this paper is to explore the basic elements of the BOT method of financing investment projects and that the example PUC Zagreb Waste Water show his method of financing in practice. Research methods are the methods: content analysis, case study.

Application of public-private partnership brings both significant advantages as well as disadvantages, having a major impact on infrastructure development, because those projects are of great value and importance to the national economy.

Data on problems in the implementation and effects that carry the largest BOT projects are mostly outside of experts. The main sources of information are the data obtained from international development organizations that support the implementation of this partnership. Lack of public information and technical serious research can dramatically affect the errors in the application of public-private partnership. Users of this research could be all interested party in the infrastructure projects that consider the application of BOT model of management and financing of public-private partnership on its infrastructure projects.

Under the Law on Public-Private Partnership and concessions (2011): "Public-Private Partnership (hereinafter referred to as PPP), is a long-term cooperation between the public and private partners with the

aim to provide financing, construction, reconstruction, operation or maintenance infrastructure and buildings of public importance and services of public interest Cooperation may be contractual or institutional. "

Partnership between public and private sector-PPP (Public Private Partnership - PPP) is created in order to obtain a project or service that are traditionally provided by the public sector. The partnership allows each sector doing what usually working best, in order that public services and infrastructure are provided in the most economical way (European Commission, 2003).

Partnership of public and private sector based on the idea that the private sector meets the needs of services and goods for the public sector, with similar (or nearly similar) competitive conditions, guiding on commercial markets. The role of the public sector remains dominant, but is more focused on the development of public services, market control and monitoring tasks. PPP is implemented by selecting the model of cooperation and private partners, which will under the conditions of competition in the markets bidders, compete with each other through transparent public bidding.

The way of cooperation between public and private sectors should change the traditional way of creating, acquiring and distributing public goods from the point of service quality and efficiency of the use of social resources, which are located within the public sector management.

This is about a systematic approach to transform ways of meeting the primary needs of society and the common use of national resources with a view to optimal ratio of the obtained use and consumption of resources. The aim is to take full advantage of the private sector can offer in terms of efficiency and economy of resource use, with the opportunity to participate or even fully finance such projects

The partnership is based on the careful building of relationships that includes a win-win strategy where both of the parties must meet their own economic interests. If it is not respected, for any reason, the realization of cooperation will not be successful. So there must be a partnership, which reflects in the existence of the efforts of both sides to find for long term economic interests, even in situations that could not be previously predicted. Maximizing the interests of only one side, almost always leads to a deadlock, and then to the termination of cooperation.

One of the basic economic needs that must be met, is the formation of the economic cost of services, covering all costs. This precondition, allows smooth cycle of reproduction of public goods and services.

By forming the economic cost of services, raises the question of existence of the population that they cannot pay for (The World Bank & Inter-American Development Bank, 2000), (The International Bank for Reconstruction and Development and The World Bank, 2005). This leads to lack of use of their services or search for ways to make this part of the population involved in a range of users. Since it is a basic existential needs of the people, it is necessary to think about the way of subsidizing the costs for this population, taking care that it is not used for the continuation of inefficient operations, which is characteristic for the previous period.

The intention of the developed world is to increase the coverage and quality of public services, as a visible indicators of increased well-being of society (The International Bank for Reconstruction and Development and The World Bank, 2005). If, in addition to intention to increase the quality of existing services, there are plans to invest more in infrastructure and development phase of their expansion, the need to finance the implementation of such projects by the public sector are becoming financially unsustainable even for developed countries. At a time when almost all countries (for various reasons) have problems with balancing the budget of the country, it is difficult allocate funds for the dynamic development of infrastructure, certainly not to the extent that we want to achieve the planned level of development.

Due to the centralized structure of government, the public utilities in countries in transition are almost exclusively performed on the basis of obtaining goods and services from state-owned enterprises. Through the development of the private sector, performs the transformation of public sector services from centralized towards market direction. This can be seen as a new emerging market for private sector in countries in transition

2. INTERESTS OF THE PUBLIC AND THE PRIVATE SECTOR FROM THE PPP PARTNERSHIP

Under the Law on public-private partnership and concessions (2011), "a project of public-private-partnership is a project that is developed, proposed, approved and implemented by some of the public-private partnerships model, and makes a series of interrelated activities, take place in a specific order, in order to achieve defined objectives within a certain period of time and financial resources, and is in accordance with this law, is approved as a project of public-private partnership, with or without elements of the concession.

What is characteristic of all models is a combination of transfers of financial and nonfinancial assets in the models. While some time ago was the dominant consideration of financing, now are increasingly analyzed and entered into non-financial elements of the character. An illustrative example of non-financial elements is the question of transfer of intellectual property on PPP projects. This transfer from private to public sector should provide greater effects on investment, which will be mostly reflected in future efficiency of investments exploitation, than the public sector has traditionally provided.

According to Guy-and-a Crauser (Director General DG Regional Policy), "The European Commission has identified four principally role of the private sector in PPP schemes:

1. To provide additional capital funding.
 2. To provide an alternative to existing management and implementation skills.
 3. To provide significant added value for consumers and the public.
 4. To provide better identification of needs and optimal use of resources. "(European Commission, 2003).
- Private sector interests are primarily related to the profit and reduction of risk in capital intensive projects.

3. BENEFITS AND COSTS OF APPLICATIONS BOT MODEL

BOT system is an abbreviation of English term build-operate-transfer - BOT), including all sub-types of this system, based on the construction or reconstruction and financing of the entire building (equipment or facilities), its use and transfer of the title to the concession grantor within the agreed timeframe.

BOT allows the private sector: construction investment, manage the work (operations) and on the basis of that generate revenues from services they charge. From the private sector is expected to bring modernization and improvements of the concept, structure and way of satisfying needs, while funding and cost-effective usage of financial resources.

The key relationships in the PPP project are determined by defining the roles of the two key groups (the grantor and the concessionaire), according to who bears responsibility for the following activities:

- Ownership of property (land, buildings, equipment, installations, etc.).
- Financing of investments.
- Method of forming tariffs
- Commercial risk.
- Provision of services through operational work and maintenance of the investment made objects, plants, etc..
- The time in which a partnership agreement is concluded.

Evaluation of the sustainability of the PPP model (Milosevic, 2009) is based on the analysis and projection of cash flows that affect the following key elements:

- Size of consumer surplus.
- Method of forming tariffs for consumers (tariff system) and certainty of collection
- Projected capacity.
- The level of exclusivity of service (there is no alternative means of satisfying the demand for services).
- The level of financial support that is derived from government and other grants.
- possibility of applying the project (land acquisition, satisfaction, environmental conditions, etc..).
- Prices of capital engaged.

BOT project can offer a lot of economic benefits (Milosevic, 2009) such as:

- Sources of financing investments in infrastructure. Special benefits can be when it comes to external sources of funding, which guarantees the inflow of foreign currency into the country.
- The government of the host country maintains strategic control over the development of infrastructure.
- Increasing the efficiency of investment and reduction of operational expenses, due to well-conceived and executed design of the system.

- Transfer of new technologies and skills, especially for the local labour force.
- Development of relations between the private and public sectors, and certain sectors of the local economy, which appear as sub contractors on the project
- Development of local capital markets, by increasing the volume and financial instruments which may occur in the domestic market

Also there are costs related to the implementation of BOT model (Milosevic, 2009):

- Costs of the tender procedure.
- Consulting services costs for the host government, without sufficient knowledge and experience in negotiating and implementing the model.
- Cost of capital commitment, due to the risk premium, the issuing of collateral and the like.
- Approved an increase of costs of public service, becoming the costs of end-users.
- The increase in material prices due to rising demand initiated by the investment company.

4. FINANCIAL STRUCTURE OF BOT MODEL

BOT projects are mainly financed by foreign sources of funding accessed by the concessionaire, according to their solvency and the situation on international financial markets. At the time of concluding the contract on financing of the project, the concession company usually does not have sufficient assets that could be pledged. Everything is based on an assessment of yield capability of the project and the conditions of placement sources of capital that is partially or not at all covered by assets, which are only created through the investment cycle of the project. Also, PPP projects are not commercial, in the practical mining, and cannot easily find new customers for the concession company, if the existing funders plan to withdraw from the project.

This certainly implies a significant risk, which bears any capital which is involved in financing the project. Attitude to risk is essential for the initiation of investment and thus for development. United States, for example, various tax measures are taken in order to stimulate investments in capital investment projects.

For the determination of financial structure there are the three key elements that must be considered by financiers:

- Financial sustainability of the project. The level of (security) of profits generated by the project.
- The reallocation of profits between the stakeholders.
- Assessment and Allocation of risk among participants in the financing.

Structure of sources of capital used to finance BOT project (Milosevic, 2009), depending on the amount of risk taken, consists of three sources:

- **Equity.**
- **Debt capital (Long-term borrowed capital).**
- **Stand by capital (Capital reserve).**

Equity is usually provided by a sponsor or group of owners of the project, bearing all the risk on the project. It is engaged at the beginning of the project during the establishment of the concession company, which carries the concession. And upon expiration of the concession contract is drawn. Besides the sponsors who are dominant in this form of financing, the opportunity to invest in this type of capital is being given to other significant participants in the project (the main contractor, provider, supplier, etc.), in order to gain security that they will not lose business interest to be engaged in the project. Initial capital is being paid to the founders, with the realized gain or loss only after the payment of all obligations of the concession company at the end of the concession. If the project is well established residual value of the project is significantly larger than the funds invested in the capital. If the project realizes losses, then they have to be offset from the capital. So this kind of capital carries the greatest risk and so the losses or gains from investments in this type of capital, are the largest on the project. The interest of the sponsors of the project is that this part of the funding of the project is as little as possible represented in the funding structure. Initial capital may be well below the 20 to 30% depending largely on how creditors estimate that the project is defined, what the guarantees are given and what is quality management project.

Debt capital (Long-term borrowed capital) that may occur as:

- **Parent Debt (senior debt).** It represents medium-invested debt capital that is covered by some provision of the instrument collection. This type of capital requirements raises the largest net inflows from

future exploitation of the project. If the future net inflows of the project are not sufficient or have a significant risk, according to the Lender (creditor) estimation, then additional guarantees from the founders and sponsors of the project are required. Instalment loan payments must be made regardless of whether the project produces results or not. The deadline in which this type of debt is placed is (mostly) the medium, with (usually) agreed fixed interest rate. This is the kind of debt that is returned after the first operation. From the perspective of the founders of the concession company, this is the cheapest kind of capital, in terms of price, if it is contracted with a fixed interest rate and predefined instalments. The founders will tend to increase it to level that creditors accept. From the standpoint of lenders, rational relation with respect to the risk and ways to ensure payment will be required.

– *Subordinated debt (junior debt or Mezzanine capital).* Long-term invested capital, which has a significant collection risk, partly because there is no security or it, is partially secured from payment risk. Because it is located between debt and investment (basic) capital, it is called Mezzanine Capital. It is paid only if there are funds for payment. Here we paid the debt for a longer period than is superior long. Because of the significant risk taken, the interest is higher than the superior debt. The motive of the project sponsors to acquire equity in this way is the distribution of risk to a number of interested parties (stakeholders) on the project. This means that if the project generates sufficient amount of cash, a portion of profits will go to the payment of subordinated debt financiers. Failure to realize expected profits will cause that interest will not be paid, or in worse situations, even the main part of the subordinated debt. To attract investors, however, this type of capital is raised with an additional possibility for investors to convert subordinated to initial capital ("equity kicker"), whether the conversion is more favourable to investors, or because there is no possibility for payment, and are forced to awaiting completion of the project and the calculation of net value of the project. In some cases vendors are included in the project financing, through mezzanine finance, converting their claims into Mezzanine finances. This type of financing provides greater elasticity of the project company. The essence of the idea is sharing the risks of the project and giving up part of the profits, in order to cover risks through the price of the capital.

Capital Reserve (stand by capital). The role of this type of funding is to provide funds to start the project for possible funding overruns (perforation) of the budget or cash flow mismatches. At the time of contracting it is not known the moment or whether it will be in general use. It is reported separately in the balance of the project (depending on whether or not used). It is engaged as debt capital and is usually part of a contractual relationship with a superior debt. If is not provided at the time of contracting senior debt funding, it will be difficult later to find the source of funding when the project budget has already broken. In this case, the project sponsor must either finance the budget penetration or seek financing source under considerably worse conditions than they were at the beginning of the project.

In practice, financial structure has not necessarily have subordinated debt in their financing. Due to the significant amount of resources required and risk allocation agreements on joint funding of more investors are common. In making such a joint agreement among investors, consortium of financiers of the project is formed.

International development organizations such as the World Bank, EBRD, etc. can occur as co-investors, or initiate the formation of a consortium of large investment projects. Especially in projects which have significant effects on the development of the country and generate an adequate profit, which may cover the cost of financing.

The role of international development organizations is double. Besides participating in the financing of the project, they reduce the risk of lending through its rigorous control and thus motivate other investors to join the consortium and the project co-financing. Their role is not to appear as competitors to private capital, but rather create conditions, stimulating the private sector to be engaged in investment projects

5. FINANCIAL INSTRUMENTS USED IN BOT PROJECT

The most commonly way to obtain the initial *equity capital* is emission of ordinary shares or the equity provided by sponsors.

For superior debt, are used bonds or contract of superior credit with some kind of collateral, such as a mortgage or bank guarantee provided by the founders of the concession company.

For *subordinated debt*, it is used the equity that has no security. This is source of capital that carries a significant part of the risk, thus the profit carries risk as well. The instruments are:

- securities convertible into ordinary shares (common shares),
- preferences shares,
- bonds
- subordinated loans
- high-risk bonds (junk bonds)
- slightly less options and warrants (options, warrants).

Financial policy must take into account the circumstances in which the project takes place, the lack of property that is truly a commercially marketable thus reducing the possibility of market sales and the provision of investment.

Assessing the financial sustainability of the project is based on an assessment of the net discounted cash flows and risks of their realization. For this reason it is necessary in the financial policy to consider the following questions:

- Minimization of own funds in the form of capital.
- Maximize the long-term funding.
- Arranging fixed interest rate for the capital employed.
- Risk assessment and means of refinancing.
- Assessment of ways of motivating means of refinancing

In the BOT project financing not only additional guarantees (from the host government or sponsors) are required, but the solvency of the project sponsor (the founder of the concession company) is an essential element of the whole structure. Project sponsor should by its own creditworthiness and by transfer of the risk offer limited possibility of recourse, to the level of investment (its) assets. The very capital value of constructed facilities is secondary, because it actually has an extremely limited ability to be resold to third parties. For its part, limited recourse in the form of investment project sponsor provides some assurance and confidence to lenders that the project sponsor seriously approached the analysis of the project.

Government may finance the project from their independent sources. In cases where there is a shortage of financial resources to requirements, many projects have to wait for the time for implementation. In doing so, it can make a significant opportunity cost of not using additional sources of funding. BOT project does not require an implicit obligation of the host government to participate in co-financing the project. This may be important in certain cases when you need to improve the country's credit rating and sustain political stability in the country. Although it is not usual for the host country government to issue guarantees for equity, it may occur as a guarantor for certain aspects of risk. On the other hand, governments may seek performance counter guaranty. Return on equity, which lenders are expecting, is higher than the host governments are usually able to pay for funding. On the other hand, transfer of technology, the concept of cost-effective, efficient operations can add the benefits of private sector participation in financing, which in a way; create balance with the increased cost of capital commitment. As for creditors, they carry a significant risk to their investment, due to the length of implementation.

6. SOURCES OF FUNDING ON BOT PROJECT PUBLIC UTILITY WASTEWATER ZAGREB

Project wastewater treatment plant in Zagreb city is the first project for water utilities and waste water treatment plants in Croatia (Zagreb wastewater PUC, 2009) and one of the few in Balkan. The project allows the city of Zagreb wastewater treatment according to EU standards. The project envisages the construction of approximately 10 miles of main sewer, with approximately 5.5 km modification of the main drainage channel and construction of the pipeline bridge across the Sava River.

The value of the project is 288 million EUR which is invested in municipal water supply and sewerage services, for the population of the region Zagreb. The drive has a capacity of approximately 1.5 million users, it is estimated that this is projected needs of the city for the next 28 years.

The borrower (the first instance debtor) is a specialized Waste Water Public Utility Company Zagreb (PUC). PUC occur on the project in the role of main contractor and project manager during the construction phase. According to the contract, PUC took over the commercial (operational) and administrative tasks during the operational phase and the maintenance of buildings and equipment.

After completion of the entire tendering process, consortium of RWE, Aqua and SHW were selected as the best providers in 1999. The concession contract was signed with the consortium as the concessionaire in December of the year 2000. As Grantor appeared the city of Zagreb. Here we use the net retained profit realized on the project, as one of the key sources of funding.

Table 1: Sources of funding in the use of BOT Project Water Zagreb (Ruhe, 2007).

Use	million EUR	Sources	million EUR
Capital and other costs	209	Equity	38
Working capital	19	Internally generated cash	99
Financial costs	54	KfW main tranche	101
Taxes	6	EBRD main tranche	50
Total use of cash	288	Total sources of cash	288

Table 2: Structure of sources of funding in a PUC-BOT project (Ruhe, 2007).

Description	Conditions
The value of superior EBRD loan	55,2 million €
Grace period	Six year
Interest	The average six-month EURIBOR plus a margin.
Guarantees	Security: Includes security over ZOV's assets, bank accounts, insurance policies, receivables, pledge of the Sponsors' shares in the Company, Direct Agreement with City, Construction guarantee, Sponsor funds guarantee.
Co-financing: Kreditanstalt für Wiederaufbau (KfW)	110 million €

Contracted amounts of credit EBRD (55.2 million €, and KfW € 110 million) were higher than was predicted in the financial structure of the project (the main tranche of the EBRD and KfW E 50 and € 101 million) for the amount of capital reserve which was covering the potential amount of breaking the project budget. Reserve capital is financed under the terms of senior debt and at the moment when contracted the entire financial structure of the project. Subsequent contracting conditions of breaking the budget of the project, when project spend significant resources, is incomparably more difficult and demanding task, which is certainly reflected on the cost of capital engaged.

7. CONCLUSION

BOT as an investment project must be profitable in order to be acceptable to both parties. BOT model of PPP projects that private capital is fully or partially funded by, does not debit the public expenditure. The role of government is crucial in ensuring the necessary conditions for the project.

The costs of public procurement and the cost of private capital engaged, represent a significant position in the cost structure. Greater efficiency in use of private capital needs to compensate these costs. Its ability to finance infrastructure projects can have a multiplying effect on national development, provided that the state ensures conditions for competitive bidding.

This model shows the best results when it is completely new (green field) investment, and bad results in cases of applications in systems with low efficiency of collection of receivables from utilities, because the public sector has a better system of enforced collection than it can provide private sector.

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FORMS OF FINANCING MERGERS AND ACQUISITIONS

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Abstract: *This paper describes the problems of choosing proper form to finance mergers and acquisitions. Companies that consider integrations must perform serious analysis of the potential partner, but also examine their own performance, in order to find the best mode of financing. They should consider results achieved in the past, current value of the company or its shares, but they should also estimate potential future effects of integration and its synergy. A decision will be determined by these factors, and here are presented the main characteristics of these forms and their risks. The chosen form of financing can greatly influence the post-integration effects, both in the buyer company and in the target company and therefore this problem should be considered seriously before signing a contract.*

Keywords: *mergers, acquisitions, financing, cash, shares, bonds*

1. INTRODUCTION

An increasing number of mergers and acquisitions imply that integrations have become very popular form of restructuring. Integrations should enable participants to appear in new markets and thus lead to increased production and better competitive position. Merger represents a combination of two companies where the integrated company ceases to exist. In this case, the company that carried out the integration takes over the assets and liabilities of the acquired company. On the other hand, the acquisition means taking control of another company, its subsidiary or its specific assets. (Gaughan, 2004) It can be achieved by purchasing shares or assets of the target company, and the buyer becomes major shareholder, while integrated company that is merged may cease to exist. Important issue includes determining either the deal is a merger or an acquisition. If it is an acquisition, buyer must provide an acquisition premium because of control loss of target company's shareholders. On the other hand, if the deal is structured as a merger, these companies remain equal, so no premium is required since neither one loses control, or because both sides equally do. (Moeller & Brady, 2007) It should be pointed out that mergers or acquisition are not easy to accept as a solution, because they usually require a large sum of money that should be paid in a short period. The problem may arise in obtaining the money, and, unlike the internal development, in this case there is no possibility of sharing risk into several stages.

The main reasons for carrying out all forms of integration are diverse. The company can expand its area of operations by combining with a company that is engaged in another activity, and in the same way it can ensure its appearance on some new markets, where it had not operated earlier. It is often faster and more efficient way of growth but carries greater risk and uncertainty. However, many different forms of payment can be used in order to complete the acquisition process, and each of them brings a different view on integration process. (Krivokapić, Dulanović, & Jevtić, 2008)

2. FINANCING MODALITIES

The most commonly used forms of payment include exchange of shares or payment through money. The payment is often completed through the combination of these two forms, which means partial payment in shares, and the rest in cash. Also, the transaction can be paid by the bonds of the overtaking company, which brings benefits to the shareholders of the target company. In practice, large acquisitions and mergers are usually completed through the share exchange.

Financing through stock exchange

As noted, large integrations are usually financed by an exchange of shares between companies involved in the agreement. In that case, the buyer (The Company A) makes an additional issue of shares in the capital market, and transmits them to shareholders of the target (The Company B). (Ćirović, 2004) The target company has two alternatives – it can keep the acquired shares, and thus become shareholder of company

A, but it may also sell those shares on the financial market, and thus obtain the money which can be further invested.

A question of compensation can be very delicate. This analysis is based on the current stock price of company shares. It is logical that The Company A should pay for the shares of The Company B more than they really are worth on the market.

If we assume that the price of The Company A's share is 20 €, and The Company B's shares are worth 6 €, then, respecting the relations of market prices, shareholders of The Company B should receive 6 shares of A for its 20 shares. However, as already noted, the agreement is achieved as The Company B receives a fee for the transfer of its shares, so the relation between these shares can be defined as 2:1, for example. It means that the shareholders of The Company B should receive 10 shares of The Company A in exchange of its 20 shares. Thus the agreed course brings benefits to The Company B.

But defining this course is not a simple act. In fact, if it is estimated that acquisitions will not make (or will make very little) added value, then the relation will be the same as the relation of the current market prices. (Ćirović, 2004) However, companies usually enter such transaction in order to achieve significant added value, so the calculation is mainly based on that assumption. Redistribution of this added value depends on several factors, but it is mostly affected by the perception of future synergies achieved through the integration process, and negotiating power of those companies that should sign the agreement. It is not rare situation that The Company A insists on the implementation of such integration, even though it's aware that it overpays company B's value. This can lead to the situation that even more than the additional value is transferred to the shareholders of The Company B. Of course, this can cause large consequences for The Company A. However, if the share capital of The Company A is much larger than the share capital of The Company B, then the transaction will have no impact on the market price of its shares. On the other hand, a series of similar acquisitions will lead to the same effect as if one large is made. This can lead to the rate decrease of The Company A.

Financing through cash

The Company A may use cash in order to finance the acquisition. This money can be obtained in several ways: (Ćirović, 2004)

- Most often it comes from retained profits from previous periods. These funds can be used to finance ventures in the company, or to carry out acquisitions.
- Further, the inflows of money can be generated through the sale of the company's parts. The Company A provides money that can use to pay its obligations to the shareholders of The Company B. This is useful because The Company A thus divests segments it doesn't need any more, or those that have inadequate rate of return on capital.
- Finally, a company can come up with the cash by selling its bonds in the financial market, or by borrowing the money from banks. In this case the structure of liabilities should be concerned, because it increases the debt in comparison to equity.

Payment by bonds

Payment by bonds is quite rarely used, especially in comparison to the previous described types of financing. In this case the shareholders of The Company B do not receive any money or shares, but bonds of The Company A, in exchange for their shares. This is not the same as if The Company A broadcasts its bonds and sells them on the securities market, and then uses that money to pay for the acquisition of B. The Company B will accept payments through bonds only if The Company A has a high rating, and if the interest rate is appropriate.

It happens that The Company A issues convertible bonds and then passes them to the shareholders of The Company B. These bonds can be converted into ordinary shares at a predetermined conversion rate, but only if this option is used by a certain deadline. This conversion will occur if the market price of The Company A's shares is greater than the established rate. Otherwise, the conversion will not occur, but shareholders will retain the bonds, and earn from interest rates.

Earn-out model

This model is usually applied on medium-sized acquisitions, those that include companies which are not registered on the stock exchange. The evaluation of such companies is difficult, because they do not have formed stock price. According to this method, the financing is done with deferred payment, where the value of acquisitions depends on the performance of the acquired company. Income generation has specific and important role in this model. (Galpin & Herndon, 2007)

Let's assume that The Company A wants to make earn-out acquisition of The Company B. At the moment of reaching an agreement, this company will pay, for example, € 10 million. Also, it is estimated that during the next 4 years The Company B will gain profits before tax, respectively, € 2.5 million, € 3 million, € 3 million and € 3.5 million. The participating companies shall conclude an agreement that The Company A will pay to The Company B at the end of the fourth year, for example, triple the amount of profit surplus above € 2.5 million.

Therefore, the maximum earn-out payment for the period would be:

$$3 * (0 + 500,000 + 500,000 + 1,000,000) € = € 6,000,000$$

this means that the total payment was €16,000,000.

However, if The Company B does not achieve the projected profits, the residual part of the acquisition cost will be revised downward. This model is quite used in many developed countries, and it is reported that about 20% of medium-sized acquisitions in Germany include some earn-out elements.

3. THE CHOICE OF FINANCING MODE

The choice of financing method is determined primarily by economical motives and effects. In fact, if you look at the two major forms of payment, then you might conclude that the paying with shares brings the risk of value change at the moment of acquisition, in comparison to the moment of concluding the agreement, while the payment through money does not include that kind of risk. This interval is typically a few months, so the change of stock price is possible or even expected. If the payment in cash is agreed, there is no such a doubt. However, given the fact that nowadays the acquisitions are mainly carried out through exchange of shares, the problem becomes more and more complex.

Of course, there are different interpretations of the reasons why the company decides to choose one form of financing, instead of another one. Thus, if The Company A offers to pay in cash, then it bears all the risk, in case its shares drop on the market. This is interpreted as a sign that the company has a very great confidence on its business and acquisition, and expects the growth of shares. On the other hand, if the offer involves a payment in shares, the market accepts it as an indication that the leech does not have enough confidence in the sustainability of its shares price, and therefore wants to share the risk.

However, payments through shares may imply two completely different alternatives. Thus, the buyer can offer fixed amount of stocks for stocks of the target company, and in this case the target company takes the risk of share prices fall. The second option implies that the bidder offers a fixed value of stocks, so in case of prices fall, the target company cannot be harmed. This case looks like a cash payment, but differences occur after the arrangement is completed.

The risk of price change is related to the fact that The Company A almost always pays for The Company B more than what it is really worth. The premium is usually between 30 and 50%, and often higher. Its justification is in expectation that the acquisition will create a synergy that will affect the profitability of the participating companies. However, it could be doubtful whether the premium will be sufficiently covered by these synergetic effects. In fact, in all cases of overtaking The Company A must offer some benefit through a good price, so that the shareholders of The Company B are motivated to take part in the acquisition. This can result in attracting some other interested competitors, so The Company A might be forced to improve the offer. If it is really keen to make acquisitions, they it will pay even a price that is higher than the objective one, making a loss and hoping that the effects of integration will quickly make amends.

Besides, the market price of the company generally does not reflect only its current but also future business performance. (Weston, Siu, & Johnson, 2001) Since the premium includes improved operations, it is expected that the effects reflect also the current share price.

4. MAKING AND EVALUATING OFFERS

The company that wants to acquire the other must consider several criteria in order to choose the form of financing. First of all, it observes the price of own stocks and estimates whether they are undervalued, realistic or overvalued. (Ćirović, 2004) If they are undervalued, then it would be better to implement the acquisition through cash, which can be obtained in various ways (by selling parts, borrowing, selling bonds, etc.). In any case, it would not be a good decision to continue with the issue of shares, because they would be offered at a price that is lower than their actual value. Otherwise, if the shares are overvalued, then it's advised to perform a new issue, and conclude the transaction on the basis of newly issued shares.

The other aspect that should be considered is the evaluation of the expected synergies effects. If the company finds that the risk is significant, the integration should be completed through the acquisition of shares, as this reduces the risk. The market assesses this as a signal that the company is not sure of the effects, or that its shares are overrated. If the buyer, however, finds that the projected synergies will be achieved, then the transaction should be financed through the money.

Finally, the buyer should assess the market risk of its shares, for the period until the completion of the transaction. If it is low, then the acquisition should be completed by paying in cash or by exchange of shares with a fixed value. Otherwise, companies will seek to finance the acquisition with a fixed amount of shares, thereby shifting the risk to the target company. However, the question is whether the target company will agree on it, because it is aware that this kind of deal involves the transfer of risk to its side. Usually, it will agree only if the bidder is a company with a high credit rating and reputation, especially if the premium is high enough. Also, the target company can accept payment through a fixed amount of shares, but can also require establishing a lower limit price, which should prevent a large decline. In such situations the upper limit is often determined, because there is a possible increase of price, so the buyer wants to protect itself from potential losses that could be made in this case.

5. CONCLUSION

Depending on various factors, companies prefer a particular form of financing integration. Each of the described models provides some benefits, but also different levels of risk, and therefore every company involved in the agreement must provide very detailed analysis of the process. Many data from different periods of time are considered, in order to find some trend of these companies' value, and to predict effects of integration so that the appropriate funding can be arranged. (Dulanović & Jaško, 2007) Assessments are carried out both by the buyer and target companies, and these results could define the conditions of the contract. The target company should assess whether the offer is acceptable to potential acquires. Assessment begins with a consideration of the premium that the bidder provides, as well as through the evaluation of expected return on investment. Company management should assess whether such a return can be achieved if the integration is being refused.

Besides, it is necessary to consider the effects of partnerships in post-acquired company, given the fact that the target company's shareholders will become shareholders of the bidder in fact, if the payment is made through the stock. It is common interest to really achieve the projected synergies, because everyone loses otherwise. Therefore, the target company must also carry out the assessment of potential synergies, because it is normal that its shareholders share the effects of future business, both positive and negative.

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MINORITY SHAREHOLDERS RIGHTS IN THE REPUBLIC OF SERBIA

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Abstract: *Minority shareholders have a significant role in the growth and development of the market, and represent the basis of marketability and market relations, especially in the countries in transition. The place, role and importance of minority shareholders are particularly evident if corporate governance is taken into consideration, and consequently, the efficiency of markets. A clear definition of the position and the rights of minority shareholders in the institutional regulation is a particular challenge in the process of analysing the mechanisms for protecting the shareholders. The subject matter of the research presented in this paper is the analysis of the position and degree of protection of minority shareholders in the Republic of Serbia. The research methodology involves the use of methods of analysis and synthesis with a special emphasis on comparative analysis, and methods of induction and deduction. The aim of the research is to gain specific knowledge about the position and possibilities of the protection of minority shareholders' rights in the Republic of Serbia with a special focus on corporate governance and institutional regulations. The research is important for both academic and professional audience, and even more for the policy makers in the Republic of Serbia in the field of minority shareholders protection. The results indicate that it is important to have an adequate regulatory protection of minority shareholders, and also point towards the necessity of employing specific measures and instruments in order to improve the position of the same.*

Keywords: *shareholders rights, minority shareholders protection, shareholders disputes, corporate governance, transitional countries*

1. INTRODUCTION

The issue of minority shareholder protection is an ever present question, both for the developed and for the transitional economies. A legitimate dilemma arises; namely, how to define and who to consider a minority shareholder? Is a minority shareholder any shareholder of a company who owns a package of shares by which majority control and decision making is not acquired, or the term refers to a group of shareholders who, when joining their shares, do not have the majority to manage a company? Therefore, it is obvious that, when defining the concept of minority shareholders, it is possible to talk about the concept in a broad and a narrow sense.

For developed economies it is typical that minority shareholders are better informed, as well as better organized; and consequently, the impact of minority shareholders on the company's business processes is felt more significantly. Transition economies, on the other hand, are characterised by a relatively low level of market awareness of the minority shareholders and their weak self organization, and consequently it is possible to manipulate with the minority shareholders rights. In that sense, it is always an issue of who should be concerned with the minority shareholders rights: the state in a systemic way, by acts and regulations; or is it necessary to enable a greater level of awareness and education of minority shareholders themselves, with the expectation that the consequences of their actions be a more efficient organization?

This issue is particularly important for the transitional economies and markets; these being institutionally incomplete and sub-capitalized markets in which ownership transformation processes have not yet been fully completed, and where there is a significant degree of market inefficiency. All this often results in a subordinate, inferior position of minority shareholders in the companies, which is mostly manifested through an insufficient level of awareness about their company's operations, insufficient involvement in the management of companies and in the decision making related to the number of shares held, and the like.

The subject matter of the research presented in this paper is to define, analyse and research the position and rights of minority shareholders on the market, with special emphasis on the Republic of Serbia, with an aim to reach concrete conclusions about the state of affairs in the studied area, and to propose a series of concrete measures and instruments in order to overcome these operational challenges.

If the current state of affairs is analysed in the transition markets, it can be seen that there is a considerable volume of information and news about the minority shareholders rights; also, the desire to enhance these

rights is continuously proclaimed. However, the facts and the real state of affairs point to a different situation. Namely, as changes on the transition markets become more intense, more manoeuvring space opens for endangering the status and rights of minority shareholders. This paper intends to draw attention of the professional and a much broader audience on the importance of minority shareholders protection in transition economies, because it is in this segment that the level of democratization of a society can be indirectly observed.

In this sense, one of the currently most endeavouring market challenges is the issue of minority shareholders protection, more precisely the issue of clearly defining the shareholders' rights and obligations in the system of market corporate governance. The Republic of Serbia, as a typical transition economy, does not significantly differ from other transition markets. That is the main reason why the following research emphasizes the status and rights of minority shareholders in the Republic of Serbia.

The paper is structured as follows. The introduction defines the basic elements of the study and reviews the studied problem. The second part focuses on theoretical assumptions and provides a review of previous relevant research in the area, as well as provides a review of the institutional regulatory arrangement position of minority shareholders, with a special focus on the Republic of Serbia. In the third part, the paper analyses the current situation, presents the concrete measures and instruments aimed at improving and promoting the position and rights of minority shareholders in the Republic of Serbia. In the summary, concrete conclusions and directions for further research are given.

2. THEORETICAL REVIEW

Defining, planning and a clear commitment to minority shareholder position in the market system of corporate governance are vital for the successful functioning of any economy. One cannot imagine an efficient market and an efficient economy, without a clearly arranged, well-defined position of minority shareholders. The essence of corporate governance, i.e. one of its main pillars, is exactly a clearly defined position of minority shareholders on the market. That is why in all market economies, the status, rights and responsibilities of minority shareholders are regulated systematically, with a relevant set of laws and regulations. A contemporary view of corporate governance cannot be implemented without considering the important phenomena and relationships that are suggested by the practice of developed countries. These are the rule of law, institutional development, and definition of corporative relationships by contracts, protection of property rights, managers' discretion, and the like (Vignjevic-Dordevic, 2010).

In this sense, one can notice certain differences in the approach of defining the position of minority shareholders on the markets of developed countries and the markets of countries in transition.

The term minority shareholders means the minority in equity and voting power; minority also implies that some shareholders – for various reasons, – did not vote for a particular decision accepted by the majority of the board, which triggers some specific rights provided by the law. Minority in capital, in the case of dispersed shareholders (as is often the case in the Republic of Serbia), is often majority in number (Paunovic, 2005). The status of minority shareholder is acquired by shareholders who own at least 10% of any shareholding company which was privatized in the last decade. In companies, where shareholders are not joined voluntarily, especially during the privatization process, an individual shareholder feels unprotected from the administration, the majority shareholders and institutions. To protect themselves, shareholders often join, hire consultants or rush to sell their shares on the first trading day on the stock exchange (Grubin, 2006).

In developed countries, the position of minority shareholders is clearly systematically arranged with a set of system laws, legal acts and regulations. The institutional framework governing the position of minority shareholders is all-inclusive and rather complex due to the fact that the issues of minority shareholders protection have an impact on all aspects of business activity. The legislation – regulating the position of minority shareholders – in developed economies has a long history, a natural evolution and a set legal way. This primarily includes a set of laws regulating the financial markets, financial instruments, the participants and technologies; it also includes the laws governing the economic and legal status of companies, corporate decision-making and responsibilities, as well as a set of legal acts governing the rights, obligations and responsibilities of both the minority and the majority shareholders.

The analysis and research of the issue of minority shareholders protection in transition economies is particularly interesting. These economies are characterized by highly dynamic, propulsive business

conditions, by less efficient (often in particular aspects even inefficient), and an emerging market, lack of market transparency, lack of corporate responsibility, unharmonised regulations and the like. All these facts have resulted in an often unequal, inferior position of minority shareholders on these markets. In this sense, many authors deal with issues of minority shareholders protection on these markets, attempting to suggest concrete measures in the form of different solutions in order to improve the position of minority shareholders on these markets.

Bearing in mind the investment processes under modern market conditions, it is necessary to consider how the degree of shareholder protection affects these processes. At the macro level, shareholder returns are higher in countries that, comparatively speaking, have less protection of minority shareholders, i.e. their rights and interests. At the micro level, companies with dispersed ownership (on average) have higher rates of return in accordance with organizational changes and by creating additional value in these companies (Christian, Betzer & Weir, 2007).

The role of shareholder activism is especially important when shareholders decide to retain ownership of the shares, and when they initiate changes within the company (without any changes in control). These investors can initiate reforms in the company by negotiating with the senior management (or board of directors) or by making proposals at the annual shareholders' meetings. Also, it can be concluded that the "shareholder democracy" is in correlation with the activities of minority shareholders, i.e. it represents the framework for the design and further development of regulations in the function of minority shareholders protection (Mallin & Melis, 2010).

The key obstacle to further growth and development of many emerging markets is the lack of regulatory protection of minority shareholders, especially in the case of company takeovers. Studies point to a lack of regulation in the given area, i.e. to a correlation between the lack of regulation and the high concentration of ownership, market illiquidity and the low level of the development of the capital market in transition economies (Parisi, Mathur & Nail, 2009). For the development of financial markets it is necessary to raise the level of corporate governance and minority shareholders protection (Pavlovic & Muminovic, 2010).

By providing protection to minority shareholders, the interest in founding capital societies increases, and so does the level of investments, i.e. the undisturbed acquisition of shares. Investors are attracted by providing adequate protection for minority shareholders, the abuse of majority rights is prevented and the principle of shareholder equality is established which is proclaimed and accepted in all legal systems (Knezevic, 2008).

The above-mentioned points to the actuality of the investigated area apply particularly in the case of transition economies and with a special emphasis on the Republic of Serbia.

3. MINORITY SHAREHOLDERS RIGHTS IN THE REPUBLIC OF SERBIA

The issue of minority shareholders protection on the territory of the Republic of Serbia and the enforcement of their rights is particularly interesting, considering the fact that the Republic of Serbia is in the so-called 'second phase' of transition, when the completion of the property-ownership transformation is expected, accompanied by the completion of the institutional frameworks; and thus the transformation of the Serbian market into an efficient market is expected. It seems that many challenges await the Republic of Serbia on this path, and this work is an actual attempt to provide quality information and propose concrete measures to accelerate the successful completion of transition reforms for market policy makers in the Republic of Serbia; and the effects will be largely felt in the field of improving the position and the rights of minority shareholders in the Republic of Serbia.

A characteristic of all transition economies is the relativization of the concept of the market and marketability in general, a presence of an insufficient level of ethics and morality on them; furthermore, a pronounced "thirst" for profit – no matter from which sources and regardless the costs, – an often incompatible and inharmonious regulations, low levels of market efficiency, etc. The results of all these circumstances are felt in significant market turbulences that contribute to an undefined position of minority shareholders on these markets.

A particular problem in the field of minority shareholders rights protection is the lack of knowledge about the area, the manipulation with market information and the ever-present desire of major capital holders for controlling minority shareholders. This situation has been a constant and significant source of conflicts on the

relation between major capital - minority shareholders - the state; and meanwhile little has been done to create real prerequisites for overcoming these conflicts.

The regulations in the Republic of Serbia which either directly or indirectly affects the minority shareholders rights are:

- Company Law,
- Law on the Capital Market,
- Law on Takeover of Joint-Stock Companies,
- Set of laws regulating privatization and the distribution of `free shares` to the citizens.

Analysing and researching the norms and standards contained in these regulations, it can be realized that they are often contradictory, insufficiently clear and reasoned, all of which having an effect of creating a large enough market space for possible abuses in the protection of the minority shareholders rights.

According to the norms governing the takeovers of shareholding companies and forced sales – the buying of shares in fact are not directed in the same direction. In the Law on Takeover of Joint-Stock Companies the emphasis is placed in particular on protecting the minority shareholders rights during the takeover; while according to the new Company Law, the scale of acquiring the possibility of forced buying/selling of shares has been reduced from 95% to the newly adopted 90% . This solution is quite uncommon and creates space for doubts, because there is a possibility that should an individual shareholder acquire 90% plus one share of a company, may buy the remaining approximately 10% of the shares of that company without further objections. This sends a very clear signal to the market about the glorification of the major capital in relation to minority shareholders, i.e. the small capital.

The question is still open how the activities considering the distribution of `free shares` to the citizens of the Republic of Serbia will be realized, and in what manner the citizens will be able to practice the rights given to them on these grounds.

All these circumstances directly contribute to an unstable corporate climate in the Republic of Serbia, and also strengthen the conflict between minor - major shareholders, with no clear commitment of the state to the how-to and the future directions considering the realization and protection of the minority shareholders rights in the Republic of Serbia.

Considering all the above mentioned, it is reasonable to propose measures, mechanisms and instruments whose implementation could improve the position of minority shareholders in the Serbian market and increase their rights. These mechanisms should be systematically targeted and coordinated towards several key directions.

The first group of measures should be related to the creation, modification and compliance of laws and regulations, particularly in the areas regulating the functioning of companies, the financial system and the market in general. By research it has also been found that the current institutional framework to some extent is adequate (but not significantly), and that in most cases, there is a need to further work on its change and modification. The greatest absurdity stems from the knowledge that often a good idea cannot be realized in practice because of inconsistencies between the regulations themselves. This is a job that can be performed relatively fast, and by the implementation of these modified measures, healthy conditions for the protection of the rights of all shareholders (especially the minority shareholders`) could be established.

The second group of measures should be aimed at strengthening the monitoring of market participants. In this regard the supervisory organs and institutions should be given a great importance, in order to prevent any possible abuse immediately.

The third group of measures should relate to a wide range of educational activities of the widest population, in order to let each individual become acquainted with all the existing opportunities one has as a shareholder. This is very important, especially due to the fact that all adult citizens of the Republic of Serbia are entitled to obtain the so-called `free shares` from the state, and it is important to let them know what is in their possession in fact.

The fourth group of measures should be aimed at harmonizing the system of market and media information, in order to avoid failures that might occur in the sphere of public information on important elements of

corporate governance, on the state of affairs in market opportunities, and therefore on the position of minority shareholders.

All of these measures must be implemented together, mutually be adjusted and synchronized, because that is the only way to accomplish the desired goal, which is achieving a considerable level of protection of minority shareholders' rights in the Republic of Serbia.

4. CONCLUSION

Bearing in mind all the above elaborated, a logical question arises of what to further do, in which directions to develop corporate governance and corporate responsibility in the Republic of Serbia, how to further guide the development of market relations and market trends through the prism of minority shareholders. The proposal is to do several activities simultaneously. Further development of laws and regulations strengthening the position of minority shareholders must be carried out, especially in the sphere of information and protection of the rights and obligations. It is necessary to strive towards the improvement of the investment climate in the Republic of Serbia and attracting foreign capital, because it is the only way to present the spirit of modern corporate governance in the Republic of Serbia. A continuous and systematic education of the population on shareholding, markets and corporate governance is also essential and must be significantly strengthened. The monopoly of certain state institutions is necessary to be reduced by systemic measures. Also, the question of the flow, exchange and protection of privileged information must be further regulated.

Taking everything into consideration, it can be openly concluded that the Republic of Serbia – considering the field of minority shareholders protection – is not high on the list of countries, and that this fact suppresses the inflow of capital from abroad. It is a common fact, that the so-called 'small investors' are the most attractive subjects of trading on financial markets of developed countries, and that it is them who really contribute to a healthy, mature and affirmative investment climate. In this regard, in front of the Republic of Serbia is a long way, where there are to arise many more challenges and ambushes.

Further research should be directed to reviewing and analysing the status, position and opportunities in the field of minority shareholders rights protection in the Republic Serbia, and to the study of the effects of implemented measures in this field.

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ANALYSIS OF THE GLOBAL ECONOMIC CRISIS

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Abstract: *Direct instigators of the crisis are regulatory bodies of the USA (FED, SEC) and rating agencies that have made conditions for the appearance and escalation of the crisis up to unimagined proportions by their unscrupulous work. Regulatory and structural shortcomings of the global financial crisis have provided the transformation of a crisis of one country into a global crisis that spread onto industrially most developed countries of the world in the first wave, whereas less developed countries were included in the second wave. Once an advantage of financial markets, their global character, now in conditions of the crisis represents the greatest disadvantage. In terms of globalization, space for finding solutions and exit strategies is narrowed down, as the level of market heterogeneity is drastically reduced [1].*

Keywords: *globalism, economic crisis, analysis, loans, seasoned and deseasoned price.*

1. INTRODUCTION

Current financial and economic crisis has affected all countries of the world with the same intensity, regardless of the development level and structure of economy, all economic sectors and all social layers and individuals. Crisis has caused the fall of all macroeconomic aggregates and indicators of all world countries. Key consequences are illiquidity, drop in production and exports, decline in employment and increase in unemployment, drop in living standard and growth of poverty.

Republic of Serbia in the period of economic crisis has, like other countries, recorded an increase of illiquidity of economy, drop in gross domestic product, industrial production, export and import, drop in employment and growth of unemployment, drop in earnings and purchasing power of population and growth in poverty. In Serbia as transitional country, delayed and piled transitional problems had primary impact on breaking of macroeconomic trends, and additionally the drop in aggregate demand, reduction of foreign capital inflow and increase of illiquidity in conditions of global economic crisis and recession [2].

2. ANALYSIS OF CRISIS IN USA, EU AND SERBIA

The reason for the appearance of sub-primary market lies in constant growth of real estate prices and desire for acquisition of an increasing profit. Constant growth of real estate prices is caused by overheated demand, which is financed precisely through mortgage loans. As the prices of real estate have constantly been growing, the number of granted mortgage loans by commercial banks and other smaller deposit-credit institutions such as nonbank banks and Thrifts has been growing. Nonbank banks have been dealing with jobs of granting loans or receiving deposits, but they have never joined two functions. Thrifts are financial institutions that are smaller than banks by size and primarily deal with granting loans to individual users and they do not deal with corporate jobs. One of the main actors that have contributed to the escalation of crisis in real estate market are precisely these smaller deposit-credit institutions.

Significant number of USA citizens due to unstable jobs they have dealt with and smaller earnings were not able to borrow in primary market from commercial banks, since they couldn't meet the required criteria for obtaining mortgage loan. Banks and other deposit institutions, wishing to use the trend of real estate prices growth and to acquire higher profit from its primary activity (loan placing) have initiated the establishment of a new submarket, sub-primary market of mortgage loans. In newly-formed market, clients with bad credit rating could obtain wanted mortgage loan [1].

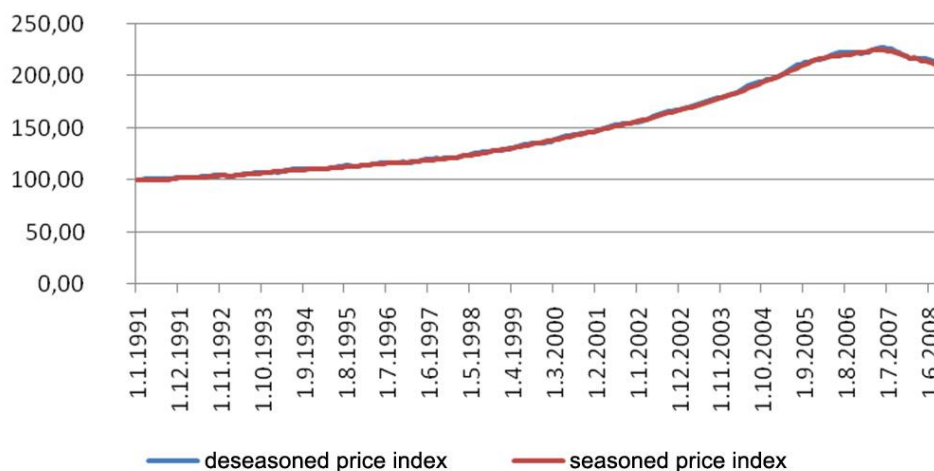


Figure 1: Base monthly index of the movement of deseasoned and seasoned real estate prices in USA market in the period from 01.01.1991. – 01.11.2008. [1, 3]

As base month, we have taken January 1991, while prices growth in other months of the period observed is compared to the base month. Differences between seasoned and deseasoned prices are insignificant (figure 1). When we look at the graph, we can see constant growth of seasoned and deseasoned prices of real estate until June 2007 when growth trends was abruptly stopped. In period from 01.01.1991. to 01.06.2007., deseasoned prices of real estate have grown by 126% on average [3], while seasoned prices have grown by 124% [3].

Favourable loans that the banks granted to their clients have led to the creation of great demand for real estate, which was a pressure to the growth in real estate prices. Growth in real estate prices was also contributed by American Federal Reserve System (FED), which have led expansive monetary policy. Policy of low interest rates that was led in the period from 2001 to the half of 2005 has led to the situation in which cheap capital was placed in long-term and capially intensive projects such as real estate (figure 2) [4].

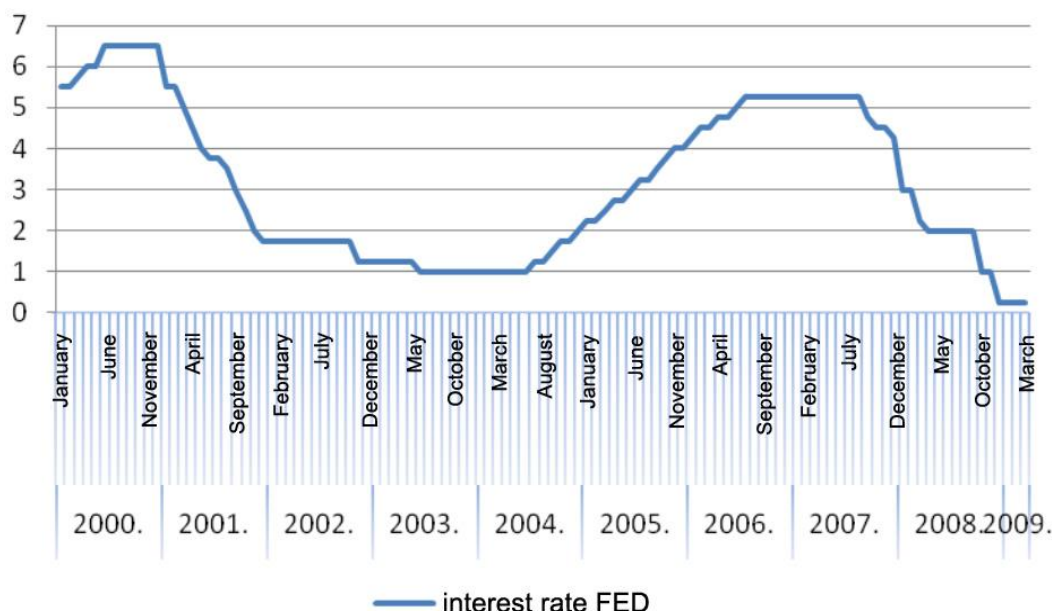


Figure 2: Review of the movements of reference interest rate of FED in the period from January 2000 to March 2009 [4]

From the second half of 2005 until the end of 2007, FED has led restrictive monetary policy which was reflected through raising the level of reference interest rate. Since the end of 2007, face with a growing crisis, FED was forced to relax monetary policy by lowering the reference interest rate in order to mitigate the effects of the crisis occurred. During 2007, defence interest rate of FED was lowered three times: on 18th

September from 5,25 % to 4,75 %, 31st October to 4,5 % and 11th December to 4,25 % [4]. Since the beginning of 2008, there was an abrupt trend of lowering basic interest rate, when FED lowered reference interest rate eight times. First lowering was performed on 22nd January 2008, when interest rate was reduced from 4,25 % to 3,5 % [4]. The second reduction happened on 30th January when reference interest rate was reduced to 3 % [4]. The next reductions of basic interest rate happened on 18th March (to 2,25 %), 30th April (to 2 %), 8th October (to 1,5%), 29th October (to 1 %) and 16th December 2008 (to 0,25 %). Measures of FED were aimed towards the reduction of costs of borrowing and improvement of the liquidity of USA economy.

Commercial and investment banks have suffered the greatest losses. Assets write-off in 2007 for Citigroup was 46,4 billion USD, Merrill Lynch 36,8 billion USD, and for Swiss UBS 36,7 billion USD. From mortgage market, crisis was transferred to the market of shares and bonds in the beginning of 2008. In September 2008, it comes to the escalation of financial crisis and real decline of American giants. The first to declare bankruptcy were Lehman

Brothers and Wachovia. State has nationalized Fannie Mae and Freddie Mac, which have controlled about 50 % of overall mortgage loans in USA. Merrill Lynch is saved by a takeover by Bank of America for approximately the half of real value and JPMorgan has taken over Washington Mutual. Morgan Stanley and Goldman Sachs were forced to change their status from investment banks into commercial banks. This decision resulted from the need of investment banks for financial aid of the state that only commercial banks could obtain. The biggest American insurance company American International Group (AIG) was saved from bankruptcy by debt redemption from the part of FED [5, 6].

The situation occurred has forced European countries on common measures in order to prevent crisis expansion. Leaders of fifteen European countries and Government of Great Britain have met on 12th October 2008, in order to agree on common strategy which they will undertake in order to exit the financial crisis. However, unlike the USA that is a single country, EU consists of 27 countries, which additionally complicated and makes finding of a common solution more difficult. EU has important financial institutions such as European Central Bank, but its great shortcoming is non-existence of European Government which would make rapid decisions and decisions that would be mandatory for all member countries. The existing legal solution provides each state to separately devise measures to overcome the crisis, without the need of the members to mutually harmonize the measures planned [7].

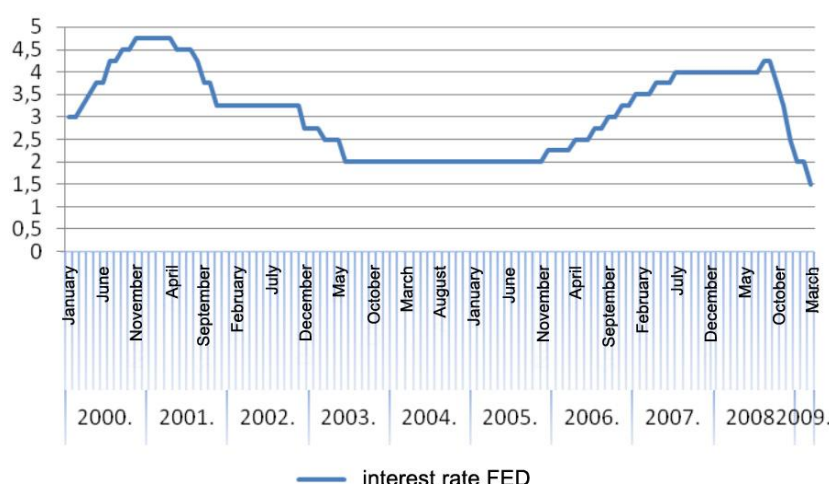


Figure 3: Movement of reference interest rate of ECB in the period from 01.01.2000. to 01.02.2009. [7, 8]

On October 13th, Germany has set aside 70 billion Euros in order to raise liquidity of banks and 400 billion Euros in order to provide interbank loans. France has set aside 40 billion Euros of financial injection for the banks and 300 billion Euros to provide interbank loans. Great Britain has given the aid of 20 billion pounds to Royal Bank of Scotland, and Lloyds and HBOS have obtained the aid of 17 billion pounds. British Government has assumed the control over mortgage bank Bradford and Bingley. Spain has prepared a package of measures of 30 billion Euros in order to pay for bad assets from banks and simultaneously increase their liquidity.

From Table 1 we can see that Slovakia, Czech Republic and Croatia are the most endangered, in case of which foreign capital has a share of more than 90% in ownership structure of financial institutions. In addition to Hungary and Macedonia, Serbia is among three least endangered countries with 60 and less percentage (table 1).

Direct effects of global economic crisis will leave deep consequences on countries that expect the most in international flows of capital and international trade. Unlike these countries, developing countries and countries that go through the process of transition will feel indirect effects of crisis for financial sector, which will be manifested through the drop in liquidity, lot of difficulties related to the construction and reform of financial institutions, as well as real sector through slowing down the economic activity. Serbia is a part of this group of countries, as a country in a transition well underway.

Table 1: Share of foreign capital in ownership structure of bank sectors of the countries mentioned [12]

Foreign ownership over financial institutions	
	Percentage in relation to the entire banking sector
Slovakia	97,4
Czech Republic	96,2
Croatia	90,4
Bosnia and Herzegovina	83,3
Bulgaria	80,0
Poland	79,6
Montenegro	78,1
Romania	70,0
Latvia	67,5
Serbia	60,0
Hungary	58,9
Macedonia	54,0

5. CONCLUSION

Crisis that initially appeared in real estate market of the USA, and then spread on financial system and economy of USA does not appear by accident. The crisis appeared as a consequence of leading irresponsible business policy of competent state institutions for the control of financial market (FED and SEC) and incompetence in work of rating agencies, as well as fundamental weaknesses that exist in the field of financial control and regulations in USA for years. Source of weaknesses mentioned comes from the idea of unlimited liberalization of financial markets, with minimal regulations and weak control of the business of investment banks and funds. Initial assumption is that big institutional investors who have enjoyed preferential treatment of regulatory bodies, will responsibly and in accordance with good practice of corporative management protect the interests of their owners, it basically appeared to be wrong and harmful. In addition to the fact that FED hasn't controlled banking system in a way in which it should have, by implementation of expansive monetary policy, through lowering the reference interest rate, FED has made loans even more cheaper and available to bigger number of users.

In August 2008, interest rate was increased to 4,25 % for a short period, then after the September of the same year there was an abrupt trend of drop which lasted until March 2009. From October 2008 until March 2009, ECB has lowered reference interest rate five times. During 2008, interest rate was lowered in October from 4,25 % to 3,75 %, in November to 3,25 % and in December to 2,5 %. In January 2009, reference interest rate was lowered to 2 % and then in March of the same year to 1,5 % [8-12].

Serbia has felt the first blows of crisis on its most sensitive part of financial market – stock exchange. Having in mind the characteristics and insufficient development of capital market in Serbia, it is believed that the impact of global economic crisis on that sector will be limited. Unstable political situation at the beginning of 2008 has additionally increased the uncertainty of investors and caused greater withdrawal of foreign capital, which has influenced the reduction of capital market liquidity and which had an unfavourable impact on future events on Belgrade Stock Exchange [13-15].

Decisions of the Governments of all countries to take more active and synchronized participation in solving the crisis were influenced by experiences from the period of great depression, in the 1930's. In that period, creators of economic policy have led laissez-faire policy, because they have considered that the market will independently establish the balance. It was attempted to lead the policy of a balanced budget and higher taxes in order to reduce budgetary deficit. [16-18] Central Banks have accepted the closure of banks and haven't taken any significant measures to neutralize the drop in monetary mass. In order to reduce the import and stimulate domestic production, protectionist external policy was carried out. Result of these measures was catastrophic, so the countries taught by events during the first global economic crisis have concluded that costs of not taking any measures was much greater than costs of interventionist policy. However, the question remains whether it is alright for the loss, generated by speculates' bad business decisions, to be socialized and for all burden of crisis to be taken by ordinary people.

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ACCOUNTING INFORMATION SYSTEM AND DECISION SUPPORT SYSTEMS (DSS) IN INCREASING THE QUALITY OF CORPORATE MANAGEMENT'S DECISION MAKING PROCESS

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Abstract: Accounting information features as the basis for business decision making in modern-day business environment. This information is produced by business entities' accounting information systems. To meet all the qualitative and quantitative characteristics of accounting information, the demand for the application of modern information technologies is set before the accounting information system. These modern information technologies significantly improve the operation of the entire accounting function. One of the modern information systems that have found significant extent of application in business practices is the Decision Support System (DSS). This article will attempt to shed light on the interdependence of business decision making quality and the appropriate accounting information system, laid on solid foundations. The effects of including decision support systems in raising the quality of accounting information systems will be examined, as well as the implications of including DSS in improving the quality of decisions made by corporate entity management. The aim of this study is to prove the indispensability of DSS in the implementation of strategic business decision making, as a decision making process typical of corporate top management.

Keywords: accounting information, accounting information system, decision support systems, business decisions, strategic business decision making

INTRODUCTION

The modern-day business setting is characterised by a high degree of turbulence, which is primarily reflected in incessant market change, accelerated technological advance and increased demands set before modern business entities, and appropriate response to such market trends necessitates their rapid response. This response, first of all, entails making appropriate business decisions providing the right response to such market trends. These business decisions should, first of all, enable eliminating growing market risk, and appropriate adaptation to modern-day market setting. Such response implies, first of all, availability of adequate information, which, first of all, stem from the accounting information system. Appropriately set up accounting information system is a good springboard for providing relevant information, necessary for making appropriate business decisions and eliminating threats entailed by increasingly intensive market change.

The expansion of modern information technologies has given rise to the development of numerous systems facilitating the process of making an increasing number of business decisions. The key role of these systems is to enable managers to see all the benefits or shortcomings of given business alternatives by means of strategic business decision making, and based on this information, select the one that will yield highest benefits. One of these systems include decision support systems (DSS), elaborated in this article.

- THE IMPORTANCE OF ACCOUNTING INFORMATION SYSTEMS

Functioning of any business entity will be successful only as much as its organisation structure is based in interdependence and mutual feedback between its segments and the whole. Thus set, the system will enable performing business activities with maximised achieved results, and minimised costs. This is achieved by implementing information systems in business entities.

Various information systems exist in each business entity. According to some authors, each business entity must contain the following information systems (www.crnarupa.singidunum.ac.rs, accessed March 10, 2012):

- production information system;
- marketing information system;
- accounting information system; and
- HR management information system.

Depending on each individual business entity's organisational structure, each of these information systems may exist either as an independent information system, or as a segment of the integral information system. As the pivotal point of this article is the accounting information system, our attention will be focussed on it. There are numerous definitions of accounting information system, depending on authors and criteria they took in their defining. For the purpose of this article, we have opted for the following definition of the accounting information system: "An accounting information system is a set of all techniques, technologies and methods for gathering, processing, distributing and archiving data" (www.ef.uns.ac.rs, accessed March 10, 2012). It is a constituent part of the business information system providing substantial support in all stages of system management. The very fact that it is an information system suggests the use of computers not only in its functioning but also all across the organisation. A given system can be broken down into the following constituent elements (www.ef.uns.ac.rs, accessed March 10, 2012.)

- Financial bookkeeping with pertaining analytic bookkeeping systems;
- Cost and performance accounting;
- Accounting supervision; and
- Accounting-based planning and analysis.

This division can be presented graphically as follows:

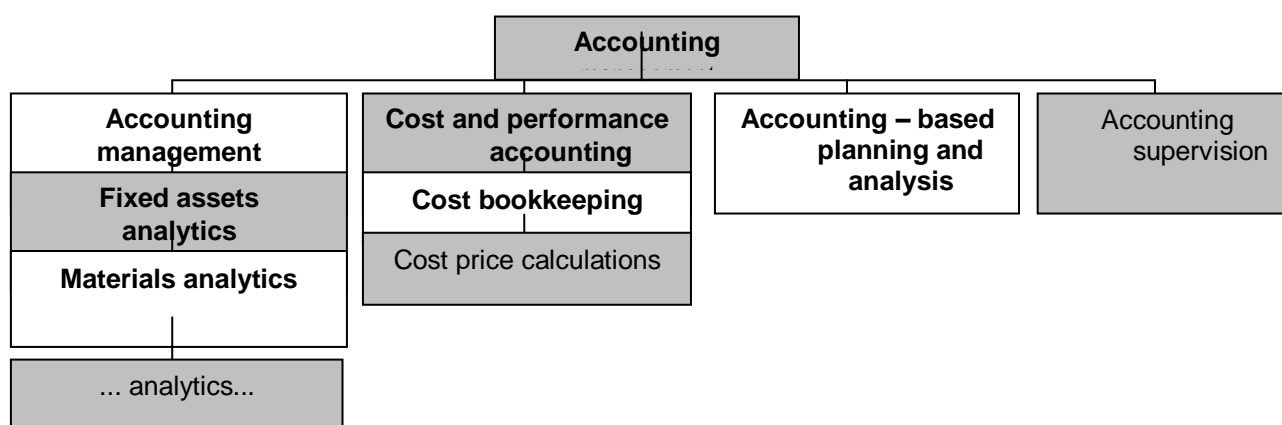


Figure 1. Constituent parts of accounting information systems (www.crnarupa.singidunum.ac.rs, accessed March 10, 2012)

Seamless functioning of accounting information systems implies prerequisite existence of the following constituent elements: human resources, equipment, procedures and data. This mean that employees use appropriate equipment and follow set procedures to produce accounting information based on given data.

The accounting information system is the oldest information system in an enterprise, containing and providing information required for conducting business transactions, decision-making, evaluating resources and performance, and reporting. To perform its role, it must cooperate with all other information systems in the enterprise. This cooperation must be a two-way-one; on the one hand, the accounting information system provides other information systems with relevant information, while on the other, these information systems provide relevant information to the accounting information system required for its seamless functioning. HR management information system provides the accounting information system with data required for payroll calculations; production subsystem provides data required for accounting coverage of production, etc.

The purpose of the accounting information system is to provide information of set quality and quantity tailored to the needs of various users. On the one hand, this system produces information of synthetic character, intended primarily for preparing and compiling annual financial reports, which is a part of financial accounting as a constituent element of the accounting information system. On the other hand, managerial accounting produces information tailored predominantly for manager to enable them to make business decisions, and it is always future-oriented.

Accounting information produced by the accounting information system are tailored for making appropriate business decisions, both by the management and all other users, both internal and external. The most important external users of accounting information include: capital owners, investors, creditors, national agencies, buyers and suppliers, whereas the dominant positions among internal users are taken up by

employees, trade unions, corporate auxiliary and expert services, etc. How the accounting information system meets the information needs of numerous users is illustrated by the following diagram:

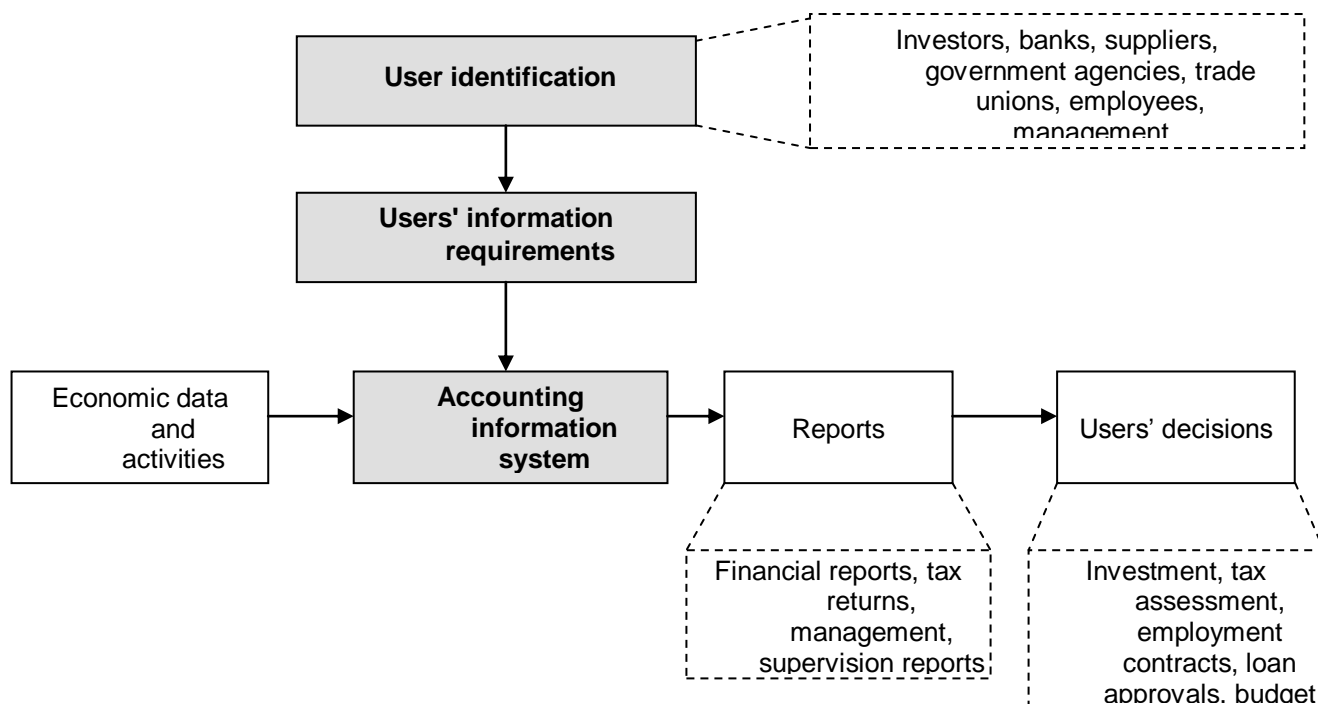


Diagram 1. Accounting information system for providing users with relevant information (Source: Teaching materials for the course in Financial Reporting and International Accounting Regulations from the 5th year of studies at the Faculty of Economics Subotica)

The diagram No. 1 shows that accounting information systems produce information tailored to the users' requirements. If the information is intended for top management, it must be synthesised, whereas if it is intended for lower management levels, it must be more analytical by nature. The figure above also shows that accounting information system produces numerous reports, such as financial reports, tax returns etc.

2. DECISION SUPPORT SYSTEMS

The increasingly intensive technological advances have resulted in numerous technological solutions whose action facilitates management processes in business entities. One group in the range of such systems are the Decision Support Systems (DSS).

Decision support systems are, in fact, model-based sets of procedures for processing and interpreting information supporting managers in their decision-making. They are, actually, an interactive computer information system intended for supporting structured, semi-structured and unstructured decision-making. They are a product of extensive theoretical research conducted in the 1960s aimed at facilitating an extremely complex process like decision-making and simplifying it as much as possible.

The above mentioned definition of decision support systems leads to the conclusion that their purpose is to resolve three groups of problems: structured, semi-structured and unstructured. Structured problems have all their resolving phases defined. This means that their resolving procedures, phases etc. are known. Structured problems do not have all their resolving phases defined and resolving them is based on intuition, whereas semi-structured problem have some of the phases or procedures defined. Resolving semi-structured and structured problems requires the use of individual decision support systems whereas resolving unstructured problems, encompassing a major number of alternatives, requires group decision support systems (GDDS).

Decision support systems have the following basic features (www.dss.com, accessed March 11, 2012): They:

- are intended for resolving unstructured and semi-structured problems;
- support to decision-making of various levels of managers;

- support group-based and individual decision-making;
- are easy to use and construct;
- are adaptable and flexible; and
- significantly improve the effectiveness and efficiency of decision-making.

To clarify and enable better understanding of decision support systems, we shall use the following scheme, showing the structure of decision support systems:

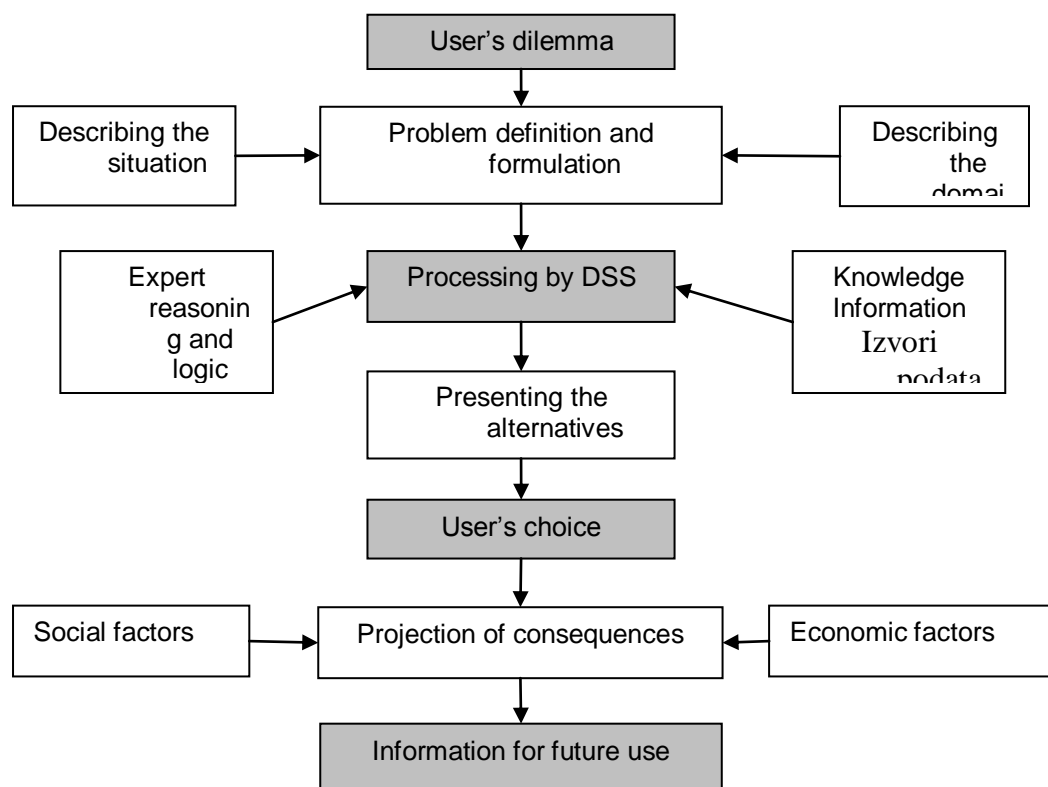


Diagram 2. Structure of decision support systems (www.dss.com, accessed March 11, 2012)

The diagram No 2 above shows that decision support systems require the user to provide precise definitions of problems or situation to be solved. After this, the system processes the presented data, and offers a certain number of alternatives to the user, with the consequences of each of the chosen alternatives. This enables users to make business decisions for which they can foresee the consequences (benefits or harms). This system cannot replace the decision-maker, i.e. the human; it can only facilitate the number between several alternatives and enable making the right business decision.

Depending on the level, there are several types of decision support systems: (www.ef.uns.ac.rs, accessed March 12, 2012):

- decision support systems for strategic decision making – intended for supporting decisions made by top managers, predominantly in semi-structured decision-making about problems related to setting goals, choosing business strategies, defining business corporate mission and vision, making plans etc.;
- decision support systems for management control – predominantly intended for middle managers, responsible for effective and efficient use of resources and managing individual functional areas;
- decision support systems for operative planning and supervision are predominantly intended for lowest-level management, responsible for executing decisions delegated by higher management levels.

The use of computer technologies provides insight into numerous advantages that they provide in corporate decision making (www.ef.uns.ac.rs, accessed March 12, 2012):

- speed, i.e. a large number of fast calculations at low prices;
- overcoming limitations in data processing and storage, as the latter may reduce the problem-solving ability (i.e. bad memory);

- cost-cutting in decision making
- technical support in storing, searching and transferring data, at higher speed and lower prices;
- high-quality decision making through better decisions, processing more alternatives, risk analysis,
- expert support; and
- agility of support.

As pointed out earlier, different management levels require information of different character. Higher-level managers are interested in information required for making decisions of strategic character, whereas this information, like market oscillations, price fluctuations, foreign currency exchange levels etc., is less interesting for managers of lower levels.

This is one of the shortcomings of decision support systems, which is resolved by introducing Executive Information Systems (EIS). These systems support differentiation in management's information needs. To facilitate insight into advantages and disadvantages of these two systems, i.e. make a comparison, we shall use the tabular presentation below:

Table 1. A comparative presentation of logistic DSS and EIS (Teaching materials for the course in Financial Reporting and International Accounting Regulations from the 5th year of studies at the Faculty of Economics Subotica)

Logistic DSS	Expectative Information Systems
- supplies data for decision making	- supplies data for performance management
- aimed at semi-structured and unstructured problems	- uses performance directions in relation to the plan
- secures instrument, not solutions	- secures information, rather than ad hoc analysis tools
- used by senior and middle management	- used by top management
- usable when developing alternatives and/or decision-making variants	- usable in reporting phase in decision making
- functions in interaction with the environment	- expressly usable when integrated in corporate culture & style

The table 1 above points to the fact that the executive information system is primarily tailored to support decision-making by top management, secures information, and is usable in the reporting phase of decision making. Unlike EIS, the logistic DSS is tailored for information requirements of both top and middle management, enables decision making in the case of multiple alternatives and provides decision-making tools, but the system itself makes no decision. Unlike EIS, which exists when integrated in the business entity's corporate structure, the logistic DSS functions in interaction with the environment.

3. MANAGERIAL DECISION MAKING AND QUALITY OF BUSINESS DECISIONS

Corporate decision-making process is a highly complex and demanding activity. The complexity of this process is notably manifest in the conditions of increasing uncertainty and a large number of alternatives that managers must take into account when making business decisions. This is primarily caused by the increasingly dynamic character of the business setting and the growing turbulence of business events.

Corporate decision making is primarily in the hands of administrators and managers of all levels. The administrative level determines the significance of business decisions made, and the importance of the made business decision also results in responsibility for future business and corporate survival. Thus, top management makes decisions of strategic character, whereas the lower management levels are mostly focussed on operative decisions.

There are numerous definitions of the decision making process, depending on the criteria and factors taken into consideration in classification. In this article, we opted for the definition of two prominent authors in the management area, Koontz and Weihrick, who view the decision-making process as choosing the direction, i.e. manner of action, where it features as choice between two alternatives. Decision making is the central activity of a corporate entity's management. The relationship between the corporate management and decision-making is best illustrated by the following diagram:

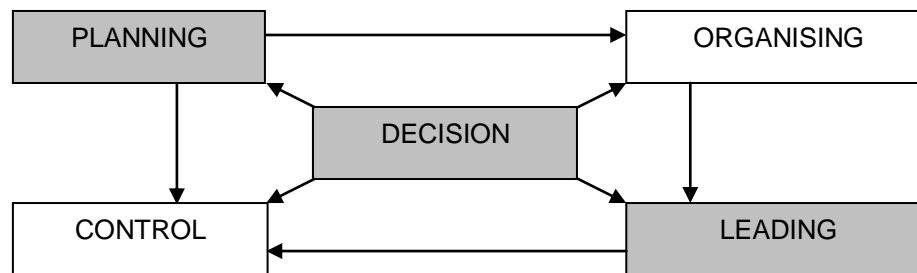


Figure 2. The relationship between management function and decision making (Bahtijarević – Šiber, Sikavica & Pološki Vokić, 2008)

The figure 2 above shows that decision making is not a separate management function, but, we can freely say, function used by management to fulfil their role in the corporate subjects. It is a superfunction, featuring as a constituent part of all classical management functions, i.e. planning organising leading and control. The outcome of the decision-making process is a decision. A decision is a choice between multiple different alternatives. For the decision to be relevant, one needs to have certain information serving as the foundation for the decision made. The decision-making process can best be represented by the following figure:

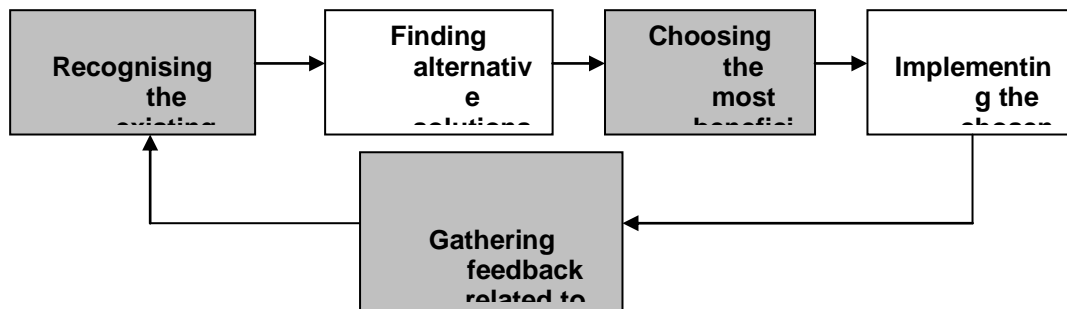


Figure 3. The decision making process model (Certo C.S. & Certo T. S, 2008)

The figure 3 above shows that decision making begins with appropriate diagnose of the problem, followed by considering all available alternatives for its resolution. After this, managers consider which of the activities are the most beneficial, choose one of them and implement the chosen alternative. This is not the end of the managers' activity, as they follow and gather all information related to implementing the given alternative, which is in the function of resolving the observed problem.

The managerial decision making process itself consists of several typical steps, as follows (Certo C.S. & Certo T. S, 2008):

1. recognising the existing problem
2. listing the possible alternatives for problem solving
3. choosing the most useful alternative;
4. implementing the selected alternative; and
5. gathering feedback to establish whether the chosen alternative contributes to resolving the problem.

Viewing the given decision-making phases, we come to a conclusion that they were made based on the diagram above. When managers view which alternatives can be taken into consideration when solving the problem, they must bear in mind that there are certain limitations acting outside the corporate entity itself, but also those. Actually, we can highlight that there are limitations existing not only within the corporate entity, but also limitations of external nature, such as social norms, legal provisions and other types of limitations. The given limitations are illustrated by the figure below:

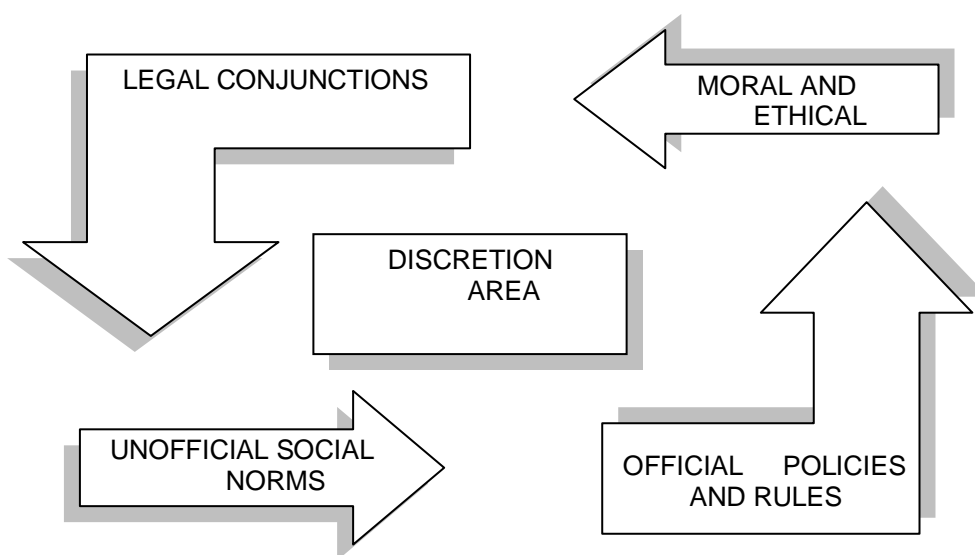


Figure 4. External factors limiting the management's number of alternatives for resolving problems (Certo C.S. & Certo T. S, 2008)

Given that each corporate entity is also a market player, in view of the fact that they conduct their business operations and earn their income, the decision making process is also influenced by the environment factors, best illustrated by the table below:

Table 2. Business environment factors exerting pressure on organisations (www.crnarupa.singidunm.ac.rs, accessed March 13, 2012)

Factor	Description
Market	<ul style="list-style-type: none"> • strong competition • growth of global market • development of e-market on the Web • new marketing methods • benefits of outsourcing with IT support • need for real-time online transactions
Customer demands	<ul style="list-style-type: none"> • demands for customisation • demands for quality, product range, assortment, and speed of delivery • increased role of customers and decreased loyalty
Technology	<ul style="list-style-type: none"> • more innovation, new products and services • faster outdated • greater information overload
Society	<ul style="list-style-type: none"> • more state regulation/deregulation • more staff turnover, increasing age, more women • concern about defence and terrorist attacks • compulsory reporting • more corporate social responsibility

As mentioned above, to function successfully management decision process requires all necessary information. This information is provided by accounting information system, so it can be freely regarded as a constituent element of the management information system, and its most vital element at the same time. The accounting information system encompasses four subsystems (Đogić, 2009):

1. subsystem dealing with the coverage of daily business events and making daily business decisions based on the former;
2. ledger and finance reporting subsystem, producing sets of financial reports, and other financial reports required by legal provisions;
3. fixed assets and capital investments subsystem; and
4. managerial reporting subsystem, providing information for corporate decision making.

The development of decision support systems has resulted in facilitated business decision making process. These systems are a symbiosis of a whole range of functional knowledge and information systems, whose fundamental function is to support corporate decision making processes. Actually, it can be concluded that decision support systems support all decision making process phases, starting from problem formulation through design, choice, down to implementing the chosen alternative.

Managerial decision support systems are best illustrated by the figure below:

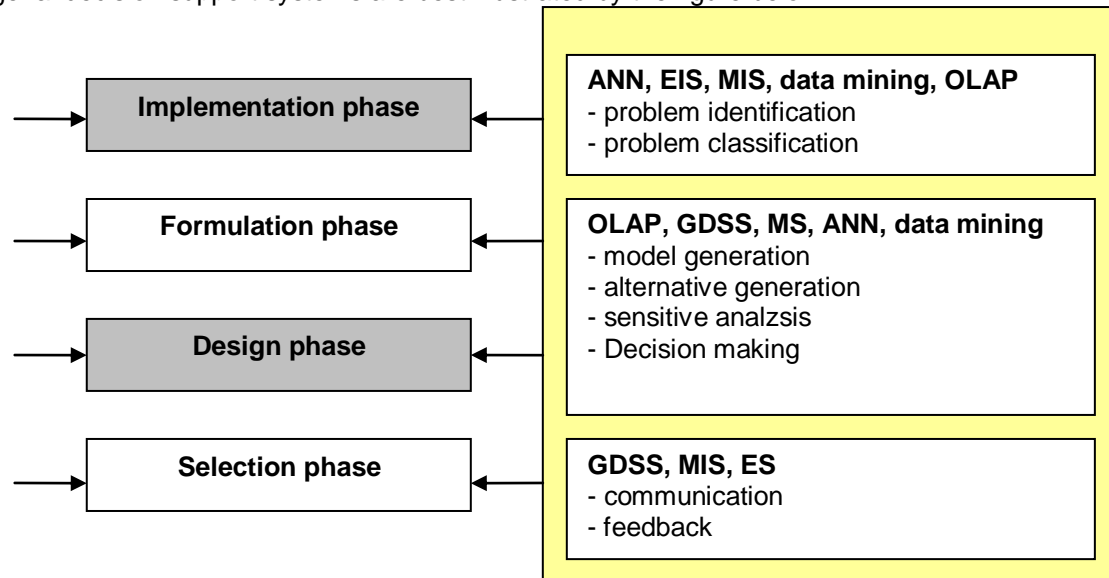


Figure 5. Computer support to decision making phases (Vasiljević, 2007)

The fundamental feature of decision support systems in corporate decision making is reflected in the following:

1. Decision support systems are used for loosely and inadequately specified decision.
2. The fundamental role of decision support systems is to assist the corporate decision maker.
3. Decision support systems contain trends in management science and traditional data processing function.

CONCLUSION

The decision making process in the modern-day market setting is gaining complexity, which is predominantly caused by powerful and constant change in the business setting. When making business decisions, managers face a large number of business alternatives, which must be taken into account so that the real business decision is made. This is where development and advancement of decision support systems gains prominence.

Decision support systems are to assist the corporate decision-making process in terms of encompassing a large number of available alternatives, analysing each of them, and point to the possible consequences of their implementation. Modern-day managerial decision-making is characterised by a large number of possible alternatives, but successful business operation forces corporate entities to choose the one that will yield maximum benefit against at minimum cost. This is what is enabled by decision support systems.

An oft-cited opinion is that high-quality business decisions only require IT support, and many people regard it as sufficient. Such a position is unacceptable, for decisions can only be made by humans, whereas the system's role is only to support business decision making. The decision cannot be made by the system itself; this is the prerogative of the manager. Responsibility for decisions made cannot be taken over by the system; it is the decision maker that is responsible.

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COST ACCOUNTING AS A KEY INFORMATION SUPPORT FOR MODERN MECHANISMS OF COMPANY MANAGEMENT

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Abstract: *In contemporary conditions of great external and internal complexity companies operate in an extremely dynamic world of interdependent and nonlinear events. The company's existence on the turbulent and uncertain market directly depends on the degree of fulfillment of customer expectations but also on the intensification and strengthening of cooperation with other organizations from the environment – customers, suppliers, and distributors. The modern company achieves its success as a result of the interaction with the environment, resources and management, i.e. its ability to employ the resources adequately, bearing in mind the company's position – its strengths and weaknesses. This requires, along with acceptable risk, a maximum exploitation of challenges brought by the environment, in order to realize the interests of various stakeholders. Managers face complex and numerous problems and challenges of successful company management. Achieving sustainable competitive advantages, as a condition sine qua non of modern business, in a dynamic and thoroughly uncertain environment necessarily requires sophisticated professional knowledge and skills, as well as designing an adequate information system as a quality support to larger and more complex information requirements of managers at all levels of management. This paper puts an emphasis on the importance of flexible designed cost accounting information system – a key information core of company's accounting information system – in generating quality information as a support to modern company management mechanisms. Only as flexibly designed it can qualitatively respond to numerous and various information requirements – it will be able to adapt to changes occurring in business environment as well as in the company itself. It also discusses some of the new and, in turn, enhanced existing tools, techniques, concepts and approaches to costing and cost management, which are fundamentally important in order to implement and support the competitive strategies of companies.*

Keywords: *management, strategy, competitive advantages, cost accounting, cost management*

1. INTRODUCTION

Last decades business environment has changed and will changing more than ever in the years that have to come. The trends of globalization inevitably result in sharp intensification of international competition and require systemic perception and coordination of business processes of all involved organizations. Quality decision-making requires having at one's disposal information relevant for solving a particular problem. Within business and financial decision-making cost accounting (CA), as the essential part of a company's accounting information system (AIS) as a whole, represents a reliable information support for the management. Therefore, it is necessary to continuously review its information offer, as well as to find new ways of generating quality information as a support for modern mechanisms of company management. Only flexibly designed CA information system can qualitatively respond to numerous and various information requirements – it will be able to adapt to changes occurring in business environment as well as in the company itself. Integrating the internal and external aspects it is possible to provide quality information for strategic management of a modern company. Strategic cost management (SCM) implies the use the cost data to develop and identify superior strategies that will produce sustainable competitive advantages. The purpose of the paper is to highlight the role CA has in offering support to managers at all managerial levels. Some of the new tools, techniques, approaches and concepts to costing and cost management (CM) have been emphasized (ABC/ABM, TQC/TQM, TC/TCM, LCPC/LCPCM, VCA, VSA/VSM).

2. KEY IMPORTANCE OF FLEXIBLY DESIGNED COST ACCOUNTING INFORMATION SYSTEM

Constant and dramatic changes in contemporary competitive environment, as well as the need of integrating into European and world market flows, require the knowledge of a wide focus cost and performance management. The management is expected to lead the company towards the achievement of set objectives, which in the contemporary settings of marked external and internal complexity requires sophisticated professional knowledge and skills, as well as quality information support. CA which measures and reports financial and non-financial information related to the organisation's acquisition or consumption of resources (Horngren, et al., 2005), has an exceptionally important position within the entire AIS of an organization because it provides information to both management accounting (MA) and financial accounting (FA) as subsystems of the AIS. When its information is intended for the FA it measures product costs in compliance with the strict legal and professional regulations; however, when its information is used for internal purposes it provides the basis for planning, control, and decision-making.

The importance of CA as information basis for external financial reporting (which is its traditional task) is particularly reflected in providing relevant data for the purpose of inventory balance and determining the cost of products sold. In compliance with the widely accepted regulations, it includes into the inventory value only the necessary costs of functional production fields – but not the costs of uneconomical spending, inefficient work and unused capacity, which represent period costs. Accounting data used for external reporting very often do not completely satisfy managers' needs for decision-making purposes. Attempts at slight modifications of financial accounting systems for managerial purposes rarely end happily – like eating soup with a fork: it is possible, but it is far from effective (Maher, 1997). Cost data for the purpose of internal reporting are meanwhile relatively free from the constraints of legal and professional regulations. When internal reporting is in question, analytical and short-term aspect – notably the success accomplished – is emphasized. Apart from presenting the overall business results of the company as a whole, it is possible to segment it from various aspects – it is an extremely important management instrument for planning and control. When activities of planning and control of the performance of the company and its narrower segments for various time intervals are in question, CA provides the management with relevant information, i.e. it represents the basis of the accounting planning and control. This is so because it assumes short-term and analytical aspect of costing, and compiling relevant reports as well, regarding the ever increasing need for planning and control of managers' performance. Therefore, internal reports created by CA are primarily used by MA for offering adequate information support to management for the purposes of planning and control of business activities, i.e. for the purposes of more qualitative and efficient operations and making various business decisions. Meeting various information needs of the management related to making individual business and financial decisions has been emphasized over the last few decades as the fundamental CA task – it assumes calculating costs and benefits of individual business alternatives. By using non routine cost-benefit analyses, CA creates reports based on the concept of relevant information. The concept of relevant costs (relevant revenues as well), in choosing among alternatives, assumes considering

the expected future costs which differ in alternative actions. Relevant cost analysis generally emphasizes quantitative financial information, but in decision-making, managers must pay due attention to quantitative non-financial and qualitative information and must, occasionally, give greater significance to qualitative or non-financial quantitative information. Non-financial information concerns legal and ethical considerations and long-term effects of decisions on the company image, employees' morale and the environment, and is relevant to particular business decisions.

While designing CA information systems one must not lose sight of the following (Maher, 1997): decision-makers' needs must be met; different cost information is used for different purposes – what works for one purpose will not necessarily work for other purposes; cost information must meet the cost-benefit test – namely, cost information can always be improved, but before establishing a new system, one basic question should be asked: will the benefits outweigh the costs? It is of vital importance that CA information systems should be flexibly designed. Due to the fact that they are relatively free from legal and professional constraints and are in function of the company management, they are, in accordance with the needs of internal users, able to generate a broad range of information. Organizational and methodological settings and functions are adapted to management requirements. Being flexible, it will be able to adapt to changes occurring in the business environment as well as in the company itself and, accordingly, respond in a qualitative manner to numerous and various information requirements of the company management. Today, there are new requirements for changes and continuous improvement so that the management could have adequate information support in managing the company – particularly key strategic variables.

The extent to which CA is capable of helping the management in serving the abovementioned purposes fundamentally determines its significance, i.e. the usefulness of its information. It is of great importance that the accountants should know their job well and seek the ways to add value to their organizations. In many successful companies in the world the accountant is a member of multifunctional teams as a reliable associate.

3. CONTEMPORARY CHALLENGES TO COST ACCOUNTING

In the last couple of decades numerous and dramatic changes in business environment have contributed to a high level of complexity, turbulence and uncertainty in the environment in which contemporary companies accomplish their economic mission. The trends of globalization followed by the removal of national barriers inevitably result in sharp intensification of international competition. What is more, the consumers' demands are changing more and more frequently and becoming more sophisticated, which, along with intense introduction of new information and communication technologies, drastically shorten product life cycle. As a response to numerous contemporary challenges, a broad range of new management approaches and philosophies is developing, such as: value chain analysis, setting up long-term relationships of close cooperation with key customers and suppliers, continuous improvement, broad empowerment of employees, new production management systems and many others. Despite the underlying notional differences, they all have the same universal motif – to master key factors for business success (cost, quality, time, innovations) and supply customers with superior value on the market. Powerful integration relations require systemic perception and coordination of business processes of all involved organizations. Therefore, managers in contemporary companies face complex and numerous challenges of successful company management. Achieving sustainable competitive advantage, as a condition sine qua non of modern business, in a dynamic and thoroughly uncertain environment necessarily requires sophisticated professional knowledge and skills, as well as designing an adequate information system – quality support to larger and more complex information requirements of managers at all levels of management.

In recent years, companies worldwide have considerably changed their strategies - from internally focused strategies to externally focused ones, whose top priority is customer satisfaction. There is a widely accepted saying that customers are company's most valuable assets. Profit is generated by customers, and products are only the ways of turning customer demands into profits. The quality of customer service is a sole criterion for distinguishing a successful company from unsuccessful one. The company's power is based on its superiority to create values for customers. The company manages to satisfy customer demands and enhance their loyalty if it succeeds to provide: a superior quality of their products to those of their competitors; products which are tailored to customer wishes and demands; reliable and timely delivery of

products; after-sales services; product quality guarantees; an effective communication system with customers, etc. Regardless of the concrete orientation regarding business strategy, the contemporary company inevitably faces the requirements of cost competition. Numerous and skilled competitors with new sophisticated approaches to CM and cutting edge technological achievements force it to manage costs carefully and skillfully. It is constantly being emphasized that CA should provide information useful for the decision-making process and particularly the information support for CM analyses and projects. Numerous studies point at the weaknesses of traditional formal CA systems, particularly emphasizing the problems of distortion, i.e. distorted information and limitations in presenting cost drivers, amounts and cost profiles in an extended business operations system. Thus, modern business environment inevitably requires CA restructuring and new approaches to costing and CM in order to improve cost information quality. It is necessary to provide adequate information support concerning the process of business strategy formulation and implementation, i.e. finding adequate directions leading to the strengthening of the competitive position on the increasingly turbulent market. In general, improved CA can reach more management objectives than traditional.

One of the new key themes in CA is turning our attention to the customer. *Customer in focus* is the key point of the organization's success. "To be customer-driven" lies at the heart of CM; among all aspects of business operations which the management must take care of, the customer is the most important because without him the organization loses its purpose. There is a permanent question in the way business operations are performed which puts the emphasis on customer satisfaction: how can value be added for the customer? The focus is on the most profitable customers and the ways to first attract them and then retain them. Today, companies first identify customer needs and demands, and then proceed with the product design and production. *Value chain and supply chain analysis* is also a key theme. Value chain (VC) facilitates consideration of the possibilities of achieving and retaining competitive advantage through strategically relevant activities. By using VC and activity cost information companies can identify strategic advantages on the market. Supply chain (SC) assumes the idea of an "extended company" - the focus expands from company *production* VC to *purchase* VC on the one hand to *distribution* VC as the final part of the whole industrial VC on the other. CM emphasizes integration and coordination of these activities through all links i.e. companies in the SC, as well as through each business function in the VC of individual companies. *Costs, quality, time and innovations* are key factors of business success. The management must continuously focus on these key strategic variables in relation to competition, which surpasses the frames of their company and draws their attention to changes in the external environment observed and assessed by their customers as well. It is of vital importance to manage them carefully and thus affect the level of customer satisfaction. Low costs are a significant business goal but cost improvement does not necessarily have to be sufficient. Customers want more than just lower prices and costs – they want quality, responsibility, punctuality. The combination of *benchmarking and continuous improvement* is an ever-present theme in the new approach to management. By comparing with the best examples, the management finds ways of continuously improving their proper practice. Benchmarking and continuous improvement are often described as a "the race with no finish" because management and employees displeased with a particular performance level seek continuous improvement. When they adopt this philosophy, the organizations perceive that they are able to achieve performance levels which they previously considered unattainable.

Thus, new environment brings new challenges and problems which inevitably impose the need for serious reconsideration of past business philosophy established in stable and predictable business settings. It is of great importance to adopt a wider external orientation with the constant focus on changeable and sophisticated customer demands. The company's existence on the market directly depends on the degree of fulfillment of customer expectations but also on the intensification and strengthening of cooperation with other organizations from the environment (customers, suppliers, distributors). Quality exchange of ideas and information, better inter-organizational coordination and integration of vital business activities are necessary assumptions for more successful competitive positioning of the company on the market.

4. IMPRUVED COST ACCOUNTING INFORMATION SYSTEM

There has been an increasing number of discussions about CM and extending various limits in the past decades. It is a dynamic process which assumes intensive efforts directed towards continuous improvement, i.e. improving the existing and inventing new tools and techniques, starting with early activity-based costing models and pursuing lately in the direction of *strategic cost management* (SCM) which implies the use of cost data to develop and identify superior strategies that will produce a sustainable competitive advantages. In that period, the most prominent trend has been *shift the focus* from determining product costs by using

standard traditional cost models, towards providing support for strategic and operational decisions by using certain forms of activity analysis. While considering the development of CM, it is very important to link it to modern challenges to organizations. Therefore, suggestions go in the direction of separating it from traditional accounting and abandoning the long-standing linearity of measuring historical costs and static standards. Managers should anticipate rather than simply react to changes in cost structure and financial performances.

The turning point in the development of CA was the advent of *Activity Based Costing (ABC)* which emerged primarily as an expression of the need to provide much more accurate data about the output cost price compared to traditional methods. It focuses on activities as parts of the entire process in a company and their cause and effect relations with the resources used as well as with cost objects (products and services, market segments, customers) i.e. activity drivers. However, management can use it not only for the purpose of calculation, i.e. more accurate product costing and, therefore, more successful price and product and service range management, but also for providing financial and non-financial information on activities, and effective CM – as assistance to activity based management. When considering the use of ABC for the strategic purposes, many experts think that it offers strategic opportunities to companies. Many companies have gained competitive advantage due to ABC information, i.e. cost reduction by lowering prices in order to increase their market share. *Activity Based Management (ABM)* focuses on managing activities with the aim of increasing the value which the customer receives and profit obtained by providing this value, which assumes driver analysis, activity analysis and performance evaluation. ABM assumes a set of decisions and actions based on ABC concept information. The goal is to increase the value delivered to customers and to boost company profitability to a higher level. Strategic and operational ABM are singled out. *Strategic ABM* assumes directing the organization towards the most profitable use of resources. Due to ABC information we can point out non-profit activities as well as the most profitable ones, and make decisions affecting product development and design, fixing sales prices, specifying the production and sales mix, and establishing and developing relations with key customers and suppliers. All this can be achieved due to skillful combining of the knowledge about cost behavior (i.e. their drivers) with the knowledge about customer behavior. *Operational ABM* assumes decisions and actions with the goal of continuous improvement of business processes; and for designing ABC systems, as its information support, several hundred activities may be necessary in order to obtain better insight into processes underlying production and customer service. Operational ABM is directed towards the improvement of efficiency and reduction of resources necessary for performing respective activities (Cooper&Kaplan, 1999). The advantages of activity analysis come primarily from the activity cost classification according to the possibilities of cost improvements. This classification enables managers to get an insight into how many current operating costs occur during inefficient processes or processes of low efficiency. ABC model determines where the greatest possibilities of cost reduction lie; but ABC information is not a current operating tool for the activities of improvement. This model offers the key direction for decision-making where to launch initiatives such as kaizen costing, pseudo-profit centers, TQM and reengineering. *Activity Based Budgeting (ABB)* extends the ABM idea to the planning cycle by using it to establish cost limits and control systems in organizations. Supported by activity analysis ABB uses benchmarking information to help the company to control costs and eliminate the increasing trend of exceeding the budget without improving the company's ability to create value for customers (McNair, 2007). ABB is directed towards future resources, activities and outputs and is a valuable information support to the process of strategic decision-making.

A philosophy of *Total Quality Management (TQM)*, in which managers strive to create an environment that will enable workers to manufacture perfect (zero-defects) products, is replacing the acceptable quality attitudes of the past. Reducing defects, in turn, reduces the total costs spent on quality activities. Four categories of *quality costs* are emphasized: *prevention* costs are incurred to prevent poor quality in the products/services being produced; *appraisal* costs are incurred to determine whether products/services are conforming to their requirements or customer needs; *internal failure* costs are incurred because products/services do not conform to specifications or customer needs; *external failure* costs are incurred because products/services fail to conform to requirements/satisfy customer needs after being delivered to customers. Quality costs can also be classified as *observable* (available from an organization's accounting records) or *hidden* (opportunity costs resulting from poor quality – not usually recognized in accounting records). A quality cost report is prepared to improve managerial planning, control and decision making (strategic pricing and cost-volume-profit analysis). Quality is one of the major competitive dimensions for world-class competitors (Hansen&Mowen, 1997). Organizations operating under the TQM philosophy have introduced a broad array of non-financial measures to monitor and improve the quality of their products/processes. For example, Motorola, a leading company in applying the TQM philosophy, adopted an

aggressive approach to quality, setting a quality target of a level representing fewer than 12 defects per 1 million parts (Cooper & Kaplan, 1999).

Target Costing (TC) is a tool (McNair, 2007) which emphasizes the relation between the price and market share as a basis for disciplining an organization's spending during product and process design, development and engineering. Basically, it assumes cost reduction per product unit. It is a completely new approach: how much a product *is allowed to cost* (Seidenschwarc, 2005). The implementation of new methods of identifying, measuring and providing information about critical factors of business success ensures the development of products to suit customer demands, regarding the features and quality, as well as the price. As a concept of a much more comprehensive and aggressive CM information support, TC is built in the decision-making (planning) process concerning introduction of new and making radical changes to the existing products and processes. *Target Cost Management (TCM)*, as a tool for a comprehensive cost and profit management and as a concept of long-term strategic CM, focuses on the design stage. It initiates CM in the earliest stages of product development and is aimed at intensifying the cooperation with the suppliers and other organizations on the market. TC operates after a general model: $\text{target costs} = \text{target sales price} - \text{target profit}$. If the target cost (as the difference between the sales price needed to ensure a previously determined market share and the desired profit per unit) is below the presently feasible cost, the management budgets cost reductions which direct real costs to target costs (Hansen&Mowen, 1997). Bearing in mind the organizational aspect, a successful implementation of TC concept assumes the creation of an organizational team structure that should include experts from different functional areas of the company as well as from the organizations it cooperates with on the market.

Life Cycle Product Costing (LCPC) is an extension (McNair, 2007) to TC tools, which links all costs driven by a new product, from the conception of the idea for the product through to its removal from the production program and withdrawal from the market, i.e. 'from the cradle to the grave'. The products are analyzed in order to determine whether they will bring profit during their entire life cycle. *Life Cycle Product Cost Management (LCPCM)*, according to the integrated approach, consists of activities leading to product design, development, manufacturing, marketing, distribution, use, maintenance, service and removal, with the aim of maximizing life cycle profits. As a result, product costs are tracked and analyzed through all stages of its life cycle, which is radically shortened due to changeable customer demands and the increasingly ambitious competition regarding the technological product innovations. In contemporary settings it is of vital importance to launch a new product on the market and replace the existing product with the innovated one as soon as possible (regarding quality and functionality). LCPCM stresses cost reduction, not cost control. Since 90% of the life cycle product costs are determined in its design process, i.e. in the stages of a new product development and construction, activity management during this stage of product existence is stressed. This should, by all means, affect the managerial decisions regarding investments and directing more resources towards activities in the early stages of product life cycle. However, the overall success depends on how well the managers in manufacturing companies understand the activities, cost drivers and interaction among activities. Although LCPCM is important for all manufacturing companies, it is particularly significant in short life cycle circumstances, when good planning is critical and the prices must be accurately determined in order to cover all life cycle costs and ensure a good profit (Hansen&Mowen, 1997).

Value Chain Analysis (VCA), i.e. costing and CM through the value chain, is a concept representing the broadest approach to management. It assumes monitoring the relations among activities that create value with the aim of cost reduction, where the problems of tracking, measuring, analyzing and managing costs are extended outside the borders of a company. Beside internal value chains (VC), it extends to the area of supply chain, i.e. suppliers, on the input side, and distribution chain, i.e. customers – distributors and end users, on the output side, because the internal VC of a company is built in the broader value system which includes both supply VC and customer VC. That is to say that the leadership strategy in low costs and/or the differentiation strategy can lead to sustainable competitive advantage, but successful application of these strategies requires the managers to understand all the activities that contribute to their achievement. It is necessary to understand the industrial value chain as a whole, not only the part in which the company participates. Without an external focus there is no effective strategic CM. With the aim of successful implementation of the relevant strategies it is necessary to break the VC into strategically relevant activities of a company. VC is a necessary approach to understand these activities; understanding both the complex links and interrelations between activities performed inside the internal VC of a company (internal linkages), and those describing the linking of activities of a company with the activities of suppliers' VC and customers' VC (external linkages). Therefore, in order to describe and exploit these relations, it is necessary to identify company activities and choose the ones that can be used for creating and sustaining competitive advantage.

The optimal choice assumes the knowledge of costs and value created by each of the activities, as well as relevant cost drivers.

Also, it is very important to point out that one of the critical factors of the success of pursuing competitive strategies on the market is to provide a rounded up performance measuring system. One of the solutions is the so-called *Balanced Scorecard (BSC)* which provides a comprehensive framework linking strategic objectives of the company with a coherent set of performance measures (Zimmerman, 2000). BSC attempts to unite and balance traditional financial perspective (concerning the measuring of current and designing future financial results) with three more perspectives of vital importance for a successful pursuit of competitive strategies on the market – the perspectives of customers, business processes and innovations and learning. In the BSC approach to performance improvement the most critical processes for the success of a strategy are identified. They are stressed not only for their potential for cost reduction, but also for their ability to fulfill end users' expectations. When using BSC, managers usually realize that for the implementation of a new strategy it may be much more important to stand out in completely new processes than to create gradual cost improvements in the existing processes (Cooper&Kaplan, 1999).

Value Stream Accounting (VSA) is characteristic of *lean manufacturing (LM)* which developed from Toyota production system based on the JIT model and is the complete opposite of traditional production. Many companies, aspiring to the "world class" position, follow LM whose objective is to improve efficiency and effectiveness in every area – including product design, interaction with the suppliers, factory operations, managing employees and customer relations. In order to keep this position, they must persist in "endless journey" which requires continuous innovations and improvement. "Lean" includes making the right product at the right place at the right time in the right quantity with minimum waste and sustaining flexibility. Thus, the key for successful LM lies in the achievement of production flexibility which includes physical organization of production plants and the application of automated technologies including CNC machines, CIM, *robotics*, CAD, CAM. Companies inclining to LM often use the tool *value stream map (VSM)* to present their business process graphically in order to identify the wasteful aspects which should be eliminated. VSM identifies all actions needed to complete product processing (batches or individual products) together with the key information about each individual action (it can include total labor hours, overtime, cycle time for the task completion, error rate). Some commercial VSM tools produce, beside the current state map, a future state map, describing the process which is lean – where waste is removed to the fullest extent. Since it is possible to identify, from the latter, the steps of the action of eliminating nonvalue-added activities within the process, it is also the basis for the lean implementations (Hall, 2008). Information needs of a lean company cannot be adequately supported by traditional information provided through conventional accounting techniques, because of inaccurate cost allocation, promotion of non-lean behavior, inaccessibility in real time, financial orientation. Therefore, many lean companies have adopted an alternative accounting model. Some of them see the solution in ABC method, but many replace it with a simpler accounting model, the so-called VSA. VSA tracks costs by the value stream instead of department or activity; the value streams cut across function lines and departments, i.e. horizontally, and thus links with traditional vertical reporting on structure and cost flows are broken (McNair, 2007). It is of fundamental importance for its implementation to define *product families* (Hall, 2008). As for the information support to lean manufacturing and world class companies, three information systems are being considered, from MRP (Materials Requirements Planning), and MRP II (Manufacturing Resource Planning), to ERP (Enterprise Resource Planning). In the past few years a range of software of the so-called ERP systems has been developed. ERP integrates departments and functions throughout the company into one system of integrated applications with a unique common database. A lean manufacturing company will thus have ERP system capable of external communication with customers and suppliers through electronic data interchange (EDI).

Considering that companies operate in an extremely dynamic world of interdependent and nonlinear events, we should finally emphasize that CM cannot stay focused on independent activities and simple linear cost models and their drivers. In order that CM could secure an important position in the 21st century and reject the label 'old wine in new bottles', it is said that it is necessary to withdraw completely from simple assumptions and traditional limitations and that the key of the CM future lies in understanding the dynamic relationships between various resources and the amount of value they can create for the company stakeholders. In that sense, key instructions are listed for the most recent research and practice regarding new techniques for the 21st century, such as: resource consumption accounting; the relative cost of intellectual capital and the value it creates; waste measurement and analysis; non-linear cost functions; dynamic cost modeling and prediction. Each of these techniques adopts a broader view of costs, focusing more on the way resources affect one another in creating or destroying the company value than on

measuring the status quo. CM follows the need to define measure and help the organization to maximize its potential to create value.

6. CONCLUSION

In the past decades there has been an increasing number of discussions about CM and extending various limits. It is a dynamic process which assumes intensive efforts directed towards continuous improvement, i.e. improving the existing and inventing new tools and techniques, starting with early activity-based costing models and pursuing lately in the direction of *strategic cost management* (SCM)- the use of cost data to develop and identify superior strategies that will produce a sustainable competitive advantage. In that period, the most prominent trend has been shift the focus from determining product costs by using standard traditional cost models, towards providing support for strategic and operational decisions by using certain forms of activity analysis.

New environment brings new challenges and problems which inevitably impose the need for serious reconsideration of past business philosophies of companies based on stable and foreseeable business conditions. Therefore, suggestions are heading towards the separation of cost accounting from traditional accounting, together with abandoning of the long sustained linearity of measuring historical costs and static standards. Only by integrating the internal and external aspects it is possible to provide quality information for strategic management of a modern company. The key point is flexibility - the cost accounting information system should be able to supply different data for different purposes. Practical application of some new solutions faces difficulties in developed countries as well, because of high investment and operational costs. It is particularly emphasized that, from the aspect of modern cost management, there is much left to be done in order to raise cost management to the highest level of the modern practices.

Our conditions are characterized, unfortunately, by underdevelopment and weak application in practice of the conventional as well as the new solutions for cost accounting. It is necessary to widen and deepen more intensively the existing theoretical and practical knowledge which will enable us to examine the wide focus of company cost and performance management and to recognize the right conditions for gradual development and implementation of new solutions along with the development of our economy. It also seems logical to ask the following question: How much do cultural features and mentality affect the implementation and efficient functioning of a particular solution? In any case, the new solution must be closely examined by the cost-benefit analysis which should clearly show whether the benefit of using particular information outweighs the costs of providing it.

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EXPERTNESS IN BUSINESS PLAN DEFINING IN CRISIS CONDITIONS

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Abstract: *The global financial crisis is caused by a structural disturbance, sudden lack of capital and a huge mass of liquid funds for the regular maintenance of economic trends in the world. Highly developed countries are threatened with the risk of long-term recession. In less developed countries, like ours, the global crisis has posed a much greater risk than a general financial collapse, due to limited resources to quickly overcome financial insolvency. For Serbia, the way out of financial crisis lies in a faster start-up of available unused national resources, where a relatively small investment project with new fresh capital can create new job positions in very short time, GDP growth and the fastest routing of new products and export services. The New Economic Development Strategy of Serbia depends on the skill and speed of running the huge resources available in the agricultural sector and industries that rely on the agricultural sector. The existence of more than 400,000 registered farms, along with several thousand small and medium-sized companies for the processing of primary agricultural products and logistical support, offers a real opportunity for a faster exit from the crisis. However, the available resources in the agricultural sector are still very limited with a range of products and services involving a higher degree of processing, which could be offered to our traditional foreign buyers. Even though there are conditions for the development of new export-oriented business ventures in Serbia, there is a lack of business ideas, knowledge and skills necessary to start such a business. In order to start new business ventures, hundreds of good business plans must be provided in a very short period. A business plan is an important document for providing necessary financial resources from the public funds or from commercial banks. In crisis conditions, it is difficult to choose an appropriate subject of a new business plan. Thus, the authors paid special attention to defining the optimal choice of subjects and a business plan in a crisis atmosphere. The expected effects of reducing unemployment and creating new jobs were not achieved with the activities of government institutions in underdeveloped areas in the agricultural sector with the financing from foreign grants. This is a limiting factor for a faster way out of the crisis and the promotion of rapid economic growth. It emphasizes the importance of the implementation of previous positive solutions to check market mobility of new programs, selection of the best technology and equipment with the lowest cost per unit, in order to achieve competitiveness in the market in a crisis situation. A good business plan is based on credible budgeting for the necessary financial resources, without which there will be no successful business. Proper analysis of the investment and business risk should provide security to entrepreneurs and owners of capital for investment given in the business plan. This research is primarily intended for current needs and implementation in practice, as a contribution to more rapid initiation of new economic activities in the agricultural sector meant to encourage the country's rapid exit from the current crisis.*

Keywords: *business plan, agricultural organizations, agricultural markets, financial incentives and new jobs.*

1. HOW TO GET GOOD BUSINESS IDEAS FOR CREATING AN EFFECTIVE BUSINESS PLAN

In the currently difficult economic conditions and tough competition in other businesses it is important, both for individual entrepreneur and a company, to possess the right knowledge and skills for organizing a successful business enterprise, if they want to survive in the market and make a profit. The main goal of any undertaken business is to gain profit.

Profit is realized when an entrepreneur or a company successfully operates, which means the best use of its available resources, contained both in mental and business acumen, their employees, all the material and financial resources engaged, in order to successfully place its products or services on the market at the lowest possible operating costs and by achievement of the highest possible income.

This includes well-designed and defined subject of a business plan as a starting point for achieving defined business objectives, particularly in the current crisis conditions. In the business plan, the limit point of return in a crisis atmosphere is best measured by establishing the relationship of fixed and variable costs in a

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planned and realized business. When defining the subject of a business plan, at the current difficult business conditions, this relationship is first to be checked. A company, whose total business organization is weaker, especially with inadequate market research, marketing and distribution, has higher fixed costs. Organization with higher fixed costs of its products and services per unit, will therefore increase its selling prices, become uncompetitive, lose its business arrangements, realize less revenue, operate with losses and quickly go into bankruptcy.

In crisis conditions, the definition of objects of a business plan is usually expressed as follows: Selection of an optimal subject of the business plan is correlated with the degree of successfully organized and achieved management of available resources, to become competitive on the market in order to achieve maximum sales impact and security of the long-term income and profit.

In practice this premise means that finding the product (s) or service (s) in the optimum extent based on previous market tests of demand volume and levels of sales price trends (sales) that could be placed under the best conditions, with the structure of the available resources (fixed and current assets), applied technology, expertise of employees and successful management.

2. THE KEY CHARACTERISTICS OF EFFECTIVE BUSINESS PLAN

Business plan is a key document for determining effective business and financial skills of legally organized company or its management in order to:

- start a new business undertaking or establish a new company,
- introduce the alternative business programme which is more competitive on the market and enables successful opposition to competition,
- enable business and financial consolidation of the existing company that sunk into financial difficulties due to the obsolescence of products or services, loss of markets, lack of funds and other weaknesses in the previous period, and
- Conduct planned expansion of existing operations, increase the capacities in order to meet increased demand of their products or services in the market and increase exports of goods and services.

An effective business plan, as an important starting business document of well-organized business enterprise is both a "tool" and a guide for the on-going management of successful entrepreneurial venture or business organization and is intended for:

- the entrepreneur who intends to initiate and conduct a new entrepreneurial venture,
- entrepreneur or legal entity that intends to develop new products and services, according to a prior assessment of market demand and the perceived intentions and actions by competitors,
- a legal entity that has decided to extend or change a registered business,
- Investors who intend to make investments in the purchase of new enterprises, plants, joint ventures, etc.).

An effective business plan is primarily intended for owners and management of the companies for reliable and secure planning of business activities and designing optimal business results. The aim of every business plan is to check the profitability of investment (financial) in business ventures, especially if they are subject to tough competition and difficult economic conditions.

3. THE STARTING POINT FOR EFFECTIVE BUSINESS PLAN IN CRISIS CONDITIONS

An effective business plan is usually prepared prior to the business and/or investment decisions. If this is done in critical conditions it is necessary to establish the main focus of activity of the crisis on the business entity (general illiquidity, an unfavourable investment climate, reduced purchasing power of population, significantly exceeding of the approved budget deficit, etc.). In such circumstances, an effective business plan seeks to use the best subject of future business activities, which will resolve the identified limiting factors for the successful continuation of business. Timely and proper selection of appropriate items of business plan provides the timely adoption of optimal business and/or investment decisions. This means that the business plan perceived correct directions of the projected business enterprise, and identified potential business and investment risks on time. Therefore it is possible to neutralize or minimize detected risks and set up adequate and safe business solutions.

In principle, an effective business plan is usually drawn in preparing loan applications submitted to banks or other lending institutions for timely provision of necessary short-term or long-term funding for the successful conduct of business. In the crisis situation other business purposes can be expressed, and primarily for

financial and business faster consolidation of the business entity, and define the appropriate exit strategy from the created of financial and economic crisis.

4. METHODOLOGICAL DIFFERENCES IN THE PREPARATION OF A BUSINESS PLAN

Tests conducted in 2011 and 2012 of actions on the training of unemployed people in undeveloped areas, which, with the help of foreign donations, should start own entrepreneurial ventures in agro-sector, based on the self-employment, showed that there had been many failures, why the goal - to reduce unemployment, has not been achieved. The main reason for not achieving the goal is that the official factors, foreign donors and consultants engaged to train unemployed people, do not perceive significant differences in the methodology for training persons in the development and use of effective business plans for new entrepreneurial ship and the establishment of new businesses, in relation to the methodology used to prepare business plans for existing businesses that have financial difficulties or need of expanding existing facilities.

In practice, there are important conceptual and methodological differences of preparation and drawing up effective business plans, for:

- a) New business ventures and the establishment of new companies,
- b) The purchase of the partial or complete facilities and enterprises,
- c) The change of the business venture orientation during downturns,
- d) For the business and financial consolidation of existing businesses, entrepreneurs or companies, which have come to financial difficulty, insolvency and continuing blockade of the current account of erroneous conduct of its work in the past?

4.1. Business plan for new business ventures,

Business plan for new business ventures, establishment of new entities and so, while preparing and drawing up an effective business plan focus the attention on the market research and finding the proper object of the intended venture. For the preparation of this type of business plan it is logical that a beginner first examines the market to which it intends to focus its attention, particularly in finding the right somersault of business and checks the market demand. This is the basis for determining its capabilities and ability for achieving planned sales and production of defined products or services. In doing so, it especially checks whether this increase in market demand represents current or permanent condition. It is also necessary to further determine the level of development of existing capacity and level of sales prices of other similar market players (competitors) in the local and global environment from the intended operation of the new program.

4.2. Business plan for the existing business ventures and existing companies

Business plan for the existing business ventures and existing companies is methodologically quite different from the initial entrepreneurial venture. The focus in this case is placed on analysis of current status, weaknesses and shortcomings of the existing organization. First, it is necessary to identify and analyse mistakes and perceived shortcomings in the use of available resources, then analyse the objective difficulties in placement of existing products or services, that occur due to technological obsolescence of products, tougher competition from other market players, adverse effects of economic measures that emphasize the import of products and restricting sales of national products, and the like. During preparation and assembly of this type of effective business plan attention is focused on research for alternative solutions to overcome arising difficulties, better use of existing resources, and quick improvement of the existing production technologies, improved business efficiency, in order to end the crisis and ensure profitable operations in the future. After examining the causes of such a situation and finding alternative solutions for the rehabilitation of future business, the following procedure is to conduction of detailed market research, assessment of market demand in order to redefine the business case, which will be then processed in the new business plan.

5. PARTICULAR ASPECTS OF DEFINING A BUSINESS PLAN IN CASE OF CRISIS CONDITIONS

An important feature for effective drafting of a business plan is to select the appropriate items of business enterprise, then determination of the appropriate scope of business activities and selection of the right methodological approach. Some banks and other financial institutions (Development Fund and similar institutions) determine for their loan claimants specific methodology for the preparation and presentation of effective business plans as a basis for reviewing and approving loans. Before preparation of the Business

plan, entrepreneur, business consultant, company management and others must first choose the institution to which they will address for securing the necessary funds.

In crisis conditions, providers of financial support require from the holder of an effective business plan to accurately describe the selected product or service, in order to test the comparative advantages of the offered items in relation to other market operators, subject to similar businesses. When describing the chosen item, the business plan should include, in particular:

- the main characteristics of products or services,
- the needs of customers for the selected product or service,
- the willingness of consumers to pay the projected cost of the product or service,
- Preparation technology on which the selected product is based and others.

In order to determine the possibility or chance of the selected product or service, there should be included the analysis of the situation in the industry or sector in which it operates, in order to resolve potential risks with appropriate modifications and other marketing measures.

6. THE IMPORTANCE OF TESTING MARKETING OPPORTUNITIES IN CRISIS CONDITIONS

Market research is very important and responsible task in preparing and drafting a business plan in a crisis conditions. Narrowed market demand due to reduced purchase options imposes more detailed examination and description of any significant market events that are related to the selected item of business plan. From the experience of good practice in critical operating conditions, careful market research should include:

- 1) Detailed assessment of characteristics of the selected product (service),
- 2) In particular, a detailed examination of the potential scale of market demand,
- 3) The verification of the formation of the selling prices of selected products or services,
- 4) Check the behaviour of competition:
 - Identify main competitors and their strength?
 - Identify their business strategy?
 - Consider the advantages and disadvantages relative to competitors in their own business?
 - Consider the production and sales capacity of competitors,
- 5) Check the selected sales methods and distribution channels that they intend to include in effective business plan,
- 6) Selecting the best advertising techniques to promote selected products or services provided in an effective business plan is one of the key elements for successful implementation of business ventures.

7. THE NECESSITY OF PRIOR ANALYSIS OF COMPETITION IN THE BUSINESS PLAN

Competition is a rivalry between alternative market entities that address the same group of customers, where each is trying in its own way to increase sales, marketing share and gaining higher profits. Competition is a latent (hidden) risk to a particular manufacturer and market subjects. Elements through which competition operates in the market are: volume, structure and size of bids, price and product quality, technology, capacity management, and financial and marketing power of the subject. The subject of research and proper analysis of competition in a crisis atmosphere directed primarily to offer their system (range, sale price, payment terms, the system of distribution and post sales service, display and use of marketing mix, market position). Based on the survey formed database includes: name of the entrepreneur or business entity, name of a competitor, location, program supply for market area in which it operates, technological capability and the like. The collected information relating to market share achieved in meeting the needs of customers needs to be fatherly analysed for the different market segments and key products, which are the subject of an effective business plan. It is also necessary to analyse the sales channels of competition, and how they cooperate with the customers, especially if they use discounts and the like.

8. SELECTION AND PRICE DEFINITION IN THE BUSINESS PLAN

The selection and definition of price is not a simple economic category. The economic entity, as the market participant trough defined by price can develop two types of strategies:

- a) A market strategy of price competition and
- b) A market strategy of non-price competition.

If the total costs of products or services (variable and fixed) represent a lower bound or "floor" price, then the level of market demand determines the upper limit or "ceiling" prices. Application of **pricing strategy** assumes that an entrepreneur or a company has mass production and low production costs. Sellers who implement this sales strategy are forced to have a policy of flexible sales price. Prices change due to changes in the structure of operating costs (increase of variable or fixed costs) or because of increased demand for particular products or services. Price changes are possible when the competition does so. The essence of pricing implies a good knowledge of market changes and the ways in which changes in market demand may influence the formation of different prices.

Strategy of **non-price** competition in the market applies to improving the quality of products or services over the competition, better and more attractive packaging, providing favourable conditions of sale, deferred payment or other services (free transport of goods or similar free installation and free services). In non-price marketing strategy vendors keep prices stable. Non-price market strategy is applied by entrepreneurs that previously positioned their products or services highly on market, using permanent maintenance of the high quality, better marketing promotions, additional services and other market activities...

9. THE FINANCIAL SEGMENT OF AN EFFECTIVE BUSINESS PLAN IN CRISIS CONDITIONS

The main objective of the establishment, commencement and conduction of any business ventures or the company is profit. Previously reviewed key financial parameters in the process of preparing an effective business plan (determined by structure of fixed and variable costs, marginal rate of income, the coefficient of possible sales charges, maintenance of the required coefficient of raw and finished products, materials, the coefficient of discharge of obligations to creditors, the expected rate of gross profit before taxation, financial liquidity and leverage, participation interest on the borrowed funds in the total income, etc..) determine the feasibility of a business venture, as to whether one could expect average earnings and return on total assets invested in a new businesses or financial consolidation of the existing business entity.

At the beginning of the preparation of the financial segment of an effective business plan it is necessary to make a realistic pre-estimation of the total funds required for the realization of the projected business enterprise. This amount usually includes: the amount of the excess, and the amount of missing funds (these funds are most often provided through banks loans, borrowed). Planning is done from the total amount of required financial resources - for which purpose it will be used. In this regard, it is necessary to:

- calculate the required fixed assets,
- calculate the necessary working capital,
- calculate the expected costs of all operations,
- estimate expected sales revenues,
- Make cash flow projections for the next 3 years.

To forecast the necessary financial resources it is very important to determine: the days for setting the time of sale, time of keeping the supplies and raw materials, reconciliation of accounts payable. In the following text we will present an example of model with integrated calculations of necessary financial resources, proven in practice for many years and accepted by many financial institutions that provide financial support to individually entrepreneurs and small companies.

10. THE EFFECTIVE PROCESSING MODEL OF FINANCIAL SEGMENT OF THE BUSINESS PLAN FOR THE PRODUCTION OF PACKAGING USED IN AGRICULTURAL PRODUCTS

It is assumed that the founders and co-owners of small company made the decision to prepare a business plan, to ensure the necessary resources for financing production of contemporary plastic packaging which will be used in the food industry. Previous market tests have shown that planned products are highly in demand due to the increased needs of industry for processing agricultural products intended for export.

After completing market research, major customers are defined, as well as their annual needs. Based on this, project of technology used for new plastic packaging is completed, and appropriate equipment was selected, and in connection with that, the technical, material and labour standards were established. An overview of the annual fixed cost for the company business is also determined. Based on the technical standards, the amount of material needed for productions are defined and preliminary contracts for the delivery concluded. According to the adopted technical, technological and labour standards, budget for necessary funds is being calculated (financial segment of the business plan), for the planned production volume. To calculate the necessary financial funds, for this example, we used defined parameters as follows:

- a) Projected annual sales volume of finished products is RSD 15.000.000.
- b) According to defined technical standards, direct costs are 40% of revenue from total planned sales
- c) Fixed costs amount to 20.40% against planned sales.

- d) Planned Amortization of permanent funds on average should be 10% per year
- e) Depreciation for the first year is covered by the planned fixed costs, and the rest is covered by the planned funds for the purchase of fixed assets.
- f) Sales financing are planned to be 30 days on average
- g) Funding of material, in accordance with the production technology and the on the dynamics from the contracts with suppliers, should be 85 days.
- h) Planed supplies of material for the beginning of the production are in amount of RSD 1.000.200.
- i) Planned purchases for the period in amount of RSD 6.300.000
- j) Provided supplies to the end of the period amounted to RSD 1.5 million, and are slightly increased due to the planned increase in production for the period
- k) The suppliers agreed to deferred payment terms for 20 days without interest
- l) The value of the acquisition of fixed assets in accordance to the business plan is RSD 2.5 million.
- m) The planned interest rate on the requested amount of the loan is 12% per annum.

Based on the previous parameters, the financial segment of an effective business plan includes:

- 1) Preparation of the projected income statement (check of business profitability),
- 2) The preparation of the budget for total funds required in business plan,
- 3) Checking the profitability and feasibility of an effective business plan
- 4) Preparation of the planned balance sheet in order to review the financial position and the certainty of return on invested funds
- 5) The preparation of the cash flow forecast to determine the ability of management to manage cash and generate invested money.

Here is the example for the preparation of financial segment of the effective business plan:

THE MODEL OF CALCULATION OF NECESSARY FINANCIAL RESOURCES

I) PLANNED INCOME STATEMENT

1. Projected sales revenue		15.000.000
Less direct costs:		
- materials (40% of No.1)	6.000.000	
- gross wages (20% of No.1)	3.000.000	
Total direct costs	9.000.000	9.000.000
2. Marginal profit		6.000.000
Less:		
- Fixed costs (20,40% of No. 1)		3.060.000
3. The planned operating profit (margin)		2.940.000
Less:		
- Borrowing costs (12% per annum, 60% of No. 9)		351.666
4. Net profit before taxation		2.588.344

II) PROJECTION OF NECESSARY ASSETS

5. Financing the purchase of fixed assets (2.500.000 – 250.000)	2.250.000	
6. Financing sales (15.000.000 x 30 days / 365)	1.232.877	
7. Funding maintenance of supplies (stocks)		
- initial stocks	1.200.000	
- supply in the period	6.300.000	
total	7.500.000	
- final stocks	1.500.000	
Net consumption of materials (7.500.000 x 85 days / 365)	6.000.000	1.746.575
		5.229.452
8. Use of the funds from suppliers (6.300.000 x 20 days / 365)	- (345.205)	
9. The total planned engagement of the funds	4.884.247	4.884.247
10. NET FUNDS NEEDED		2.295.913
Turnover ratio for engaged funds	3,07	Equity
The planned rate of net profit	17,26%	Loan
		918.365 40%
		1.377.548 60%

The rate of return on total funds invested 52,99%

III) PROJECTED BALANCE SHEET

A) ASSETS		
I. FIXED ASSETS		
- Purchase value	2.500.000	
- Depreciation	<u>250.000</u>	
- Current value	2.250.000	2.250.000 (1)
II CURRENT ASSETS		
1. Stocks	1.500.000 (2)	
2. Receivables from debtors	1.232.877 (3)	
3. Cash	<u>246.575 (9)</u>	
Total current assets	<u>2.975.452 (8)</u>	
Less:		
III CURRENT LIABILITIES		
4. SUPPLIES CREDITORS	<u>- (345.205) (4)</u>	
NET CURRENT ASSETS (NCA)	2.634.247 (7)	<u>2.634.247 (6)</u>
TOTAL FIXED ASSETS + NCA		4.884.247 (5)
Less:		
IV LONG-TERMS LOAN FOR BUSINESS PLAN		
		<u>1.377.548 (10)</u>
NET ASSETS OF THE OWNER		<u>3.506.699 (11)</u>
B) LIABILITIES + EQUITY		
1. Initial capital		1.280.731 (14)
2. Net profit after taxation (2.588.334 x 14/100)		<u>2.225.968 (12)</u>
TOTAL OWNERS EQUITY		<u>3.506.699 (13)</u>

IV) PLANNED BALANCE OF CASH FLOW

A) CASH FLOW FROM OPERATING ACTIVITIES		
1. Gross profit from the planned operation		2.588.334
2. Non-monetary activities included in gross income		
2.1. Receivables from debtors	- (1.232.877)	
2.2. Stocks	- (1.500.000)	
2.3. Liabilities to creditors	<u>+ 345.205</u>	
Total	- (2.387.672)	<u>- (2.387.672)</u>
3. Net cash flow operating activities		+ 200.662
B) CASH FLOW FROM INVESTING ACTIVITIES		
4. Investment in buildings	-	
5. Investment in equipment	<u>- (2.500.000)</u>	
Net cash flow of investing activities	- (2.500.000)	- (2.500.000)
C) CASH FLOW FROM FINANCING ACTIVITIES		
6. Loan for business plan	1.377.548	
7. Equity	+ 1.280.731	
8. withdrawal of funds	<u>- (112.366)</u>	
Net cash flow from financing activities	2.545.913	<u>+ 2.545.913</u>
		+ 246.575
D) INCREASE - DECREASE IN CASH		
9. Opening balance		<u>0</u>
10. Cash at the end of period		<u>246.575</u>

10.1. The rating for financial segment of the business plan

The presented methodological approach for processing the financial segment of the business plan makes it possible to establish the first anticipated profitability of the business enterprise. In this example, the planned income statement states that the marginal profit rate is 40%, which corresponds to a highly profitable business. The production of contemporary plastic packaging for food products is therefore profitable venture.

After determining the profitability of the planned business venture, the next step is to make the projection of the required financial resources, as a key segment of the business plan.

From the above stated parameters, a relatively small number of sales financing days is determined, which requires verification of the actual situation regarding the degree of collection of revenue from product sales. Preparation of the budget shows the existence of critical points of the items for required funds in the part relating to the financing of the volume of material production, due to the greater the number of days for keeping the stocks, prior to use in the manufacturing of the plastic packaging.

Number of inventory turnover days for the production of materials is determined by the structure of sources of supply of key materials. The total volume of stocks at highly automated production, such as the production of plastic packaging for the food industry, depends on the length of time for delivery of the last of components, especially those purchased abroad, with the prolonged delivery.

10.2. Reading and understanding of financial statements of the business plan

Checks and controls when developing and implementing an effective business plan include reading and mastering the skills of financial information. Introduction of accounting categories and logic, allows efficient evaluation of business projections made in the business plan, comparing the obtained results with those of other businesses, particularly in the following financial categories:

- a) Relation of fixed and current assets (to avoid excessive immobilization of funds)?
- b) Relation of long-term and short-term liabilities (to achieve greater financial liquidity)?
- c) The structure of equity (in order to strengthen the equity and financial position)?
- d) The structure of debt (principal and interest payments)?
- e) Relations of fixed and variable costs (for maintenance of rational organization of entities)?
- f) Relations of direct and indirect costs (for monitoring the efficiency of business)?
- g) Analysis of the calculated costs of products or services (in order to maintain competitiveness)?
- h) Analysis of the balance sheet for maintenance operations or financial position of the company,
- i) Analysis of the income statement - revenues, expenses, profit or loss (to maintain profitability)?
- j) The analysis of cash and cash management (to improve financial liquidity)?

11. WHAT IS NOT INCLUDED IN FIGURES IN THE BUSINESS PLAN

In financial calculations and financial information we cannot see, but, between the lines of a business plan, we can read following:

- the business skills of owners, entrepreneurs and management of a business entity,
- quality of organization and certainty of business success in the future,
- future demand for specific products and services company,
- The certainty or uncertainty of future operations (expected bankruptcy and bankruptcy).

As a rule, if the company's business - the business entity is simple or a smaller scale, the accounting data are less complicated, more efficient, more accurate and reliable for use. Financial accounts are usually prepared in a manner that would be adapted and prepared for a tax audit, which has been recently very present and represents a limiting factor for the proper and accurate preparation of financial budgets, business plans and preparation of new strategies that should ensure faster emerging from the crisis and boost future business development, increase revenue, net income and dividends.

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INNOVATIVE BUDGETING EXPENSES OF DEFENSE

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Abstract: *This document presents a system of programming budgeting, that is a model management with a goal to establish relations between engaged and proposed resources, in fact achieved results. Special attention is dedicated to the needs as well as to the achieved results of the applied model in order to dispose rationally and finally to efficiently conduct determined tasks.*

Keywords: *programming budgeting, development, resources, management, defense system.*

1. INTRODUCTION

Changes in society and therefore in state, that occurred in the last decade of the 20th century and in the first decade of the 19th century, have influenced by the fact that the rooted attitudes and opinions have changed within the society which are a reptil of old times when it was thought that the education and defense are too important from a political, sociological and human aspect to be able to undergo some kind of economic calculations. On the contrary, in the today's situation, management structure of the system of defense must act immediately and make concrete decisions according that and, also, being faced with the problem of limited resources.

The additional problem for the defense system of the early 21st century, is that the previous system of financial resources, particularly budgeting, was not sufficiently effective and did not corespond to the complex requirements that were demanded of the management structure of the defense system of Serbia. The planning area of the defense system of Serbia was largely undeveloped and the need to regulate this in a qualitatively new basis was reported as an imperative. There were no mechanisms to provide sufficient information if the planned goals and objectives of the defense system would successfully implemented, and whether if an appropriate allocation of the resources for the realisation of the planned objectives would carried out.

Managing of financial resources was reduced to an allocation of available financial resources, without interconnections between the tasks of defense and financial plans. Also, there is problem of converting strategic objectives into financial plans that can be linked to budget resources. The fact is, of course, that many aspects of pre-defined objectives are implemented within the regular activities in the defense, but without feedback.

Financial planning, mechanisms for the preparation of financial plans and regulations for their enforcement haven't, until recently, provided sufficient information on whether the defined objectives have implemented successfully in practice. Because of this it was very important to improve the links between financial plans and strategies, to provide appropriate mechanisms for monitoring the effectiveness of their implementation and consideration of future needs. The introduction of functional programmatic dimension into the existing budget classification was one of those mechanisms.

The modern view and the view of overcoming problems of increasingly limited incomes also in the public sector of the Serbian government, found the solution in the 'budget directed to results' or program budget⁴. The role and place of the state in financing defense system is characterized by compromise in conflict resolution: to achieve the defined goal with minimal financial investment. The cause of this discrepancy is primarily the needs of the various growth opportunities that defense functions of the state require and its limited material and financial resources. However, the government of every state is obliged to, on the one hand, consider the economic situation of the country, and on the other hand, to give stable defense system, rationally using limited resources.

⁴ Program budgeting is based on the concept, methodology and practice of cycle management in project oriented organizations and recommendations of possible solutions of that model in the organizations of functional type in which belong the institutions of state administration.

Management structures of the defense system, as an integral part of society and its problems were faced, already in the 20th century and in the first half of 21th century, on the one hand, with the problem of transmission of liabilities from year to year, rising debts to suppliers, costs of court judgements for the delay in payments, penalty and interests for late payments of accrued liabilities, and on the other hand, with limited and insufficiently available financial resources. What necessarily required news and changes in management of financial and other resources of defense.

The significant changes have been implemented in the system of defense of The Republic of Serbia in recent years. The overall objective of the changes is the transformation of the system in line with modern security challenges and threats, that is needs and opportunities of The Republic of Serbia.

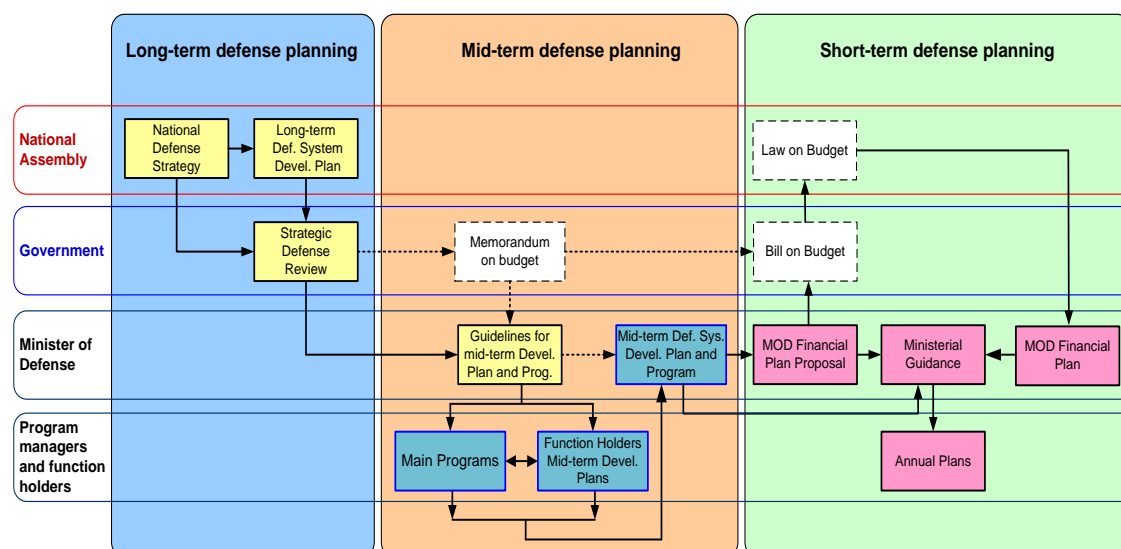
In order to ensure continuous growth in the quality of defense capabilities, increase efficiency of execution of the defense tasks, rational use of available resources, ensuring adaptability and flexibility of the process executing the defense tasks and coordination of development components of the defense system with the overall development of the State in the Ministry of Defense and the Army of Serbia in 2008. the system of planning, programming, budgeting and execution (PPBE) was introduced as a new management system of defense resources and in the final funding of developing programs and projects of defense system.

2. BUDGETING ANALYSIS OF DEFENSE SPENDING BEFORE AND NOW

Planning of the development of the defense system in the period before the introduction of program budgeting model was disintegrated and there was no continuity in the planning process. The development plans were made by the the office holders of the defense system each of them for themselves individually. Disintegration of planning functions, that existed before the introduction of a new defense resources management process, was a reflection of the existence of a large number of office hlders dealing with problems of planning. A particular problem was reflected in the lack of legislative and normative framework that would regulate this area.

Integration of the functions of development planning of the defense system, as it introduced a model known as program budgeting system PPBE, contributed to increase the overall performance of the Ministry of Defense and the Army of Serbia, because the defense system is viewed as a whole, fortified with all the tasks and resources required for their completion. Of course, the global financial crisis further complicates the problem, because the fundings for the tasks laid down by the Ministry of Defense and the Army of Serbia is getting more and more restrictive.

Decision makers in the defense system chose to introduce an integrated system of defense resource management, in order to bridge the created situation and to coordinate the requirements of the defense system and the possibilities of our society. Due to adoption and implementations of the PPBE system, integration of planning function as a first stage in the process of defense resource management comes into play.



Picture 1: Model of Serbian Defense Planning-now

Continuity in the programming phase is ensured with the development and adoption of long-term development plans of the defense system on which the medium term plans and development programs are made, which later serve for the development and implementation of short-term plans. Planning model which is represented in the defense system of the Republic of Serbia in 2011. is presented in picture 1.

Long-term planning is the process of setting objectives of the defense system for a longer period of time, as well as methods for their implementation. The long-term defense planning is an interdisciplinary process that involves many different activities. Activities are mutually dependent and precise coordination is needed. An interdisciplinary approach to planning requires close cooperation between the planners and military commanders, various specialists, political authority, etc.

The purpose of long-term defense planning is to consider the mission and tasks of the defense system and to establish realistic long-term objectives adjusted to the missions and tasks, as well as to determine the strategy of its realization. Long-term planning is oriented toward the relatively distant future and that represents a problem for planners as they face many difficulties that are the consequences of uncertainty in the future. Also, long-term defense planning should enable the appropriate development of defense system and avoidance of unwanted effects.

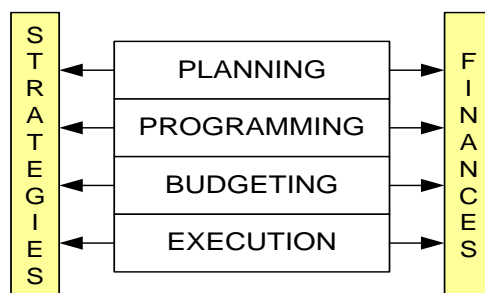
Medium-term planning is the process of determining the objectives of the defense system for medium-term planning period and the ways of their implementation. The objectives and priorities are determined by factors of development capabilities of the defense system that need to be realistic, purposive, implementable, measurable, time limited and classified according chronological and logical sequence.

Short-term planning is part of an integrated planning process that operationalized the medium term planning. In the defense system of the Republic of Serbia it includes a one-year planning period. Successful implementation requires the preparation of annual plans of a number of different plans that are different in content, level of detailing, the time interval covered etc.

3. PROGRAMME BUDGETING EXPENDITURE OF THE DEFENSE SYSTEM

In the public sector reform and within it performance-based budget or PPBE system, expenditures are classified according to programs and projects, operational objectives of each program are determined, and performance indicators are established for each program and activity. PPBE system is one of the important components of a wider process of reform of public finances. Specifically, it means the introduction of an effective mechanism for monitoring the achievement of defined objectives.

In the current environment of public finances, it is difficult to translate strategic objectives into operational plans and projects of development of the defense system, which can be linked to the budget means (picture. 2). The fact is, of course, that many aspects of already defined objectives are being implemented within the ordinary activities of direct budget funding.



Picture 2: Converting strategic objectives into financial plans

However, operational planning, mechanisms for the preparation of financial plans and rules for the enforcement of them, within the line budgeting, which was represented by 2008. in the defense system, did not provide enough information about whether the defined objectives are being successfully implemented in practice. It was therefore important to improve the links between financial plans and strategies in order to provide appropriate mechanisms for monitoring the success of their implementation and consideration of future needs.

Therefore, the program budget is a comprehensive system of defense resource management - a system of monitoring results (performance management system). Key feature of the program budget is in a change of

budget focus from budgetary commitments on short-and long-term results and reached objectives of the defense system.

However, limited resources imposes, in fact, wanted it or not, accepting different, basically an economic standpoint, which is characterized by:

1. the need for the best utilization of resources available for the specific purpose
2. the influence by the consequences of decisions in the present to a quality of development in the future
3. the necessity to be efficient, which correspond to a care that the set objectives achieve with adequate real available resources and
4. the obligation to legally dispose and permanently control the expenditure of resources for implementation of planned needs.

To increase the efficiency of the management structures of the defense system, changes in the sphere of budget expenditures were necessary, just because of limitation and scarcity of available funding. Otherwise the time and attention of management structures would be focused on securing funding for a reconciliation of the regular needs of defense and would be lost to the efficiency of doing the basic tasks.

4. SECTOR PROGRAMS AS AN INOVATIVE WAY TO BUDGETS EXPENDITURES OF DONATIONS OF DEFENSE

Defense expenses are financed by funds from the budget and donations from the European Union through Sector Approaches (also known as Sector Wide Approaches – SWAs). Sector Approaches are usually seen as programme-based approaches (PBA) operating at the level of a sector. PBA is defined as follows:⁵

A programme-based approach (PBA) is a way of engaging funds EU in development sectors programme, such as a National defence strategy, a sector programme, a thematic programme or a programme of a specific organisation (defence).PBAs have the following features:

- ✓ leadership by the host country;
- ✓ a single comprehensive programme and budget framework;
- ✓ a formalised process of donor coordination and harmonisation of donor procedures for reporting, budgeting, financial management and procurement end
- ✓ efforts to increase the use of this systems for programme design and implementation, financial management, monitoring and evaluation.

The European Commission (EC) is committed to delivering "more and better aid" for "legitimate strategies". One of the legitimate strategies is National defence strategy.

Sector approaches or sector-wide approaches (SWAs) are processes aimed at the development of coherent sector policies and strategies. They involve governments, donors and other sector stakeholders in a unified process and framework.

As mentioned above, EC decisions about whether and how to support a sector programme are based on assessments in seven key areas:⁶

⁵ European Commission, (July 2007).Guidelines for ec support to sector programmes – short version, p.23-30

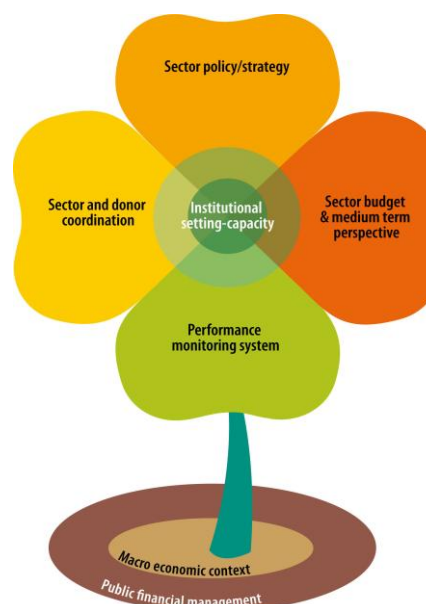
⁶ European Commission, (July 2007).Guidelines for ec support to sector programmes – short version, p.27-35

The five elements of a sector programme

1. The sector policy and overall strategic framework
2. The budget and its medium-term perspectives
3. Sector and donor coordination systems
4. The institutional setting and existing capacities
5. Performance monitoring

And the two additional elements influencing the sector programme's performance

6. The macroeconomic framework
7. Public financial management (PFM) systems



Limitations EC provide an insight into the basic concepts that are relevant to each assessment, identify key issues to be addressed and point to additional sources for more detailed guidance. The aim is to assist programme managers throughout the cycle of operations of EC support in reviewing the quality of sector programmes and deciding on appropriate support modalities.

Assessment of these areas would start during the programming and identification phases of the sector politics cycle, with the analysis then being completed during formulation. During implementation, these assessments would also need to be updated regularly in order to keep abreast of developments in the sector politics and each of the areas.

There are many overlaps between these assessments (for example, there are obvious connections between sector expenditure strategy, the macroeconomic assessment and the review of public finance management; all the other assessments may feed into the institutional and capacity assessment, and so forth).

Also, many of the assessments are also required for other aspects of EC work (e.g. a macroeconomic assessment will have been undertaken as part of limits preparation and to support any sector politics and so on. Those working on analyses should first of all draw on given limits, and if necessary update, existing assessments. Wherever there are relevant preexisting studies and materials, these should be drawn upon.

When it is possible, the EC works jointly with other donors, as well as with the partner government, on such assessments, and does so in ways that support the development of partner country capacity. The assessment required at the design stage of an politics sector is part of a continual process of monitoring and review of key issues. There are few, if any, absolute criteria involved in the assessments. Balanced judgements are required, which identify opportunities as well as risks, and which assess the direction of change as well as current levels of performance.

5. CONCLUSION

The introduction of the new model of program budgeting, situation in the field of management of defense resource is changing drastically. Namely, there is a process that takes place continuously. All plans and programs are integrated into one unit. The financial plan of the defense, as a function of plan holders, serve to establish a connection between the proposed appropriation of resources and results achieved. Mechanisms for monitoring the implementation of goals achieved are being introduced, which is advantage compared to the state so far.

The system of financial management of defense resources is becoming a complex, dynamic, interoperable, and integrated process. The main purpose of this process is management of maintenance and capacity building of the Ministry of Defense and the Serbian Army to achieve the defense objectives of Serbia. Finally, the purpose of defense resource management process is the provision of conditions for achieving the mission and tasks of the defense system.

However, the process of resource management is not just a technical procedure, but also an important political process. In the event that there is no political will and consistency in terms of sustainability of the planned and predicted values, there is a risk that the budgeting process could turn back into the allocation of available financial resources, as it has been the case until the year of 2010.

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MEASURING FINANCIAL DISTRESS OF "VELEFARM" AD BELGRADE, USING ALTMAN Z-SCORE MODEL

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Abstract: *The study of bankruptcy is becoming more relevant regarding the fact that even large companies are failing and therefore causing economic and social problems to the society. Using financial distress models to predict failure in advance is for most businesses absolutely essential in their decision making process. Hence, this study involves a critical investigation in the process of applying the Altman Z-score model in predicting financial distress in Serbia. The Altman model was developed in a different economic environment, time horizon, industry and country. Testing this model in the Serbia context is important for determining practical applicability and relevance of the model. The main objective of the study is to test the Altman model in determining practical predictive ability of failure in selected company - Velefarm AD, Belgrade, listed on the Belgrade Stock Exchange and to comment on the model applicability according to the empirical results. The data in the research consist of financial statements of Velefarm AD for the period of 2008-2010. The study is designed into three sections. The first section will discuss the theoretical aspects of the study. The second part will be the discussion of the research results, and finally the conclusion and recommendations of the study will be presented. Based on the conducted empirical research over financial statements of Velefarm AD, Z-Score model predicts bankruptcy for this company. The empirical results are interesting since they can be used by company management for making financial decisions, by regulatory authorities and by portfolio managers in stock selection.*

Keywords: *financial ratios, bankruptcy, Z-Score model, Altman, financial statements*

1. INTRODUCTION

Disclosure of the fact that the company is about to collapse represents fundamentally important knowledge which allows following the development of finance - threatening phenomena which might become a threat to the company's existence. It is important to have general financial outlook, methodology for monitoring the phenomenon and the people responsible for such monitoring and reporting the findings, along with the opinion about the implications and recommendations for dealing with the problem. Instruments for monitoring the emergence of financial distress represent the set of analytical tools that can be used alone or in combination. Financial distress is the situation when a company does not have capacity to fulfill its liabilities to the third parties (Andrade & Kaplan, 1998).

In making an investment, investors need to know how much risk they are taking. This paper attempts to answer how can we predict which businesses are likely to go bankrupt? About 40 years ago, Edward I. Altman set out to answer this question. Altman, then a financial economist at New York University's Graduate School of Business, developed a model for predicting the expectancy that a firm would go bankrupt. His model uses five financial ratios that combine in a specific way to produce a single number (Milojević, 2012). This number, called the Z-Score, is a general measure of corporate financial health. Later, Altman developed a modified version for private manufacturing firms and a second version for use by all businesses (Muller, 2008). This article describes the first original version, which is easy to use in Excel or similar application.

For this study, Altman Z-Score model is applied to Velefarm AD, Belgrade, one of the the biggest wholesaler of medications and medical products in Serbia, which is listed on Belgrade Stock Exchange since 2003. The data in the research consist of financial statements of Velefarm AD for the period of 2008-2010 (BELEX Belgrade, 2012). The study is focus on the potential bankruptcy of Velefarm AD.

2. ALTMAN Z-SCORE MODEL

The Z-score model of Edward I. Altman which was created at the end of the 60's of the last century. It attracted the attention of experts and was greeted with hope that it can be a very important tool for early detection of financial distress.

The intention of the model authors was to give investors an opportunity to evaluate (with one expression) status of financial distress, which might be better described as the probability that the company will enter into insolvency and threat to its existence (Gruszczynski, 2004). It is known that in evaluating the financial condition of a firm we can use many indicators based on the correlation between the two categories (ratios). Over time, these ratios drastically increased and those numbers alone have led to confusion. In a variety of ratios user does not have a clear idea on which to rely. In other words, an important issue emerged: Which ratio of gives reliable information on the status of the debtor? In response to this question Altman made the interesting structure which he called Z-score. Z-score model is based on a number of other terms, and all these expressions are in circulation in the financial professional community. Z-score model is an expression by which investors can make reliable investment decisions or judgments about whether their investment is safe or compromised.

Based on the above results, it is suggested that the Z-Score model is an accurate forecaster of failure up to two years prior to distress and that accuracy diminishes substantially as the lead time increases.

Z score bankruptcy model:

$$Z = 1,2X_1 + 1,4X_2 + 3,3X_3 + 0,6X_4 + X_5 \quad (1)$$

Original z-score component definitions variable definition weighting factor:

where X_1 = Working Capital / Total Assets

X_2 = Retained Earnings / Total Assets

X_3 = Earnings Before Interest and Taxes / Total Assets

X_4 = Market Value of Equity / Total Liabilities

X_5 = Sales / Total Assets

Z = overall index.

X_1 , Working Capital/Total Assets.

The working capital/total assets ratio, is a measure of the net liquid assets of the firm relative to the total capitalization. This ratio measures liquid assets in relation to the size of the firm. Working capital is defined as the difference between current assets and current liabilities. In general, a firm experiencing consistent operating losses will have shrinking current assets in relation to total assets. This ratio proved to be the most valuable liquidity ratio ever evaluated (Altman, 2000). Company which doesn't have sufficient working capital is handicapped and vulnerable to financial stress. Lack of working capital inevitably lead to insolvency.

X_2 , Retained Earnings/Total Assets

Retained earnings is the account which reports the total amount of reinvested earnings and/or losses of a firm over its entire life. It measures profitability that reflects the firm's age and earning power. The account is also referred to as earned surplus. It should be noted that the retained earnings account is subject to "manipulation" via corporate quasi-reorganizations and stock dividend declarations. The age of a firm is implicitly considered in this ratio. For example, a relatively young firm will probably show a low Retained Earnings/Total Assets ratio because it has not had time to build up its cumulative profits. Therefore, it may be argued that the young firm is somewhat discriminated against in this analysis, and its chance of being classified as bankrupt is relatively higher than that of another older firm, ceteris paribus. The incidence of failure is much higher in a firm's earlier years. In addition, this ratio measures the leverage of a firm. Those firms with high Retained Earnings, relative to Total Assets, have financed their assets through retention of profits and have not utilized as much debt.

If the balance sheet shows both retained earnings and a loss, we will take the difference between retained earnings and a loss. This difference can be negative, which will happen when the retained earnings are less

than the loss. In this case, the ratio between loss and total assets is negative as well. When the company shows only the loss in the balance sheet, then the Retained Earnings/Total Assets ratio is negative, too.

X_3 , Earnings Before Interest and Taxes (EBIT)/Total Assets.

This ratio is a measure of the true productivity of the firm's assets. It recognizes operating earnings as being important to long-term viability. Since a firm's ultimate existence is based on the earning power of its assets, this ratio appears to be particularly appropriate for studies dealing with corporate failure. Furthermore, insolvency in a bankrupt sense occurs when the total liabilities exceed a fair valuation of the firm's assets with value determined by the earning power of the assets. Altman (2000) point out that „this ratio continually outperforms other profitability measures, including cash flow“ (p. 11).

Although financial reports in Serbia are in compliance with IAS/IFRS, Earnings before interest and taxes need to be adjusted, with respect to the fact that distribution of positions within the income statement in Serbia differs from its equivalents in the USA. Earnings Before Interest and Taxes represents gross profit increased by interest expenses. However, if instead of a gross profit they achieved a loss, then the loss is subtracted from interest expenses, and that means that this result could be negative, which happens when the loss is greater than interest expenses. In that case, Earnings Before Interest and Taxes/Total Assets ratio is, also, negative.

X_4 , Market Value of Equity/Book Value of Total Liabilities

Equity is measured by the combined market value of all shares of stock, preferred and common, while liabilities include both current and long term. The measure shows how much the firm's assets can decline in value (measured by market value of equity plus debt) before the liabilities exceed the assets and the firm becomes insolvent. This ratio adds a market value dimension. It also appears to be a more effective predictor of bankruptcy than a similar, more commonly used ratio; net worth/total debt (book values). There is added Dimension of Market so, even if the market capitalization is higher and more sustained, confidence in the soundness of the financial position of the company is greater.

X_5 , Sales/Total Assets

The capital-turnover ratio is a standard financial ratio illustrating the sales generating ability of the firm's assets. This is a standard measure for total asset turnover which varies greatly from industry to industry. It is one measure of management's capacity in dealing with competitive conditions. This final ratio is quite important because it is the least significant ratio on an individual basis. However, because of its unique relationship to other variables in the model, the sales/total assets ratio ranks second in its contribution to the overall discriminating ability of the model.

Table 3: Relative contribution of the variables

Variable	Coefficients	Percent (%)
X_1	1,2	16,00
X_2	1,4	18,67
X_3	3,3	44,00
X_4	0,6	8,00
X_5	1,0	13,33
In total: X_1 to X_5	7,5	100,00

The above formula clearly shows that the author does not give equal importance to all factors. According to the above mentioned the top priority goes to X_3 - Earnings Before Interest and Taxes/Total Assets., followed by X_2 - Retained Earnings/Total Assets, then X_1 - Working Capital/Total Assets, then X_5 - Sales/Total Assets and finally X_4 - Market Value of Equity/Book Value of Total Liabilities with the lowest coefficient.

According to this model, zones of Discrimination are:

- $Z > 2.99$ -“Safe” Zones, this means bankruptcy risk is low. The higher the score, the better the company's chances of avoiding bankruptcy.
- $1.81 < Z < 2.99$ -“Grey” Zones, bankruptcy risk is possible, but not likely in the near-future
- $Z < 1.81$ -“Distress” Zones, bankruptcy risk is high.

In its initial test, the Altman Z-Score was found to be 72% accurate in predicting bankruptcy two years prior to the event, with a Type II error (false positives) of 6% (Altman, 1968). In a series of subsequent tests covering three different time periods over the next 31 years (up until 1999), the model was found to be approximately 80–90% accurate in predicting bankruptcy one year prior to the event, with a Type II error (classifying the firm as bankrupt when it does not go bankrupt) of approximately 15–20% (Altman, 2000). Over the time, the Z-scores gained wide acceptance by auditors, management accountants, courts, and database systems used for loan evaluation (Eidleman, 1995).

The Z-Score is not intended to predict when a firm will file a formal declaration of bankruptcy. It is instead a measure of how closely a firm resembles other firms that have filed for bankruptcy. It is a measure of corporate financial distress, a measure of economic bankruptcy.

Z-Score model weaknesses are:

- A prerequisite for any serious analysis of financial statements and therefore the prediction of bankruptcy, is that the financial statements are examined by an independent auditor. In the case of poor quality and unreliable financial information, Z-score test is useless and this model can't be compensated for deficiencies in the quality of financial information.
- Companies that have a low EBIT level have no chance of success when it comes to this test. Hence so much emphasis on state EBIT ratio by 3.3 (Kidane, 2004).
- This model does not take into account the issue of cash flow despite the fact that a cash flow represents a basis for payment and maintaining liquidity and safety. We should bear in mind the fact that cash flow is given significant attention only recently, and at the moment when the model was created, was not largely popular.
- Although this model is directed towards the future since it is designed as a tool for assessing companies bankruptcy, it takes into account only the historical data while any predictions of the future have no place in the model.

And yet, despite these concerns, the original Z-Score model is the best-known and most widely used measure of its kind (Pranovo, Achsani, Manurung, Nuryartono, & Nunung, 2010). This measure is not perfect, but it's easy to calculate in Excel and many practitioners continue to find it useful.

3. APPLYING THE ALTMAN Z-SCORE TO VELEFARM AD

Joint-stock Holding Company Velefarm Belgrade (hereinafter also referred to as Velefarm AD, the Company) is one of the the biggest wholesaler of medications and medical products in Serbia. Velefarm AD is the partner of biggest domestic and international producers of medications, medical equipment, medical devices, parapharmaceuticals, and specialized medical programs products. Velefarm AD has region-wide distribution network in Serbia, Bosnia and Herzegovina (Republika Srpska) and Montenegro. In the year 1999 Velefarm AD was the first Serbian company in the industry to implement a certified quality management system. The Company owns the largest, cutting edge storage facilities equipped with specialized chambers (VELEFARM AD, 2012). At the end of 2010., the Company had 142 employees.

Velefarm AD is listed on Belgrade Stock Exchange since 2003.

Velefarm AD seems like a good candidate for applying the Z-score given the size and reputation of the company, and the fact that there are evident signs of poor performance in the previous three years. Namely, the company has for years benefited and then in 2009 it began to suffer a great loss. The net loss for 2009. was RSD 2,108,178 thousand (approximately EUR 21,986 thousand), and net loss for 2010. was RSD 2,716,458 thousand (approximately EUR 25,749 thousand). At the time of writing this paper, data on financial results for 2011 were not yet known.

Auditor of the company is in Independent Auditor's Report on Financial Statements of Velefarm AD as of and for the year ended 31 December 2010, draw attention to the following matters: the Company operates with a shortage of permanent capital and working capital, The Company incurred a net loss of RSD 2,716,458

thousand during the year ended 31 December 2010, the Company's operations are burdened with the consequences of the global financial and economic crisis, which has a negative impact on the activities of a significant number of companies in Serbia and Europe. These conditions indicate the existence of a material uncertainty which may cast significant doubt about the Company's ability to continue as a going concern.

The company is in the process of negotiations over the restructuring of contractual obligations to creditors and suppliers and in the process of finding new sources of long-term finance.

Stock market price of the company also indicates a bad situation and which amounted to RSD 1,000 on December 31, 2010 and on the same date in 2009 same stock was worth RSD 2,444, and only a year earlier (in 2008, last year when the company had positive financial result) market price of shares was RSD 3,280. The latest data from the Stock Exchange from December 31, 2011, which amounts only RSD 300 per share, indicate a deepening distrust of the company and pessimistic forecasts about the recovery of the company in 2012.

In this situation, it is interesting to see the results of Z-Score model for the observed firm based on data from financial statements available for the last three years (2008-2010). The results are shown in Table 2.

Table 2: Z-score test of Velefarm AD

Variable	2008	2009	2010
X_1	$13,175,917/26,549,931 = 0.4963$	$3,555,457/16,614,687 = 0.2140$	$1,564,220/13,879,356 = 0.1127$
X_2	$160,724/26,549,931 = 0.0061$	$(4,656,102)/16,614,687 = (0.2802)$	$(7,013,266)/13,879,356 = (0.5053)$
X_3	$1,534,900/26,549,931 = 0.0578$	$(137,185)/16,614,687 = (0.0083)$	$(1,527,868)/13,879,356 = (0.1101)$
X_4	$5,113,831,600/20,401,092,000 = 0.2507$	$1,559,095,000/13,690,321,000 = 0.2783$	$1,559,095,000/13,684,357,000 = 0.1139$
X_5	$9,845,659/26,549,931 = 0.3708$	$5,402,261/16,614,687 = 0.3251$	$2,009,966/13,879,356 = 0.1448$
Z score:	1.316	0.3292	(0.7224)

Negative Z-Score shown in the obtained results can also be displayed graphically:



Figure 1: Z-score of Velefarm AD, Belgrade (2008.-2010.)

Based on the above results shown in Figure 1, all of the observed ratios show a deteriorating trend. In the observed period, calculated Z-score was in "Distress" Zones ($Z < 1.81$). The Z-Score model forecasts that Velefarm AD is approaching bankruptcy. Negative trend indicates this scenario of Z - overall index, which fell from 1.316 in 2008 to the negative 0.7224 in 2010. Time will tell if the forecast is correct.

4. CONCLUSION

This model, when it was created, caused a great deal of attention and was received with high credibility, and it appears that its actuality is not an issue even today. However, because of the limitations that are inherent to this model it should be used with other tools and financial indicators.

Although this test provides an excellent insight and synthetic view of the financial condition of companies observed, this model should not be only prediction tool. In the present test of Velefarm AD, model only indicates a problem, but for a reliable diagnosis it is necessary to perform a series of additional tests. This research points to the possible application of the Altman Z-Score test in Serbia, in which case minor adjustments are needed (Earnings Before Interest and Taxes adjustments).

In the past three years Velefarm AD has constantly been in "Distress" Zones, which means that bankruptcy risk is very high. The Z-score of the Company is constantly decreasing during this period, and in 2010 was even negative (-0.7224). The results indicate the imminent bankruptcy of Velefarm AD, Belgrade.

The empirical results are interesting since they can be used by company management for financing decisions, by regulatory authorities and by portfolio managers in stock selection.

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FINANCIAL SUPPLY CHAIN MANAGEMENT - NEW SOLUTIONS FOR CASH FLOW PROBLEMS

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Abstract: *The aim of this paper is to present new trends and practices in cash flow management of an enterprise, and to show how the concept of financial supply chain management, as a modern solution of cash management but also as a new strategic approach, can help the company raise the efficiency of financial operations, reduce costs and increase profitability. In the analysis were used the achievements of financial theory and practical experience of large companies in cash flow management. Adoption of ideas, techniques and FSCM tools contribute to improving key performance indicators of financial flows, thus they increase the efficiency of operations along the supply chain and enable successful implementation of strategies of creating maximum value for consumers. Maintaining liquidity, faster circulation of funds and less engagement of working capital are particularly important goals in times of crisis when the financial and real sectors encounter lack of fresh money. Therefore the FSCM is a very relevant issue of concern to financial managers of companies of all sizes and industries, especially those who deal with a large number of invoices relating to customers and suppliers on a daily basis.*

Keywords: *financial supply chain management, cash flow, liquidity.*

INTRODUCTION

Modern business conditions, often characterized as dynamic and complex in front of companies and their managers put great challenges. The expansion of business across national borders, mass communication, a large number of suppliers and customers, the growing importance of accurate and timely information, have created conditions for the existence of global markets and global competition in all industries. In these conditions of "New economy" in order to operate successfully companies must optimize their operations in the way that will make maximum savings in all aspects of business, starting at procurement, production all the way to the distribution of products and services and collection of receivables. The dominant strategy becomes the strategy of activity management in all phases of supply chain, and as a primary goal the creation of the maximum value for customers with minimum costs for all participants in the chain.

In dynamic business conditions there is a growing corporate demand for financially efficient supply chains, with companies and their suppliers under conflicting pressures to improve payment terms, reduce prices and improve cash flow efficiencies. In order to achieve true efficiency within the financial supply chain, organizations must take a holistic approach and consider how to improve communication and integration between different parts of the business, as well as continuously improve the efficiencies of their working capital processes.

Within any corporate's organizational structure, there are numerous departments that all have an impact on the financial supply chain in some way. For example, procurement department manages procurement terms and sourcing, the treasury department manages working capital while the sales department generates revenues. There is also the finance department that manages all commercial payments, accounts receivable and payable. The problems that many organizations face, however, are the lack of coordination and integration between departments in handling the supply chain. Each department often has its own agenda and it's on set of key performance indicators (KPI's), so the efficiency of the supply chain may not be foremost in their mind when it comes to their everyday activities.

Financial supply chain management (FSCM) has the task to integrate all financial processes within the supply chain, to influence on growth of the financial KPI's, because only an efficient, on information technologies based FSC, can provide an adequate platform for the implementation of strategies of creating maximum value for the consumer with minimal costs for all participants in the chain.

1. RELATIONSHIP BETWEEN FINANCIAL SCM AND PHYSICAL SCM

Optimization of business processes from suppliers to the final customers with maximizing the total value generated for consumers is a basic principle on which to base strategies that recognize the SCM. Managing the physical supply chain is a long-standing practice of many companies, especially those who have chosen as a strategic option to create maximum value for consumers. According to Scott, Lundgren, Thompson (2011) physical or manufacturing SCM refers to the savings that are realized in relation to service areas:

- Transportation;
- Warehousing;
- Finance;
- Market research;
- New product design;
- Information, communication and technology (p.6).

The focus to date for many organizations has been the physical supply chain. Supply chain managers have worked hard to build cross-functional teams bringing together managers from sales and marketing, operations, procurement and logistics. Internal and external collaboration with suppliers and supply chain partners, particularly around logistics, has been the business priority.

In today's world of global trade, supply chain management is considered normal and often the necessary strategic approach, which requires a much greater capacity and expertise of professional managers who participate in the organization of the supply chain. Today, supply chain measure thousands of kilometers, tons and minutes and therefore anyone who works on the principles of activities management within the supply chain has the possibility to achieve large savings that he can bring a competitive advantage in the market and increase profitability in the long run.

Historically FSC is regarded as an independent process from manufacturing supply chain. Creating and transmitting value from vendor to the final customers is separately seen from the material aspect and the aspect of finance or cash flows. The functioning of a modern supply chain involves the necessity of closer links with all key business functions that are included to information, goods and money flows *within and between* different enterprises. Supply chain according to Braun (2008) encompasses three parallel flows:

- Physical supply chain: The flow of services or products, such as raw materials, that moves between the buyer and seller within the supply chain.
- Financial supply chain: The flow of financial transactions that pays for the physical goods or services.
- Information flows: Information associated with the payment for products and services also flows through the supply chain. This includes purchase orders, inventory documents, confirmations and invoices. The information initiates the physical flow of products and services as well as the financial transactions. It is a supportive flow and part of both the financial and physical supply chains (p.1).

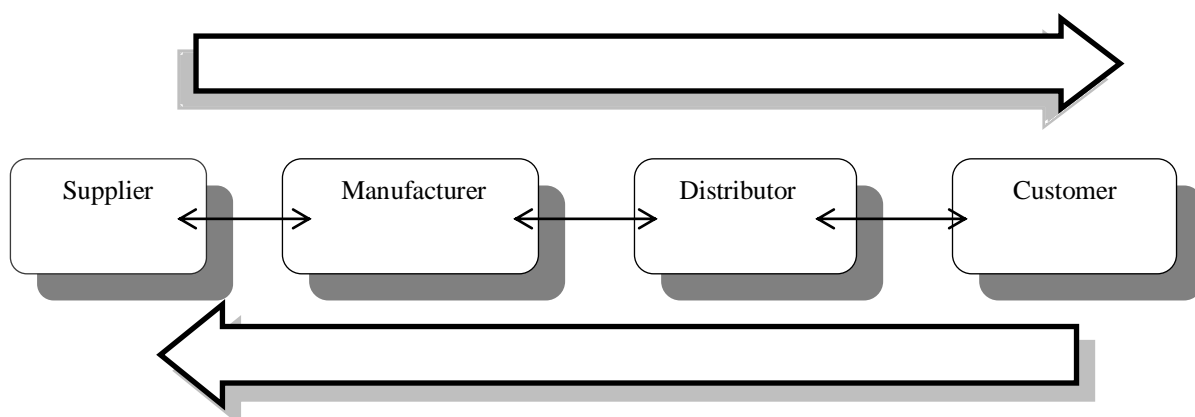


Figure 1. Flows in the Supply Chains (Hausman, 2005. p.3)

The FSC can be defined simply as the flow of cash between businesses along the supply chain, which can be in the form of a payment between buyer, broker, carrier, third party logistics agent (3PL) and suppliers, or in the form of finance, either from a bank, financial institution or a supply chain partner willing to lend in the form of an early or extended payment. This definition needs to be extended to embrace the exchange of assets and liabilities within the working capital management cycle, again across the entire supply chain. Therefore, besides cash and bank debt, this also includes account payables, account receivables and the movement of inventory or stock.

According to the Robinson (2007) "at the heart of FSCM is the management of working capital and financial flows, but equally important is the management of information across the chain and the documents and data that support these flows, such as purchase orders, advanced shipping notices, invoices and payment approval processes. Much of the data contained in these documents is the same information that is used to efficiently manage ever more complicated physical flows" (p.1).

Managers agree that sharing critical information, in real time, has been shown to reduce costs dramatically and improves the performance at all SC levels. Collaboration by sharing information has joined the ranks of integration and automation as a hallmark of competitive advantage in the supply chains (Marquez, 2010). The convergence of physical and financial supply chains around increasingly electronic information flows has been a key feature of recent years.

Opportunities for greater savings related to the physical supply chain are mostly exhausted. Days required for processing the orders were reduced from 5-7 days to 1 day, the time required for delivery of goods to customers decreased from 2-3 weeks to 2 days. In recent decades there has been little progress in the areas of billing, receivables management and collection, assessment of client's credit ratings in general money management, so that today these areas are becoming the primary place for business improvement and generation of savings. FSCM as a set of knowledge, activities, tools for managing financial activities need to integrate, support and monitor physical activities of supply chain.

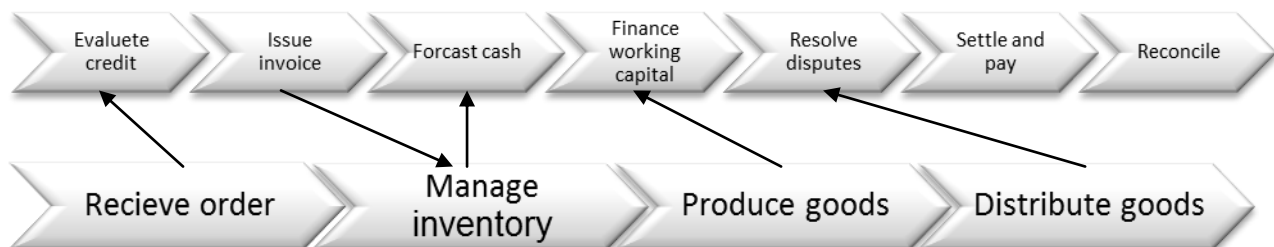


Figure 2. Connection between FSCM and production SCM (Philips, 2003. slide 9).

Global environmental challenges and the emergence of the global economic and financial crisis put modern financial management in even more difficult situation. Cash management and provision of liquidity represent a great challenge for financial managers today. Optimization of financial operations while maintaining the practice adopted, in relation to physical SCM, is becoming a trend for all companies who adopted a proactive approach and who are prepared to meet the emerging changes in the business. Proper management of financial flows and using modern tools, supported by information technology products, provide great opportunities to increase efficiency through automation and speeding up financial processes and eliminating the most significant vulnerabilities of financial operations, such as slow processing vendor invoices and reconciliation, a large amount captured working capital, the slow collection of receivables from customers, complicated and slow credit rating scoring, the more difficult possibilities of raising funds from banks.

2. CASH FLOW CHALLENGES

The financial crisis of 2008 showed that corporate finance volume depends not only on the market position nor structure of physical products, but also on the general health of the financial markets. Corporate's have felt the impact on trade credit, bank loans and cash flow in general, experiencing a shortage of liquidity. This is critical as sufficient liquidity is a fundamental condition when entering into a new business ventures or keeping existing alive. Without adequate liquidity support from banks or from business partners, some corporates could become insolvent because they would not have sufficient liquidity to pay their obligation.

The challenges facing companies today in the cash flows management come from the mass business activity, the more complicated financial relations and transactions between trading partners and between groups within large companies. Financial flow in the supply chain of a typical global enterprise includes thousands of invoices for which related payments and charges have to be addressed and processed. Problems such as slow processing of data, unreliable and unpredictable cash flows, expensive processes, high days sales outstanding (DSO) ratio, inappropriate decisions regarding the assessment of credit risk are caused partly by the effects of economic crisis and partly by using non holistic and non integrated method of money management, which is not based on the ideas of FSCM and the ideas of cooperation of all functions across the supply chain. Some of the internal causes of these miss functionalities and the reason for the emergence of a growing interest CFO's for better management of cash flows according to Hausman (2005) are:

- Manual and stand-alone processes. Manual processes tend to be slow, unreliable, unpredictable, and in the final analysis, often more costly than automated solutions.
- Lack of timely information. In many situations, financial flows do not contain sufficient detailed information for either manual or automated systems to accomplish their jobs. As a result, additional time and effort is required to obtain missing information (e.g., invoice-level detailed information such as item quantities and purchase order numbers).
- Lack of employee empowerment and compliance. If purchasing by individuals isn't carefully monitored and controlled, inappropriate spending may occur, undermining the company's initiatives to control expenses and improve strategic sourcing.
- Delays in invoice reconciliation. Delays in invoice reconciliation are a particular cause of additional working capital. They delay receipt of payments and increase day's sales outstanding. When there is a three-way mismatch of invoice, P.O., and shipping receipt, there is an inevitable delay while the mismatch is investigated. These investigations typically take time, as well as add cost.
- Manual processes for setting optimal credit limits. Companies often maintain their own departments to set customer credit limits. However, the ability to set optimal credit limits may require sophisticated algorithms that are often inaccessible to non financial companies (p.6).

Modern business conditions, followed by world economic crisis contributed to creating new streams in financial practice. Now the most significant source of short-term financing for companies becomes trade finance. Relationship with vendors and customers and adequate managing of receivables and liabilities today are the most important instrument for companies looking to optimize short-term bank loans and is a strong determinant of corporates financing costs. FSCM requires particular care to preserve the balance among established financing partners (Cavenaghi, 2012). Previously companies sought to extend their payments terms as long as possible, but now it is widely recognized that pushing cost and risk down the chain is no longer an effective proposition. Companies must work together to overcome raising challenges, so improving efficiencies across the whole chain, and therefore improving efficiencies for all parties, is now the ultimate goal.

3. FSCM-MODERN APPROACH

Adopting a strategic approach of creating maximum value for the consumers at minimal costs for all participants in the supply chain from companies requires cooperation and integration processes at all levels not only in relation to the physical-logistic aspect of business but also in the field of finance and information exchange. In practice, according to Cohen and Roussel (2005) this means achieving:

- Enterprise connectivity—business and transactional systems that are linked, allowing data to be seen and transported to different entities within the supply chain
- Distributed decision making—bidirectional information flow and defined business rules used to manage ongoing changes in demand and supply
- Real-time performance management—real-time, accurate information available to enable rapid and informed decision making (p.232).

Financial management in accordance with the principles FSCM can enable more efficient and effective way of managing cash flows which are every day more and more complex. In recent years much attention is paid to information technology, channels of mass communication and the opportunities they provide for improving the financial operations of the company. Current trends in the management of cash flows increases the efficiency of FSC through the application of new solutions in dealing with customers, suppliers, creditors, etc. Some of these solutions according to Hausman (2005) are:

- Purchasing cards and distribution cards. More and more companies are installing purchasing cards (P-Cards) as a way of making purchasing more efficient and cost-effective. P-Card systems also enable companies to aggregate spend data quickly and frequently, and to maintain compliance with company spend policies. They also increase financial transparency and help companies adhere to regulations. The distribution card is designed to re-engineer distributors and wholesalers accounts receivable (A/R) process through the replacement of cash, customer credit and promissory notes. By shifting the manual-driven process and burden of invoicing and collections from the distributor to the bank, the distribution card transforms the collection process into a quick paperless electronic payment, reducing accounts receivable (A/R) costs substantially. Sales proceeds can be immediately transferred into working capital for faster turnover.
- Electronic invoice presentment and payment (EIPP). Gradually, companies are moving toward electronic invoice presentment (EIP) and electronic invoice presentment and payment (EIPP). Today's new EIPP tools provide an excellent opportunity to perform financial flow and information flow tasks at the same time. The ability to send detailed invoice-level information (quantities, P.O. numbers, etc.) along with remittances enables the supply chain to transfer this information quickly and without errors often found in manual procedures.
- Invoice imaging. Some companies are creating soft copy images of paper invoices so that all payments can proceed along an electronic, paperless pathway. Others are creating data warehouses to maintain line item detail, with information from a P-Card solution or other sources.
- Supplier web portals for invoice inquiries. Another significant trend is to develop web-based automated inquiry systems for suppliers. Instead of accessing a call center to make a simple inquiry, suppliers can access a web portal for their company and perform self-service inquiry regarding the status of their invoices (received, in payables queue, in reconciliation queue, scheduled to be paid as of a certain date, etc.).
- Web-based financial reporting. To reduce costs, significantly improve spend management, and make more informed business decisions, many companies are finding that it's critical to electronically capture financial transaction and invoice-level data and then review it through a web-based reporting tool. This transaction and invoice-level data may be easily integrated with existing back office financial systems (p.7).

Best practice: Financial supply chain management with SAP ERP

SAP Financial Supply Chain Management (FSCM) supports companies optimizing their cash flows within the whole supply chain (from vendor to customer). That is, the financial process that accompanies the "real" business process from a financial point of view often offers potential for improvement in the areas of invoicing and reconciliation. The aim of the FSCM SAP component is to improve an organization's cash flow mainly in the Order to Cash business process. Components of FSCM are:

- SAP Credit Management- provides companies with the opportunity to monitor the total liability of their customers by using appropriate credit lines.
- Electronic Bill Presentment and Payment (SAP Biller Direct)- allows billers to send and customers to receive invoices electronically and making invoicing more efficient.
- SAP Dispute Management-offers the system support for processing payment deductions.
- SAP Collections Management- allows you to structure, classify and minimize the receivables owed to your organization.
- SAP Cash and Liquidity Management- supports the cash manager in efficiently managing liquidity and currency risk.
- SAP Treasury and Risk Management- offers a comprehensive set of functions for managing your financial transactions and risk.

All new trends in relation to cash flow management rely on achievements in the computers field, modern means of communication and data exchange. In order to realize successful implementation of strategies based on FSCM company and its business partners must have the appropriate IT infrastructure, knowledge and ability to adapt to new challenges. Education and training of employees and all other participants in the supply chain becomes continuous duty. A prerequisite for the successful management of financial supply chain is the existence of adequate communication channels based on the internet, allowing rapid exchange of large amounts of data, hardware devices and software solutions as well as qualified personnel. If such conditions are met a basic platform is created for the successful cash flow management, increasing the efficiency of financial operations and costs reduction.

4. FSCM MAKING CASH FLOW EFFICIENT

The adoption of new strategies and the introduction of new management practices of enterprises cash flows is caused by the growing need for raising the efficiency of overall operations. Improving the performance of financial operations, and therefore the overall results of the company means overcoming difficulties related primarily to the liquidity and eliminating the causes of their origin, through the implementation of latest achievements in financial management practice along the supply chain.

Firstly, FSCM practice contributes to improving the process of reconciliation of documents related to suppliers and customers. Matching shipping receipt, corresponding purchase order and invoice is now electronic, which reduces errors, speeds up the process of reconciliation accounts because the matching is done in the earlier stages of the process. Speeding up cash flow along the chain helps companies to save working capital, use it for covering other expenses or increasing profitability.

Secondly, modern solutions for managing electronic billing operations give the analytical possibilities to CFO's because they provide sufficient invoice detail so that many mismatches can be quickly diagnosed with the information provided electronically. This speeds up the reconciliation process significantly and accomplishes it at much lower cost. Cooperation between business partners in the supply chain is lifted to a higher level; all participants are now dedicated to creating maximum value for the end customer. The flow and exchange of information becomes significantly easier and quicker. Companies now have the ability to use common portals, for the information support to all participants in the supply chain.

Lastly, FSCM delivers company and its partners new capabilities in money management through a reduction days sales outstanding, reduce errors, transparency of business operations, better access to information, effective planning and control of cash flows, which ultimately results in less involvement of working capital, reduced operating costs. All this results in increased liquidity KPI's such as current liquidity ratio, future liquidity ratio, general liquidity ratio, supplier and customer turnover ratio (Vunjak, 2005).

The adoption of new strategies and the introduction of new practices in the management of cash flow of an enterprise imply a new way of organizing the financial function. The transition from manual processes to new fully or partly automated carries on certain risks related to system reliability, data protection from non authorized access, the time needed to learn new technology by staff and acceptance by the business partners etc. Regardless of the often high costs of implementation and the difficulties that the company and its business partners may have in the period of adjustment to new solutions, it is considered that potential benefits for the company are much greater in the medium and especially long run and that the impacts on liquidity, solvency and overall result of the company are primarily positive.

Modern business conditions require permanent adjustment of an enterprise, which despite some limitations, must lead towards automation and increasing efficiency of business processes. Adopting the idea of FSCM is not only a new way of performing daily activities, but also represents a new strategic approach aimed at creating maximum value for consumers and increase efficiency particularly of financial operations of an enterprise through the growth of cash flow KPI's.

CONCLUSION

Dynamic environment, a large number of suppliers and customers, their territorial distance, mass communication, free flow of goods, services, people and capital have led many companies to become a part of global market. Maintaining competitiveness in such harsh conditions of the company requires continuous improvement in efficiency of operations, increased cooperation with business partners, and proactive approach to problem solving. The emergence of global economic and financial crisis in 2008 pushed companies further into uncertainty and forced them to devote more attention to finding a source of savings in daily activities.

Common strategic direction that enterprises nowadays choose is management of activities at all stages of the supply chain, in order to create maximum value for consumers while minimizing the cost of business operations of all participants in the chain. So far, much attention enterprises dedicated to activities management in relation to the physical supply chain, thus the possibilities for savings in logistics, production, warehousing is almost exhausted. The problems that companies have nowadays are largely related to the question "How and where to find the cash". Difficulties in the area of liquidity are partly a result of the effects of the global economic crisis, and partly result of lack of adequate cash flows management. **Financial supply chain management can be defined as the flow of cash between businesses along the supply chain, including payment between buyers, brokers, carriers, third party logistics agents, suppliers, banks etc. Also FSCM deals with exchange of assets and liabilities within the working capital management cycle, again across the entire supply chain. Very important part of FSCM is information flow, as the way companies interact and exchange financial and other documents.**

Today corporates feel the impact on trade credit as DSO rates are high, on bank loans as conditions for external financing are more rigid and on cash flow in general, which has implications on more trapped working capital and higher expenses. Now the most significant source of short-term financing for companies becomes trade finance. Managing receivables and liabilities today are the most important instrument for companies looking to optimize short-term bank loans and is a strong determinant of corporates financing costs.

FSCM, based on the ideas of holistic approach and integrated money management of all functions across the supply chain, can help overcoming miss functionalities within cash flows and the cause's of their origin such as: manual and stand-alone processes, lack of timely information, delays in invoice reconciliation, slow processes for setting optimal credit limits etc.

Financial management in accordance with the principles FSCM can enable more efficient and effective way of managing cash flows through the application of new solutions in dealing with customers, suppliers, creditors such as: purchasing cards and distribution cards, electronic invoice presentment and payment

(EIPP), invoice imaging, supplier web portals for invoice inquiries, web-based financial reporting. Adoption of the previous solutions of FSCM practice contributes to improving the process of reconciliation of documents. give the analytical possibilities to CFO's, reduction days sales outstanding, reduce errors, transparency of business operations, better access to information, effective planning and control of cash flows, which ultimately results in less involvement of working capital, increased liquidity and reduced operating costs.

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THE LIQUIDITY ANALYSIS OF COMPANIES IN MANUFACTURING INDUSTRY IN SERBIA

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Abstract: *Debt payments of companies at maturity also imply regular payments received from customers. Therefore, time between debt payments and received payments from customers should be put to minimum. Using liquidity analysis we determine if the company is capable to contracted debt payments at maturity. In this paper authors present comparative analysis of liquidity ratio and cash conversion cycle between companies in manufacturing industry in Serbia. Financial reports of 100 joint-stock companies in manufacturing industry that have stocks quoted at Belgrade stock exchange were taken for this research. Companies were divided into 8 groups in regard to the branch of manufacturing industry and analysis includes three consecutive years. Based on conducted research it could be concluded that average liquidity of all analyzed companies in defined time was gradually increased in order to have the ratio of rigorous liquidity at satisfactory level in the last year. Nevertheless, it can be observed the deficit of cash funds at the analyzed companies as well as the long period of time between debt payments and received payments from customers. In conclusion authors present the measurements that companies should implement in order to increase their liquidity and ensure the smooth business activities.*

Keywords: *Liquidity, cash conversion cycle, analysis, manufacturing industry.*

1. PREFACE

Analysis of liquidity provides information about company's capability to meet their obligations at maturity. Liquidity analysis is necessary not only for companies management because of efficient business management but also for banks, suppliers, buyers, as well as insurance companies, that are interested in liquidity of firm with which they do business. Also, liquidity analysis is important to all employees and stockholders that expect regular dividend payment and constant growth of company.

Beginning liquidity analysis is based on determination of relation between working assets and short-term obligations. In case of equality between short-term assets and short-term obligations the company has short-term financial equilibrium. Equality between long-term assets and long-term financing sources brings to long-term financial equilibrium. On this way the conditions for keeping liquidity are ensured. Nevertheless, in practice the case of absolute short-term and long-term financial equilibrium is scarce.

If long-term financing sources are exceeding the company's long-term assets, there is certainty in keeping the liquidity, because the surplus of long-term sources can be used for financing the short-term assets. However, if long-term assets are not covered with long-term sources and they are financed with short-term sources, there is danger of illiquidity. Time period between generating the money and paying back matured short-term obligations isn't a match at expense of short-term obligations. Described structure of assets and financing sources isn't long-term sustainable and company must find way to increase their liquidity.

Also, it is necessary to accent that liquidity analysis isn't determined just with volume of short-term assets but also with its structure. Because of that for calculation of company's liquidity different indicators are used, that are presented in continuation of the paper.

2. LIQUIDITY ANALYSIS ON BASE OF RATIO INDICATORS

In short-term asset structure supplies are at the last place at the liquidity degree, because they have the slowest process of turning into cash. Next are short-term claims, short-term financial placements and cash and cash equivalents. There are different coefficients in regard to the relations between total short-term assets, liquidity assets and assets of large degree of liquidity with short-term obligations, such as:

Ratio of current (general) liquidity is calculated as relation between short-term assets and short-term obligations. Traditional thinking that this relation has to be 2:1 in favor of short-term assets should be taken extremely careful, as extenuate Krasulja, Ivanišević (2001) „with regard that on adequacy of general ratio have influence many general and specific factors, such as: category and size of company, business activity volume, time bondage of short-term assets in specific phase of business cycle, crediting conditions of suppliers in regards to the crediting conditions that are granted to buyers, efficiency of received claim payments, discipline of matured debt payment etc.“ (p.23). However, ratio value larger than 2 indicates the inefficient cash and short-term obligations management, while ratio value below 1 indicates the lack of liquidity assets for financing short-term obligations. Shortage of ratio is reflected in structure of short-term assets that includes supplies. Namely, company can have in their short-term asset structure large participation of supplies that have for consequence the indication of liquidity. However, because supplies have the slowest transformation process in cash, it is necessarily to reduce short-term assets in order to accurately calculate the liquidity (ratio of reduced liquidity).

Ratio of reduced liquidity is calculated with putting in relation the short-term assets with excluded supplies with short-term obligations. Given ratio indicates the number of dinars of liquidity short-term assets that covers the one dinar of short-term obligations. This ratio needs to be larger than 1. In numerator of this relation is cash, short-term placement in securities and receivables from customers. As receivables from customers presents category that doesn't have to be fully transformed into cash (if customer goes to bankruptcy and default in their obligations towards the given company), develops the need for even more rigorous valuation of liquidity.

Ratio of money liquidity, which is calculated with putting into relation the cash and liquidity securities with short-term obligations, shows if company possesses enough cash and highly liquidity securities to cover short-term obligations.

Company thrives to keep the optimal structure of short-term assets and improve their quality (problem of slow moving and obsolete inventories or uncollectible receivables from customers), that leads to the better liquidity of the company.

3. CASH CONVERSION CYCLE

During the liquidity analysis it is necessary to take in consideration the period between the debt payments and received payments from customers. Namely, company buys materials for product manufacturing that represents cash outflows, but from the other side they expects cash inflows from sale of manufactured products. It raises the question whether company receives payments from customers faster than debt payments or debt payments to creditors are faster than received payments for sold goods.

Cash conversion cycle takes in consideration the time bondage of inventories, time bondage of customers and time bondage of suppliers. As the time bondage of inventories implies time from first investment in supplies until the day of sale, and time bondage of customers implies time from sale until the received payments for sold products, combining the time bondage of inventories with time bondage of customers, result is period in which the company is without funds. From this sum it should be deduced time bondage of suppliers, in other words time that is necessary for debt payments of company. On this way time period between debt payments and received payments is calculated, that is called cash conversion cycle or (Brili, Majers, Markus, 2007):

$$\begin{aligned}
 & \text{Average supplies} / (\text{annual cost of sold products} / 365) \\
 + & \text{Average value of receivable claims} / (\text{annual revenue} / 365) \\
 - & \text{Average value of debt to suppliers} / (\text{annual cost of sold products} / 365) \\
 = & \text{Cash conversion cycle}
 \end{aligned}$$

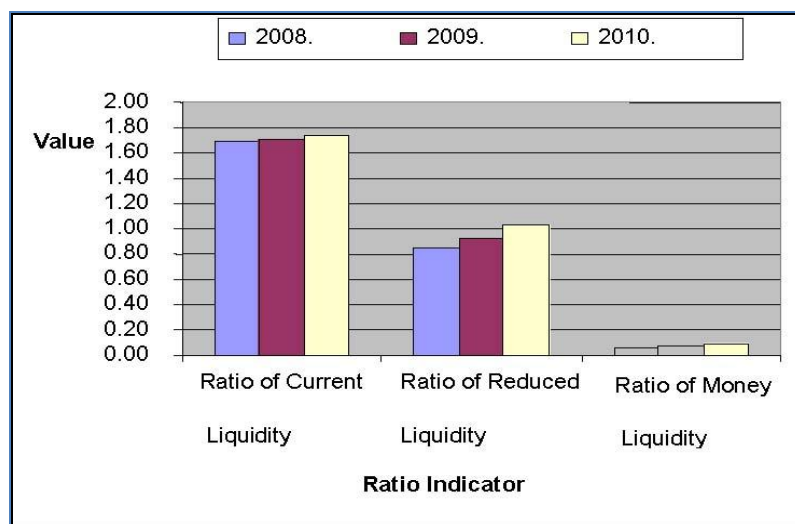
Time discrepancy between cash inflows and outflows is reason for cash conversion cycle analysis that can be positive, neutral and negative. Positive cash conversion cycle indicates how much day's company must wait on received payments in order to payback its debts. Neutral cash conversion cycle (result is zero) implies time discrepancy between cash inflows from buyers and cash outflows for debt payments. Negative cash conversion cycle indicates number of days of money disposal before company must pay their obligations. Accordingly, company receives payments for sold products faster than payments of their obligations. Company tends to ensure low or negative cash conversion cycle.

4. RESEARCH OBJECTIVE

The paper's objective is to comparatively analyze liquidity ratio and cash conversion cycle between companies in manufacturing industry in Serbia. For purpose of these research financial statements of 100 joint-stock companies in manufacturing industry that have stocks quoted on Belgrade stock exchange are taken in consideration. At the same time random sample selection is used. Companies are divided into 8 categories in regards to branch of manufacturing industry they belong (tobacco, machine, chemical, metallurgy, wood, textile, food or construction industry). Analysis is following the consecutive three years. With this analysis authors determine trends of liquidity indicators of all analyzed companies, every branch of manufacturing industry, as well as their interrelationship.

5. RESEARCH RESULT

Average value of every individual liquidity ratio of all analyzed companies in manufacturing industry record slight but constant growth since 2008 until 2010. Ratio of current liquidity ranged from 1,69 in 2008, along 1,71 in 2009 to 1,73 in 2010, that indicates the gradual improvement of liquidity. However, with analysis of only current liquidity, wrong impression could be taken about apparent liquidity if the majority of short-term assets are the most illiquid assets. Rigorous liquidity ratio excludes supplies from short-term assets, and on the examined companies ranged from 0,85, along 0,92 to 1,04 in 2010. It means that on 1 dinar of short-term obligations company owns 0,85, 0,92 and 1,04 dinars of liquid asset. In first two observed years company can't settle occurred short-term obligations with liquid assets, while the liquidity of companies in manufacturing industry was improved in 2010 and has acceptable level. However, with analysis is determined that companies doesn't own enough funds - cash and liquid securities to settle short-term obligations. On every dinar of short-term obligations, companies owns only 0,07, 0,08 and 0,10 dinars of cash funds. Liquidity analysis by ratio indicators for 2008, 2009 and 2010 is presented on next picture.



Picture 1: Liquidity analysis for companies in manufacturing industry

Comparing the liquidity ratio in observed years at branches of manufacturing industry it can be spotted that liquidity ratio moved also in increasing and decreasing intensity that is conditioned with industry category, company's size and time bondage of short-term assets in specific phases of business cycle etc. The lowest value of current liquidity ratio was recorded in construction and wood industry, and the highest value in chemical industry. Ratio of reduced liquidity was also the highest in chemical industry, but the lowest was in metallurgy. However, ratio of money liquidity in all branches of manufacturing industry records low value. Average values of liquidity ratio indicators at branches of manufacturing industry are presented next in Table 1.

Table 4: Average values of liquidity ratio indicators at branches of manufacturing industry

Branch of manufacturing industry	Ratio of current liquidity (average values)			Ratio of reduced liquidity (average values)			Ratio of money liquidity (average values)		
	2008.	2009.	2010.	2008.	2009.	2010.	2008.	2009.	2010.
Tobacco industry	2.34	1.58	1.50	0.90	0.69	0.79	0.38	0.06	0.17
Machine industry	1.87	1.53	1.43	0.75	0.72	0.74	0.13	0.19	0.22
Chemical industry	1.94	2.67	2.32	1.03	1.50	1.48	0.06	0.14	0.08
Metallurgy	1.29	1.28	1.70	0.55	0.55	0.86	0.03	0.04	0.16
Wood industry	1.31	1.27	1.21	0.80	0.69	0.81	0.03	0.01	0.05
Textile industry	2.01	1.64	1.52	0.71	0.63	0.60	0.02	0.02	0.02
Food industry	1.73	1.74	1.81	0.96	1.03	1.19	0.06	0.07	0.07
Construction industry	1.22	1.47	1.10	0.83	1.01	0.70	0.00	0.00	0.02

Based on average values of inventory turnover ratio, claims and suppliers for every branch of manufacturing industry, average duration of cash conversion cycle for every individual branch was determined. The longest period from received payments to debt payments was recorded in wood and textile industry (from 200 to 400 days). Cash conversion cycle in food industry (in which there is the most companies that have stocks traded on exchange) is ranged from 88 to 102 days. Something lower time period was recorded in chemical, machine, construction industry and metallurgy. Since the 2008 companies in Serbia were stricken with global economic crisis that produced decreased business activities. In addition, there were problems with servicing matured obligations and increased borrowing that could only overpass problems of liquidity in short-term. Liquidity analysis in individual branches of manufacturing industry points out on conclusion that companies in chemical industry in relation to other observed companies managed to fight with consequences of crisis, achieves high ratio of current liquidity, acceptable ratio of rigorous liquidity and time between debt payments and received payments reduces on average 60 days.

6. CONCLUSION

Providing liquidity has great value for smooth functioning of business activities and company's survival. Liquidity analysis starts with checking whether the total short-term assets can cover all short-term obligations. Thereafter, is determination of how much dinars of liquid short-term assets comes on one dinar of short-term obligations, and last ratio indicator determines how much cash company owns for coverage of short-term obligations.

If liquidity is threatened, company has to conduct several measurements such as efficient inventory management. Namely, with providing the optimal inventory that don't disturb constant business activities, and don't bond unnecessarily, time desynchronized, money in material form, decreases the level of supplies on one side, and level of short-term obligations on the other side. Next, efficient received payments from customers can be reached with discounts for customers that regularly pay in short-term, while customers that are late with payments can be calculated interest. On this way the value of receivable claims is faster transforming into cash that company can use for settlement of occurred obligations and company's liquidity increases.

With increased liquidity comes the decreased time period between debt payments to creditors and received payments from customers. With efficient inventory management, received payments from customers and prolonging the time for debt payments, cash conversion cycle is decreasing.

Based on liquidity analysis of selected companies that have stocks coated on exchange, potential investors can make the difference between individual branches for investment activities. Next is analysis of individual companies from selected branch in order to make the best investment call.

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CANDLESTICK MODELLING USING INTERPOLATIVE BOOLEAN ALGEBRA FOR FINANCIAL FORECASTING

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Abstract: *In this paper we present a modelling approach to candlestick patterns based on interpolative Boolean algebra (IBA) which is applied to stock market BELEX. We have decided to use IBA instead of conventional fuzzy logic, since it simplifies the process of modelling and as a consistent fuzzy technique it further improves the existing efforts and resolves some known issues. Results show that a candlestick pattern modelling using IBA is indeed successful and should be adopted for further use. The proposed method gives a degree of fulfilment for observed patterns, thus giving traders easy interpretation of how much candlesticks fit into different patterns.*

Keywords: *candlestick, interpolative Boolean algebra, fuzzy, BELEX, stocks*

1. INTRODUCTION

Effectiveness of candlestick patterns interpretation analysed by some papers give opposite results. They prove to be useful on some markets and unprofitable on others. Some back-up negative results by the fact that candlestick patterns were invented for rise markets during the 1700s and are not suitable for today markets (Marshall, 2006). Still, vast number of traders uses this kind of technical analysis on an everyday basis. Emotional beliefs are an important factor that affects market prices and technical analysis is supposed to reveal these behaviours (Nison, 1991). Since this kind of behaviour is not completely rational, technical analysis transforms thought process of investors into charts in an effort to forecast the price change.

Since models are individual for each trader, we do not try to propose an optimal solution, but rather a methodology that can help traders to express their personal preferences. Emerging papers in scope of candlestick patterns show an uprising interest in their fuzzy modelling. Many of these papers show respectful results, but for traders who are not familiar with fuzzy logic, putting these concepts into action can really be difficult. Since conventional fuzzy logic lacks the ability to consistently treat all logical relations, for instance law of excluded middle does not hold in general case, using it for proposed models is not satisfactory. To address this problem we introduce interpolative Boolean algebra to candlestick modelling.

Method proposed in this paper uses interpolative Boolean algebra as a consistent fuzzy technique, introduced by Radojevic (2000), which should simplify steps in defining candlestick patterns. Conventional fuzzy approach is hindered by the fact that it cannot consistently describe elements of Boolean algebra, such as law of contradiction ($A \cap \bar{A}$), and stay in a Boolean frame (Radojevic 2008b). Therefore, proposed models cannot be implemented with traditional approach. Consistent fuzzy technique, as IBA is sometimes referred in literature, is applied in this paper to improve upon strongly set conventional one.

For testing purposes we used data from Belgrade Stock Exchange (BELEX) market. Our results reveal that transforming candlestick parameters into intensity of a candlestick pattern, using proposed methodology, truly depicts human perception.

A brief description of chapters 2 to 5 is given. In chapter 2 contemporary literature is analysed. Data and methodology are described in Chapter 3. Chapter 4 discusses results. The last section concludes the paper.

2. LITERATURE REVIEW

There are different opinions regarding the effectiveness of Japanese candlestick patterns on stock and similar markets. Some papers suggest that usage of such patterns for forecasting on stock markets is unjustified. For instance, studies conducted by Horton (2009) and Marshall et al. (2006) show that candlestick technical analysis does not produce profit. Marshall et al. used thirty-five individual stock indexes with carefully chosen sample period of ten years. Robustness of the system was tested using the bootstrap

methodology. One of the criticisms was addressed to the fact that candlestick patterns were originally devised for rice markets.

In contrast, recent study conducted by Lu et al. (2012) shows that some types of candlestick technical analysis patterns are indeed profitable when applied to Taiwan stock market. Data used for testing their method comprised of individual stocks found in Taiwan 50. To check the robustness of results, same as previously mentioned, bootstrap methodology was used. Although some of these results put shadow onto candlestick patterns effectiveness, never the less, many papers have been written regarding their usage in forecasting.

Lee & Jo (2009) created an expert system based on candlestick chart analysis. Their system looks up in a database for signals and interprets them as candlestick patterns. They get 72% accurate results on the Korean stock market. Model is rule-based and does not take gradation into consideration.

Tool which uses fuzzy candlestick patterns to describe investment knowledge on the Taiwan stock market was presented by Lee et al. (2005). By using fuzzy technique, they are addressing the problem of candlestick pattern definition vagueness which arises from different authors' comprehensions of the same pattern. In another paper, group of same authors compare their method with previously presented ones, acquiring better results (Lee et al., 2006). Finally Lee (2009) constructs personal ontology to describe candlestick patterns.

Approaches presented by Kamo and Dagli (2009) use candlestick method in gating network, by using rules for describing the market and also by fuzzy logic-based weight generator, as part of their hybrid system. As they have shown, fuzzy logic based systems deliver smoother and more accurate forecasting results. Another fuzzy-candlestick model for reversal point prediction was presented in (Lan et al., 2011). It tries to set a warning before a reversal of a stock price occurs. Reported results show precision far greater than 50%.

3. DATA AND METODOLOGY

Candlesticks are originating from mid-18th century, firstly introduced by a youngest child of Munehisa family – Homma (Nison, 1991). From his excellence in the field of trading, people started calling him “god of the markets”. Since Nison introduced Japanese candlestick trading methods to western markets, they rapidly gained popularity. Today, candlesticks chart analysis is one of the most widely used technical analysis technique. Candlestick patterns should reflect psychological state of the market and then traders should base their decisions on recognized patterns.

Candlesticks are formed out of open, high, low and close price for a predefined time period (figure 1). Body colour of a candlestick depends on whether a close price is higher or lower than an open price. If it is higher, body has a white, empty filling and oppositely, if it is lower, body is black. Lines called shadows above and under body represent highest and lowest price of the time interval, respectively. Body size indicates the market momentum and the shadows show extremes of the price movement. Body and shadows are usually described as long or short, when defining patterns.

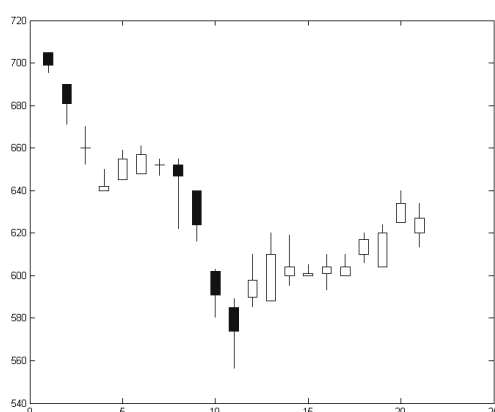


Figure 2: Candlesticks example

Example on how a candlestick reflects a market state is for instance candle with white body without shadows, the so called White Marubozu pattern. Open price equals lowest price, and close price equals the highest (figure 2). That means buyers are very bullish, since market opened at one price and closed at another, never dropping below initial price, and closing well above it. The opposite rule applies for black bar, Black Marubozu.

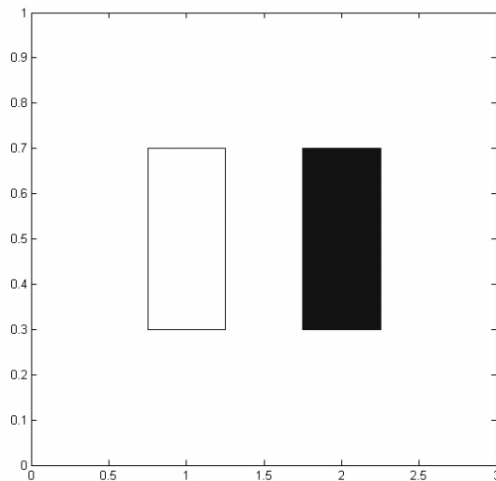


Figure 3: Marubozu example

However, interpretation of candlestick patterns is individual. Investors can obtain different pieces of information from the same pattern and apply custom set of rules. This is one of the reasons why we use interpolative Boolean algebra, a consistent fuzzy technique, to model vagueness of candlestick patterns interpretation. This new approach simplifies pattern definition, making it easier for investors to use. Usage is straightforward and only basic mathematical skills are required. Need for gradation is also satisfied, for instance how intensive White Marubozu is. This gives information on certainty that the pattern rules will reflect the future market movement.

For test and example purposes, daily stock prices of NIIS (Naftna Industrija Srbije) from BELEX (Belgrade Stock Exchange) are used. Time period is one year, from January to December of 2011. Particular stock from BELEX was chosen because it can oscillate around an open price between 12% upwards and 8% downwards, as regulated by stock market rules.

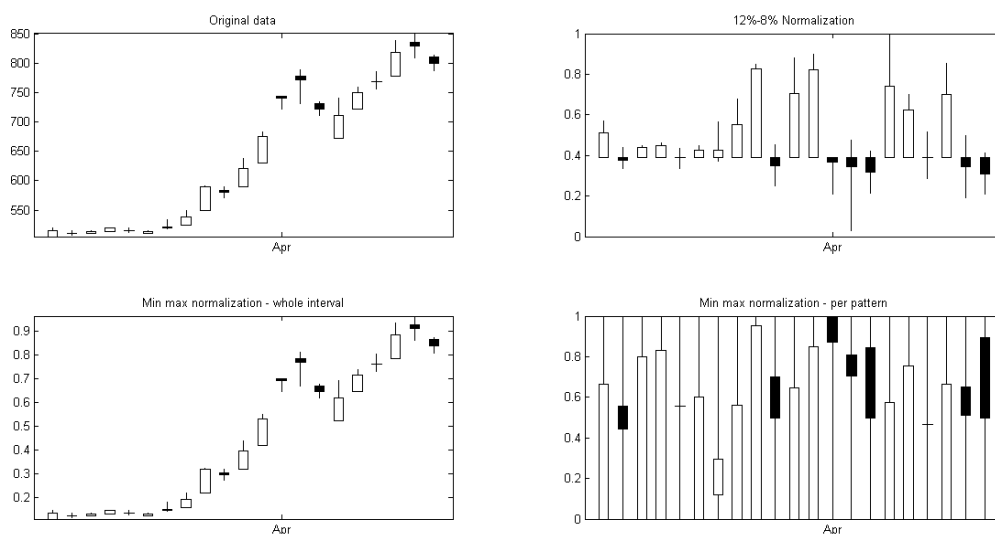


Figure 4: Real data compared to normalized data

IBA requirement is that all values must be on [0,1] interval. Candlesticks were normalized taking those rules into consideration (Figure 3). Since we know maximal possible price change, it is better to treat extreme movements with higher degree. The upward movement of 12% can be considered as 1 and downward movement of 8% as 0. One problem with this kind of normalization is that movements are sometimes too small, because movements near extreme borders are very scarce. Another problem is that when analyzing two or more bar patterns, one does not consider normalizing them in such a way, so that pairs maintain bar parameter relations. Easy solution to latter problem is Min Max normalization executed on the whole data set. However, this will not address the first problem. Another option is to normalize each group of elements that create a pattern. This way, relevant bars will maintain their relations. If bar size on the whole data set interval has any importance, one should consider aggregating results of two or more different normalization techniques. For simplicity sake, we used Min Max normalization on pattern groups.

Radojevic (2000) presented [0,1]-valued logic that is in the Boolean framework. With it we have the opportunity to use consistent fuzzy relations, also called interpolative relations (Radojevic, 2005), to measure logical similarity and dissimilarity between individuals. Interpolative Boolean algebra provides a frame for consistent realization of all possible elements of finite Boolean algebra. It is consistent in a sense that it preserves all the laws on which Boolean algebra relies.

We will use classical Boolean expressions to model candlestick patterns. As an example, a few expressions have been described. Equivalence is used when we want to state that parameters are equal. Relation of equivalence (\Leftrightarrow) is well-known expression of logical similarity between objects. Equivalence of two objects A and B is noted as:

$$A \Leftrightarrow B = (A \cap B) \cup (\bar{A} \cap \bar{B}) \quad (1)$$

For Doji pattern open equals close price so it can be defined with ease by stating $\text{open} \Leftrightarrow \text{close}$.

If we do not want attributes to be the same, logical choice of an operator is exclusive disjunction ($\underline{\vee}$). Relation of exclusive disjunction is complementary relation to the equivalence relation:

$$A \underline{\vee} B = 1 - A \Leftrightarrow B = (A \cap \bar{B}) \cup (\bar{A} \cap B) \quad (2)$$

Long day pattern can be modeled as an exclusive disjunction between open and close price. It can be expressed as close and open prices as far apart as possible. Candlesticks, whose open price is in relation of exclusive disjunction with close price, are best rated if open and close have values 1 and 0.

Very useful expression is implication (\rightarrow). It can be viewed as a not strict inequality relation - less or equals.

$$A \rightarrow B = \bar{A} \cup B \quad (3)$$

For instance, this expression can be used for defining Engulfing pattern which is described as a bar with a small body which is engulfed by a bigger body of a next bar.

These relations are based on interpolative Boolean algebra (IBA), which is real-valued [0,1]-valued realization of finite Boolean algebra (Radojevic, 2008a). Any element from the IBA has its corresponding generalized Boolean polynomial (GBP) (Radojevic, 2008b).

Transformation from Boolean expressions to GBP is described in (Radojevic, 2008b) and example explanation of the process for exclusive disjunction is given by (4).

$$\begin{aligned} (A \underline{\vee} B)^{\otimes} &= [(A \cap \bar{B}) \cup (\bar{A} \cap B)]^{\otimes} = \\ &= (A \cap \bar{B})^{\otimes} + (\bar{A} \cap B)^{\otimes} - (A \cap \bar{B})^{\otimes} \otimes (\bar{A} \cap B)^{\otimes} = \\ &= A \otimes (1 - B) + (1 - A) \otimes B - \\ &= A \otimes (1 - B) \otimes (1 - A) \otimes B = \\ &= A + B - 2(A \otimes B) \end{aligned} \quad (4)$$

The GBP is, as its name says, general form of polynomial. Generalized product (\otimes) is any function that satisfies conditions of commutativity, associativity, monotonicity and 1 as identity and non-negativity condition (Radojevic, 2008a).

$$\otimes: [0,1] \times [0,1] \rightarrow [0,1] \quad (5)$$

If both attributes are of the same type, we can use minimum t-norm as a generalized product. That would mean they are correlated. For instance, if we compare two persons by their height, intersection of their heights is height of a smaller person. If they are non-correlated attributes, product t-norm should be used instead. An example for this if compare two persons by their height and their wealth. At last, if they are negatively correlated Łukasiewicz t-norm-norm should be used.

Example above (4) can now be translated to:

$$(A \sqcup B)^{\otimes} = A + B - 2(A \otimes B) = A + B - 2\min(A, B) \quad (6)$$

Next, example models for candlestick patterns are given. This should illustrate how fuzziness can help in determining the intensity and avoid completely discarding candlestick patterns that only on small part do not satisfy conditions.

White marubozu:

$$open \Leftrightarrow low \wedge close \Leftrightarrow high \quad (7)$$

Black marubozu:

$$open \Leftrightarrow high \wedge close \Leftrightarrow low \quad (8)$$

Doji:

$$open \Leftrightarrow close \quad (9)$$

Hammer:

$$close \Leftrightarrow high \wedge close \sqcup low \quad (10)$$

Hanging man:

$$open \Leftrightarrow high \wedge open \sqcup low \quad (11)$$

Inverted hammer:

$$open \Leftrightarrow low \wedge open \sqcup high \quad (12)$$

Shooting star:

$$close \Leftrightarrow low \wedge close \sqcup high \quad (13)$$

Bullish engulfing:

$$open1 \rightarrow close2 \wedge open2 \rightarrow close1 \quad (12)$$

Bearish engulfing:

$$close2 \rightarrow open1 \wedge close1 \rightarrow open2 \quad (12)$$

Tweezer tops:

$$open1 \Leftrightarrow low1 \wedge open1 \sqcup low1$$

$$\wedge \quad (14)$$

$$close2 \Leftrightarrow low2 \wedge close2 \sqcup high2$$

Tweezer bottoms:

$$open1 \Leftrightarrow high1 \wedge open1 \leq low1$$

$$\wedge \quad (15)$$

$$close2 \Leftrightarrow high2 \wedge close2 \leq low2$$

4. RESULTS

Tests conducted on various models show that IBA approach to modelling candlesticks can indeed provide insight into pattern fitness. Traders can monitor provided indicators and decide when input attributes form candlestick patterns. Also, these pieces of information are easily used for creating automated decision support systems. By setting a border near value 1, traders can receive signals when a pattern occurs. IBA can be used for automation as a logical aggregation tool. This kind of automation can induce signals of pattern occurrences on which traders can base their decisions.

Results presented are a fragment of our research. Only one bar candlestick patterns are used in the example.

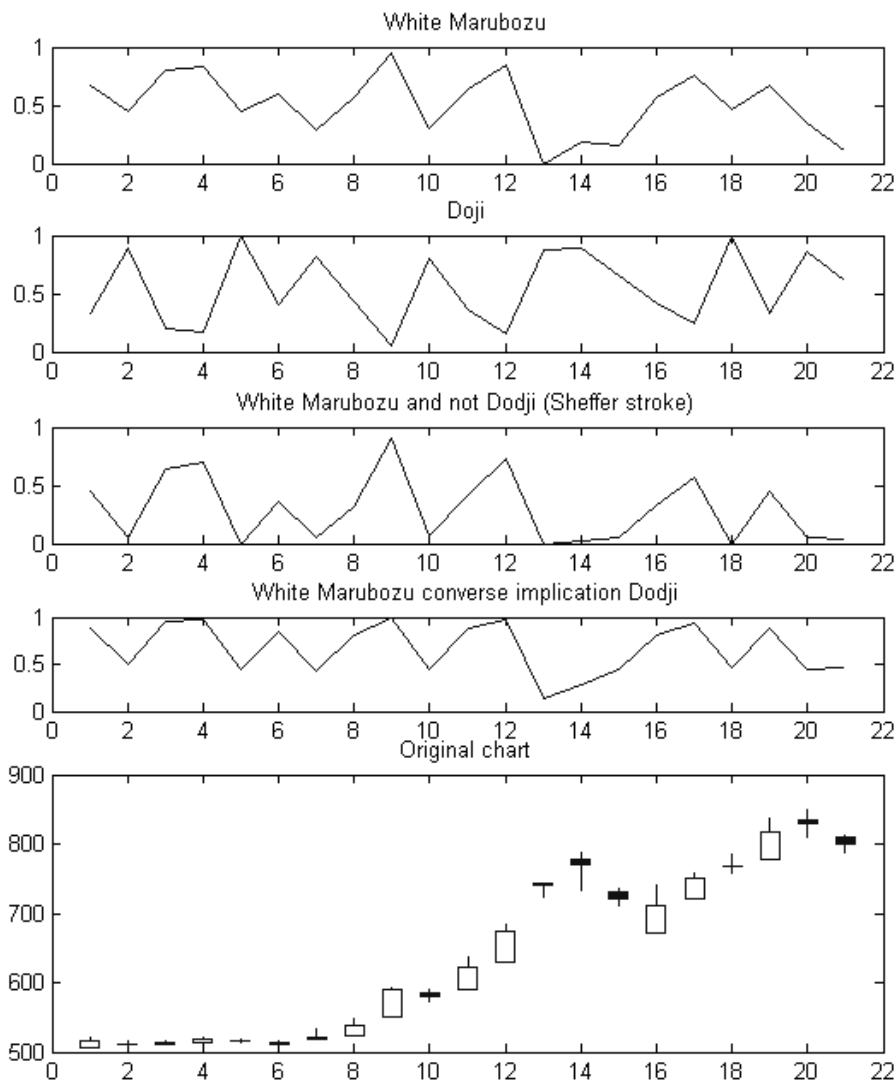


Figure 5: IBA candlesticks modelling results

Table 1 contains data on which previous charts are made (figure 4).

Table 5: Original data and results sample

Open	High	Low	Close	White Marubozu	Dodji	Marubozu ↗ ↘ Dodji	Marubozu ← Dodji
515	519	510	515	0,4444	1,0000	0,0000	0,4444
510	515	510	513	0,6000	0,4000	0,3600	0,8400
519	534	517	522	0,2941	0,8235	0,0519	0,4187
524	549	524	538	0,5600	0,4400	0,3136	0,8064
550	592	550	590	0,9524	0,0476	0,9070	0,9977
584	590	570	580	0,3000	0,8000	0,0600	0,4400
590	638	590	621	0,6458	0,3542	0,4171	0,8746
630	683	630	675	0,8491	0,1509	0,7209	0,9772
743	743	720	740	0,0000	0,8696	0,0000	0,1304
777	788	730	771	0,1897	0,8966	0,0196	0,2735
731	735	709	722	0,1538	0,6538	0,0533	0,4467
672	740	672	711	0,5735	0,4265	0,3289	0,8181
722	759	722	750	0,7568	0,2432	0,5727	0,9408
515	519	510	515	0,4444	1,0000	0,0000	0,4444

Some models described in chapter 3 are very rough and could use some improvement. Simplest way to improve Marubozu model is to compare it to Doji. Since there is no ambiguity in Doji pattern definition, we can use it to improve upon other models. For instance, Marubozu is a Marubozu, only when it is not a Doji. Marubozu models described in chapter 3 can have high intensity even when Doji appears. By definition, it is correct to treat them in such a way, but traders will dismiss them if they do not have larger body. That leaves us with at least two options. One is to look for Marubozu when Doji does not occur and the other is to look for Marubozu when Doji is described as less intensive.

The first scenario White Marubozu and not Dodji depicts traders who consider that Marubozu patterns cannot occur unless body has the opposite size of an ideal Doji body size. Second scenario (White Marubozu ← Dodji) is less harsh and the condition is met when Dojis intensity is smaller than the one of a Marubozu. It is interesting to note that both scenarios give very similar results, but the latter one, case with the converse implication between indicators, is more tolerant. It also appears shifted up compared to the first scenario.

Results depend on type of normalization chosen. For hammer, if data are for instance normalized using Min Max for each bar, we get redundant calculations left and right from ↗. But, if we choose some other type of normalization, results will change accordingly.

For data presented in Table 1 and Figure 4, we used Min Max normalization on each candlestick. If Min Max normalization on the whole interval was used, results would be different. Most notable difference is how logical relations influence changes. Sheffer stroke between White Marubozu and Doji will almost never produce maximal intensity. If converse implication was used, Doji will have very little influence on White Marubozu.

Another possible normalization presented on figure 3 is the one based on 12% and -8% price change boundaries. Since price changes are based on the above assumption, after normalization they are more intense. This affects results to be more volatile. Still, changes are small and there is a big chance of pattern getting recognized with high intensity as a Doji. Last normalization gives us the highest degree of change, so no difference between candlesticks regarding their relative size is made.

From presented results, one can conclude that by looking at intensities of individual or combined patterns, we can get more pieces of information than from two valued logic. Since there are other fuzzy approaches to this problem, strongest argument for using this one is that it is easier to model. From relations between one candlestick data, over relations between two or more candlestick patterns, to relations between complex patterns, everything is modelled using logical relations. Downside is that this approach works with relations, and as a consequence it can be less intuitive than the traditional fuzzy approach. But by using presented techniques, any type of candlestick patterns can be modelled.

As generalized product in GBP for Doji and Marubozu we use minimum t-norm, since all inputs have the same nature. But, for relations between them, we use product t-norm. If the proposed method needs more tuning, pseudo-logical polynomial can be used to introduce weights (Radojevic, 2008c).

5. CONCLUSION

In this paper we presented a way of modelling Japanese candlestick patterns which should be easy for traders to use. The base for creating more complex models is made. In our example we wanted to illustrate that the proposed methodology works satisfactory. To our best knowledge this paper is the first to address candlestick patterns modelling using IBA.

Earlier studies implemented fuzzy logic by defining candlestick elements sizes and then setting IF-THEN rules. Once applied, these methodologies show good results, but it can be hard for traders to get to that point without solid knowledge of fuzzy logic. Another arising issue is situation where multiple patterns should be combined into more complex ones or should be used in creation of trading strategies. Though possible, it is not a straightforward process. Our methodology uses basic logic expressions to model everything from candlestick patterns to strategies and then uses IBA to translate these expressions into values. This process is very simple for traders to comprehend.

Further studies should compare success rates of previous methods to the proposed one and test them for robustness. Also, they should create comparison of different normalization methods and show their influence on results. Finally, effects of using pseudo-logical polynomial on candlestick patterns modelling should be explored.

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FORECASTING STOCK PERFORMANCE USING MULTI-LAYER FEED-FORWARD NEURAL NETWORK: BELGRADE STOCK EXCHANGE CASE

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Abstract: *This paper presents possible usage of neural networks in forecasting stock returns within the Belgrade Stock Exchange. Forecasting is done on the example of the NIS (Serbian Oil Company) stock, which has been chosen as the most liquid equity with the biggest market capitalization. The neural network that has been used for this purpose is a classical multi-layer perceptron with one hidden layer. Technical indicators and stock valuation ratios have been used as inputs. Three combinations of input sets have been developed: the first consisting only of technical analysis indicators; the second consisting of financial ratios; and the third as a mix of the previous two input sets. Results are compared in order to investigate the potential of technical and fundamental analysis as a tool for predicting price changes. Stock valuation ratios have shown excellent characteristics in forecasting future price movements and outperform other approaches. Furthermore, the simpler model has made better results than the complex one, showing that more is not always better.*

Keywords: *neural networks, multi-layer perceptron, stock price forecasting, technical analysis indicators, stock valuation ratios.*

1. INTRODUCTION

Forecasting is certainly the most exotic field of science. Second half of the 20th century has brought exciting development to this field. With the emergence of computers, forecasting has become more and more interesting and many complex technologies rose. Forecasting is one of the main topics in finance. For centuries, men have sought to understand the underlying processes of financial markets in order to predict the future or at least one day ahead. It is the constant battle between man and the market forces. The efficient market hypothesis (EMH) asserts that in an efficient market stock prices movements are random and unpredictable. It means that predicting price movements is impossible. Therefore, analysing history data is useless given that no additional information can be extracted from historical data. But there is no consensus so far on EMH validity. There are numerous papers that give empirical evidence that it is possible to predict, to certain extent, future returns or at least direction of future price change. On the basis of those forecasts, many researches created trading systems that are profitable.

Since 1940's and the first mathematical model of single neuron introduced by McCulloch and Pitts, artificial neural networks (ANN) have gained their popularity in different scientific fields. Their ability to mimic structure and learning process of the human brain made them promising and interesting for lot of researchers around the world. But the main reason for their popularity lies in the fact that ANN requires few theoretical assumptions for modelling. After initial success of Rosenblatt's perceptron and the first criticism of Minsky and Papert, a dramatic resurgence of interest in artificial neural networks have begun in 1980's. Since then, ANN technology has been developing very fast with a wide variety of scientific applications and many types of business applications. Business application areas that require pattern recognition, classification and prediction were candidates for ANN technology. Therefore, it is not surprising that financial application of ANN were one of the most extensively studied, forecasting especially.

In this paper, we use feed-forward neural networks as one of the oldest and most commonly used ANN technology. We use technical and fundamental analysis tools, in order to extract additional information from the history data that we use as input variables in the ANN model. Using these input data we trained neural network to understand underlying process of the market in order to predict future price movements. Results indicated best performances of fundamental analysis approach based on stock valuation ratios. It outperformed other approaches and showed very good results in forecasting future stock movements with high hit rate which indicates what percent of predictions are on the right side of the market.

The remainder of this paper is organized into four sections. Section 2 will present theoretical background and literature review. In section 3 we describe methodology along with the data used for analysis. Section 4 will report results of the comparative analysis. In section 5 we present our conclusions.

2. BACKGROUND

There are a lot of financial areas that are suitable for artificial neural network applications. Credit rating evaluation, price/interest rate forecasting, bankruptcy prediction, corporate health estimation are just some of them. Wong and Selvi (1998) made a review and analysis of different ANN applications in finance.

Forecasting has been for decades one of the most interesting areas of finance. Many researchers studied different techniques in their efforts to discover the underlying model of the market in order to make accurate prediction of price changes. De Gooijer and Hyndman (2006) reviewed many different techniques that were used since 1982 and artificial neural networks have taken its important place among other forecasting methods. Atsalakis and Valavanis (2009) surveyed many scientific articles that focus on neural and neural-fuzzy techniques indicating that soft computing techniques are widely accepted for evaluating stock market behaviour.

Although very old, feed-forward neural networks (FFNN) are still one of the most used networks for financial forecasting. They are simple, fast and easy to implement. In (Atsalakis and Valavanis, 2009) we see that about one third of the surveyed articles use feed-forward neural networks as a forecasting tool. Multi-layer networks with one or two hidden layers are most commonly used. In principle, there is no need to consider other architectures, since the ANN with one hidden layer already has universal approximation capabilities (Bishop, 1994). Cao et al (2005) use simple FFNN with one and three input variables and compare the results with CAPM and 3-factor model. Their results indicate that ANNs do indeed offer an opportunity for more accurate forecasts.

In order to predict stock prices, authors use variety of different inputs. Technical analysis indicators and fundamental analysis ratios are very popular tools among traders and researches. For example, Armano *et al.* (2005) use historical prices along with five different indicators in order to predict prices for the next three days. Olson and Mossman (2003) used 61 accounting ratios for 2352 Canadian companies to forecast annual returns. In many cases, researches are not trying to predict actual prices of the stock or other financial instrument, but their daily returns. Cao et al. (2005) use univariate and multivariate FFNN to predict stock price movements (price returns). Predicting trading signals that can be used for trading strategies is also very popular among researchers. Tsang *et al.* (2007) use open, close, high and low price of the previous day, along with volume and momentum indicator in order to predict trading signals. Chang *et al.* (2011) use more than twenty technical indicators as input variables in order to predict buy and sell signals.

3. METHODOLOGY

Artificial neural network (ANN) is referred to computational model that is inspired by the structure of biological neurons. ANN consists of a certain number of artificial neurons that are interconnected and can be arranged in one or more layers and the information is processed through layers. The main characteristic of ANN is their ability to mimic the knowledge acquisition.

Artificial neurons are the constitutive units of ANN. It is a simple mathematical model of biological neuron. This model receives one or more inputs (representing the one or more dendrites) and sums them to produce an output (representing a biological neuron's axon). Usually the values of the input nodes are weighted and their sum is squashed or transformed by a function known as activation function. An activation function can be linear or non-linear, and most commonly used functions are: threshold, threshold linear, sigmoid and hyperbolic tangent function. There are no clear criteria regarding which activation function to use.

The feed-forward neural network (FFNN) is the oldest and the simplest type of ANNs. In this network, the information moves in only one direction, forward, from the input layer, through the hidden layers (if any) and to the output layer. There are no loops in the network. ANN that is used in this paper is simple feed-forward neural network (FFNN) with one hidden layer. Hidden layer is consisted of 15 neurons. Log-sigmoid functions were used as activation functions in the hidden layer neurons. There are several input variables and only one output variables. Activation function that is used in the single output node is threshold linear function. Figure 1 shows such FFNN with 8 input variables.

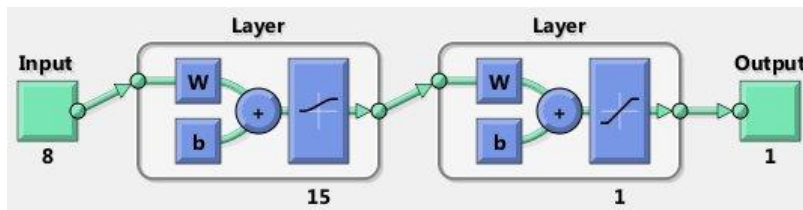


Figure 1: Architecture of the FFNN used in this paper

In order to train our feed-forward network we use recursive methodology. Instead of partitioning data “once and for all” into training and test set, we use the type of recursive methodology called expanding window. Within a given data set that is consisted of N daily values, we use the first $M < N$ observations for initial estimation to obtain initial forecast \hat{r}_{t+1} . Then we re-estimate the model based on $M+1$ observation, and obtain \hat{r}_{t+2} forecast. The process continues until the entire sample is covered. This methodology is called expanding window since the sample size becomes larger as we move forward in time.

3.1. INPUTS

In this paper we use three input sets for the same ANN architecture in order to make comparison of the resulting forecasts. In the first case we use technical analysis indicators as input variables, in the second case stock valuation ratios are used and in the third case both technical indicators and financial ratios are used as input variables for the purpose of forecasting. The idea of these three cases is to investigate the power of technical and fundamental analysis as tools for financial forecasting, first separately and then jointly. Table 1 and Table 2 present the selected technical indicators and stock valuation ratios, along with their formulas and verbal description.

Table 6: Technical analysis indicators as input variables

Indicator	Formula	Description
MACD line	$MACD(N, M) = EMA(N) - EMA(M)$	Moving Average Convergence/Divergence line tracks a difference between longer and shorter trend of the price.
ROC	$ROC(N) = \frac{Price_t - Price_{(t-N)}}{Price_{(t-N)}} \cdot 100$	Rate of Change is designed to show the relative difference between today's closing price and the close N days ago
RSI	$RSI(N) = 100 - \frac{100}{1 + \frac{EMA(upper\ mov, N)}{EMA(down\ mov, N)}}$	The Relative Strength Index is designed to measure the velocity and magnitude of directional price movements.
Chaikin volatility	$CHV(N) = \frac{EMA(H_t - L_t, N) - EMA(H_{t-N} - L_{t-N}, N)}{EMA(H_{t-N} - L_{t-N}, N)} \cdot 100$ $H_t - \text{High price}(t), L_t - \text{Low price}(t)$	Chaikin Volatility determines volatility of financial instrument using percent change in a moving average of subtraction of high and low prices over some period of time.
Volume-price trend	$VPT_t = VPT_{t-1} + volume \cdot \frac{close_t - close_{t-1}}{close_{t-1}}$	Generally, the idea of Volume-price trend is to show the trend of the volume and to investigate is it moving along with price trend.

Table 2: Stock valuation ratios used as input variables

Ratio	Formula	Description
P/E	$P/E = \frac{\text{Price per share}}{\text{Earnings per share}}$	Price-to-earnings ratio shows how much the investors are willing to pay per dollar/euro/dinar/etc of earnings.
P/S	$P/S = \frac{\text{Price per share}}{\text{Sales per share}}$	Price-to-sales ratio shows how much the investors are willing to pay per dollar/euro/dinar/etc of sales.
P/B	$P/B = \frac{\text{Price per share}}{\text{Book value of share}}$	Price-to-book ratio is used to compare a stock's market value to its book value.

3.2. OUTPUT

The selected input variables, presented in the previous section, are used for prediction of daily stock returns. Therefore, the stock return is the only output variable.

3.3. DATA

The proposed feed-forward neural network is used on the example of the Belgrade Stock Exchange (BSE) in forecasting daily returns for stock NIIS (Naftna industrija Srbije A.D.). This stock is selected as the most liquid equity on the BSE market. Naftna industrija Srbije A.D. is also the company with the largest market capitalization on the BSE.

This study covers the time period of May 4th, 2011 through April 30th, 2012. The data consists of 251 daily prices accompanied with daily values of the corresponding technical indicators and stock valuation ratios. Technical indicators were calculated on the basis of daily open, close, low and high prices and volume, collected from official site of BSE⁷. In order to calculate financial ratios, a manual review of the data from the annual financial report of the company⁸ was done. Table 3 presents the part of the data that are used in order to forecast.

Table 3: The data

Date	Return	Close price	P/E	P/S	P/B	MACD line (12,26)	ROC (12)	RSI (12)	Chaikin Volatility (12)	Volume-price trend
04.05.2011.	NA	510	5,04	0,49	1,76	NA	NA	NA	NA	19.575,00
05.05.2011.	0,78	514	5,08	0,49	1,78	NA	NA	NA	NA	19.788,69
06.05.2011.	0,97	519	5,13	0,50	1,80	NA	NA	NA	NA	20.120,46
09.05.2011.	-0,77	515	5,09	0,50	1,78	NA	NA	NA	NA	19.957,95
10.05.2011.	-0,39	513	5,07	0,49	1,78	NA	NA	NA	NA	19.905,74
...
01.02.2012.	0,52	579	2,61	0,51	1,27	-9,00	-3,18	32,14	116,11	70.518,95
02.02.2012.	3,80	601	2,71	0,53	1,32	-6,88	2,56	51,95	123,68	72.194,44
03.02.2012.	6,16	638	2,87	0,57	1,40	-2,19	9,62	75,49	158,51	75.071,33
06.02.2012.	5,49	673	3,03	0,60	1,48	4,30	14,85	84,21	146,97	76.826,21
07.02.2012.	-3,12	652	2,94	0,58	1,43	7,67	11,45	72,00	159,14	75.574,14
...
24.04.2012.	-0,61	647	2,60	0,55	1,20	-10,49	-4,15	15,56	32,91	81.229,43
25.04.2012.	0,46	650	2,61	0,55	1,21	-10,54	-2,55	22,22	39,70	81.283,43
26.04.2012.	1,54	660	2,65	0,56	1,23	-9,67	0,00	42,55	38,39	81.549,47
27.04.2012.	-0,76	655	3,18	0,59	1,11	-9,27	-1,06	44,44	29,72	81.442,19

3.4. NORMALIZATION

Values of the input variables are normalized to [0,1] interval and afterwards put through neural network in order to forecast future stock returns. We use the following linear rescaling function:

$$X_{norm} = \frac{X_i - X_{min}}{X_{max} - X_{min}} \quad (1)$$

⁷ www.belex.rs

⁸ <http://www.belex.rs/trgovanje/informator/NIIS>

3.5. FORECASTING ACCURACY MEASURE

We compute the following three error metrics to measure forecast accuracy of the network:

- Mean absolute error (MAE)

$$MAE = \frac{1}{n} \sum_{i=1}^n |r - \hat{r}_i| \quad (2)$$

- Root mean square error (RMSE)

$$RMSE = \frac{1}{n} \sqrt{\sum_{i=1}^n (r - \hat{r}_i)^2} \quad (3)$$

- Hit rate (HR)

$$HR = \frac{\sum_{i=1}^n H_i}{n}, \quad H_i = \begin{cases} 1, & \text{if } \text{sign}(\hat{r}_i) = \text{sign}(r_i) \\ 0, & \text{if } \text{sign}(\hat{r}_i) \neq \text{sign}(r_i) \end{cases} \quad (4)$$

4. RESULTS

This paper is intended to analyze the power of technical and fundamental analysis as forecasting tools. For that purpose, the data were separated into three datasets. In the first dataset daily returns (1 output) and corresponding daily values of technical indicators were used (5 input variables). In the second dataset daily returns (1 output) were used along with the corresponding values of the selected stock valuation ratios (3 inputs). Third dataset was consisted of the data from both previously described datasets (1 output and 8 input variable). Therefore, in third dataset there are eight input variables. Forecasting results from these three datasets were compared with each other. The purpose of this analysis is to investigate usefulness of technical analysis indicators and stock valuation ratios as a forecasting tool, first separately and then jointly. Resulting forecasts are presented in Table 4.

Table 4: The results

HISTORICAL DATA		Approach 1	Approach 2	Approach 3
DATE	ACTUAL RETURNS	Technical indicators	Stock valuation ratios	Technical indicators + valuation ratios
		FORECASTS	FORECASTS	FORECASTS
07.03.2012.	-2,07	-1,10	-3,78	-0,34
08.03.2012.	0,42	-6,39	0,88	-1,62
09.03.2012.	-0,28	-0,68	-0,48	-0,75
12.03.2012.	-0,56	-0,37	0,55	-2,19
...
17.04.2012.	-0,15	-0,84	-0,15	-1,27
18.04.2012.	0,15	-0,53	0,31	-0,40
19.04.2012.	0,15	-3,01	-0,51	4,64
20.04.2012.	0,46	-0,59	-0,73	-0,44
23.04.2012.	-1,51	-4,75	-4,33	-1,05
24.04.2012.	-0,61	0,17	-0,73	-0,76
25.04.2012.	0,46	-0,75	2,17	-2,58
26.04.2012.	1,54	2,40	-0,61	-2,56
27.04.2012.	-0,76	-3,44	-0,25	-1,04

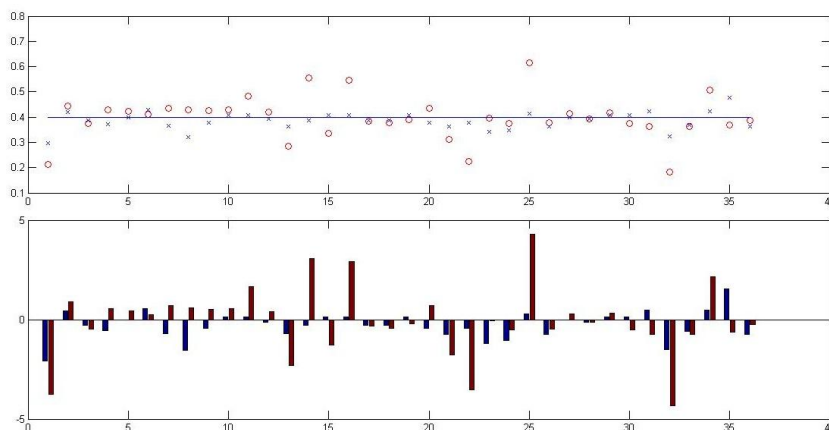
In order to compare these three approaches, we use mean absolute error (MAE), root mean square error (RMSE) and hit rate (HR). The following Table 5 gives the resulting errors for all three approaches.

Table 5: Accuracy measures

Accuracy measure	Technical analysis	Fundamental analysis	Universal approach
	approach	approach	
MAE	1,4902	1,1980	1,2497
RMSE	2,4114	1,7295	1,8751
HR	58,33%	61,11%	47,22

The most accurate is the second approach that uses stock valuation ratios in order to forecast future stock return. It has very a good hit rate of about 61%. It is very interesting that technical analysis approach had worst performances looking at MAE and RMSE, but it had good performances looking at the prediction rate. Surprisingly, universal approach that should use all the best characteristics of both approaches showed disappointing results. Perhaps, this finding proves that more does not always mean better. Cao *et al.* (2005) proved the same in their work when they unexpectedly got better forecasting results for univariate (with one input variable) multi-layer perceptron (MLP) than for multivariate MLP with three input variables. First two approaches have hit rates bigger than 50% which means they are most of the time on the right side of the market. However, this does not mean that they could bring profit to their owners.

Since it is the most successful approach, Figure 2 will show the graphical representation of the forecasting results achieved using stock valuation ratios. Forecasts are marked with circles in the upper graph and red bars in the lower graph, and actual prices are marked as crosses and blue bars. The upper graph represents normalized data while lower shows regular data.


Figure 2: Graphical representation of stock valuation ratio accuracy

2. CONCLUSION

In this paper, feed-forward neural networks (FFNN) are used in order to predict stock price movements on the example of NIIS (Naftna industrija Srbije A.D.) from Belgrade Stock Exchange (BSE). Even though FFNN are among the oldest and simplest neural network architectures the results shown that they indeed offer an opportunity for investors to improve their predictive power. Three different approaches are used in order to create accurate forecasting system. The first approach used stock valuation ratios to predict future stock movements, the second used technical indicators and the third was combination of the previous two.

Unexpectedly, it appears that simpler models are more successful in forecasting returns and price movement directions than the complex one. Results have shown that fundamental analysis approach gives excellent results. Stock valuation ratios outperformed both technical analysis and universal approach.

As for the future work, it will be interesting to investigate more carefully potential of fundamental analysis. Also, we are willing to assess the relationship between the number of input variables and the accuracy of the model. Furthermore, we will try to extract trading signals from the forecasting results in order to make profitable trading system.

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THE CHAOTIC REAL EXCHANGE RATE GROWTH MODEL

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Abstract: Chaos theory is used to prove that erratic and chaotic fluctuations can indeed arise in completely deterministic models. Chaos theory reveals structure in periodic, dynamic systems. The number of nonlinear business cycle models use chaos theory to explain complex motion of the economy. Chaotic systems exhibit a sensitive dependence on initial conditions: seemingly insignificant changes in the initial conditions produce large differences in outcomes. The basic aim of this analysis is to provide a relatively simple chaotic real exchange rate growth model that is capable of generating stable equilibria, cycles, or chaos.

Key words: *real exchange rate, growth, depreciation, chaos*

1. INTRODUCTION

Chaos theory started with Lorenz's (1963) discovery of complex dynamics arising from three nonlinear differential equations leading to turbulence in the weather system. Li and Yorke (1975) discovered that the simple logistic curve can exhibit very complex behaviour. Further, May (1976) described chaos in population biology. Chaos theory has been applied in economics by Benhabib and Day (1981,1982), Day (1982, 1983,1997,), Grandmont (1985), Goodwin (1990), Medio (1993,1996), Medio, A. and Lines, M (2004), Lorenz (1993), Shone, R.(1999) , Jablanovic (2010, 2011a, 2011b, 2012). Deterministic chaos refers to irregular or chaotic motion that is generated by nonlinear systems evolving according to dynamical laws that uniquely determine the state of the system at all times from a knowledge of the system's previous history. Chaos embodies three important principles: (i) extreme sensitivity to initial conditions ; (ii) cause and effect are not proportional; and (iii) nonlinearity.

National saving is the source of the supply of loanable funds. Domestic investment and net capital outflow are the sources of the demand for loanable funds. At the equilibrium interest rate, the amount that people want to save exactly balances the amount that people want to borrow for the purpose of buying domestic capital and foreign capital. At the equilibrium interest rate , the amount that people want to save exactly balances the desired quantities of domestic investment and net capital outflow.

The real exchange rate is determined by the supply and demand for foreign – currency exchange. The supply of domestic currency to be exchanged into foreign currency comes from net capital outflow. The demand for domestic currency comes from net exports. Because a lower real exchange rate stimulates net export , the demand curve is downward sloping. At the equilibrium real exchange rate, the demand for domestic currency to buy net export exactly balances the supply of domestic currency to be exchanged into foreign currency to buy assets abroad.

The supply and demand for loanable funds determine the real interest rate. The interest rate determine net capital outflow, which provides the supply of dollars in the market for foreign –currency exchange. The supply and demand for domestic currency in the market for foreign-currency exchange determine the real exchange rate.

In an open economy, government budget deficit raises real interest rates, crowds out domestic investment, decreases net capital outflow, causes the domestic currency to appreciate. However this appreciation makes domestic goods and services more expensive compared to foreign goods and services. In this case, exports fall, and imports rise. Namely, net exports fall. An appreciation of the real exchange rate expresses that the foreign price of a bundle of goods has risen relative to the domestic price. If the real exchange rate appreciates it means that the real value of the domestic currency has depreciated

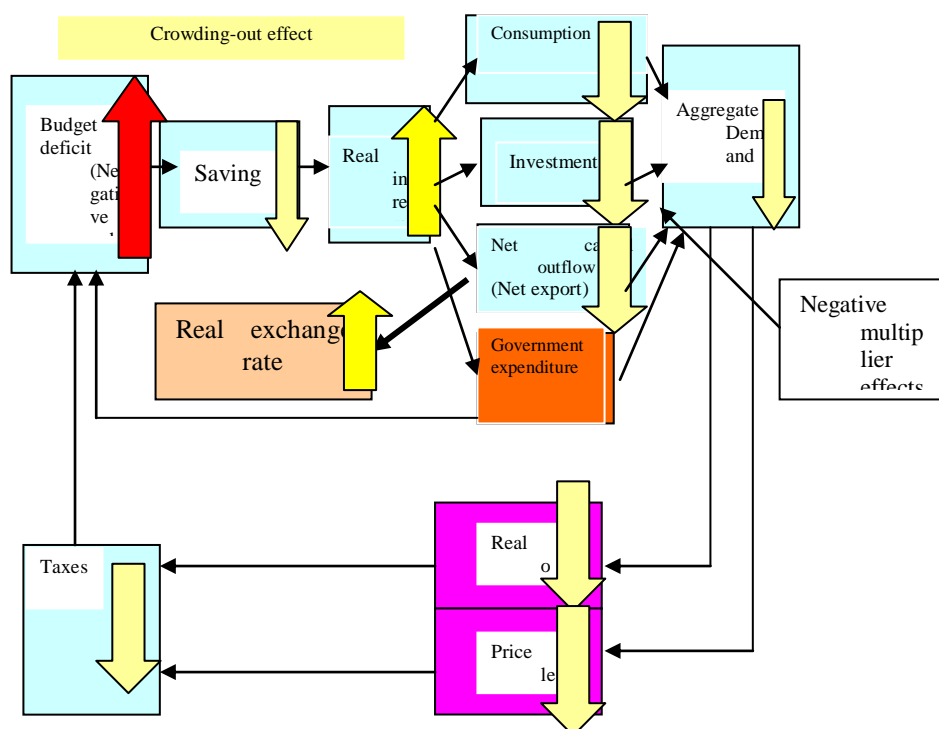


Figure 1. Relation between budget deficit, saving , investment, and real exchange rate

The basic aim of this analysis is to provide a relatively simple chaotic real exchange rate growth model that is capable of generating stable equilibria, cycles, or chaos.

2. A SIMPLE CHAOTIC REAL EXCHANGE RATE GROWTH MODEL

The chaotic real exchange rate growth model is presented by the following equation

$$k_m = \frac{\Delta K}{\Delta Y} \quad (1)$$

$$k = \frac{K}{Y} \quad (2)$$

$$Y_t = K_t^{1/2} \quad (3)$$

$$NCO_t = Nx_t \quad (4)$$

$$Nx_t = \gamma - \delta e_t \quad (5)$$

$$NCO_t = \alpha - \beta Bd_t \quad (6)$$

$$Bd_t = \pi Y_t \quad (7)$$

Where e – real exchange rate, NCO – net capital outflow, Nx - net export, Bd – budget deficit; Y – real output ; K – capital; k - average capital coefficient, k_m - marginal capital coefficient, $\alpha, \beta, \gamma, \delta, \pi$, -coefficients.

(1) defines marginal capital coefficient ; (2) defines average capital coefficient ; (3) determines production function; (4) the identity between net capital outflow and net export; (5) describes the demand for dollars which comes from net export; (6) describes net capital outflow as a function of budget deficit; and (7) describes the relation between budget deficit and the real output.

Firstly , it is supposed that $\alpha = 0$ and $\gamma = 0$. Further, by substitution one derives:

$$e_{t+1} = \frac{k_m}{k_m - k} e_t - \frac{1}{\beta \pi (k_m - k)} e_t^2 \quad (8)$$

Further, it is assumed that the current value of the real exchange rate is restricted by its maximal value in its time series. This premise requires a modification of the growth law. Now, the real exchange rate growth rate depends on the current size of the real exchange rate, e , relative to its maximal size in its time series e^m . We introduce ε as $\varepsilon = e/e^m$. Thus ε range between 0 and 1. Again we index ε by t , i.e., write ε_t to refer to the size at time steps $t = 0, 1, 2, 3, \dots$. Now growth rate of the real exchange rate is measured as

$$\varepsilon_{t+1} = \frac{k_m}{k_m - k} \varepsilon_t - \frac{1}{\beta \pi (k_m - k)} \varepsilon_t^2 \quad (9)$$

This model given by equation (9) is called the logistic model. For most choices of β , π , k and k_m there is no explicit solution for (9). This is at the heart of the presence of chaos in deterministic feedback processes. Lorenz (1963) discovered this effect - the lack of predictability in deterministic systems. Sensitive dependence on initial conditions is one of the central ingredients of what is called deterministic chaos.

3. LOGISTIC EQUATION

The logistic map is often cited as an example of how complex, chaotic behaviour can arise from very simple non-linear dynamical equations. The map was popularized in a seminal 1976 paper by the biologist Robert May. The logistic model was originally introduced as a demographic model by Pierre François Verhulst. Chaotic dynamics was made popular by the the logistic map. The most interesting characteristic of the logistic map is in the simplicity of its form (quadratic) and the complexity of its dynamics. It is the simplest model that shows chaos. It is possible to show that iteration process for the logistic equation

$$z_{t+1} = \pi z_t (1 - z_t), \quad \pi \in [0, 4], \quad z_t \in [0, 1] \quad (10)$$

is equivalent to the iteration of growth model (9) when we use the identification

$$z_t = \frac{1}{\beta \pi k_m} \varepsilon_t \quad \text{and} \quad \pi = \frac{k_m}{k_m - k}. \quad (11)$$

Using (9) and (11) we obtain:

$$z_{t+1} = \frac{1}{\beta \pi k_m} \varepsilon_{t+1} = \frac{1}{\beta \pi k_m} \left[\left(\frac{k_m}{k_m - k} \right) \varepsilon_t - \left(\frac{1}{\beta \pi (k_m - k)} \right) \varepsilon_t^2 \right] =$$

$$= \left[\frac{1}{\beta \pi (k_m - k)} \right] \varepsilon_t - \left[\frac{1}{\beta^2 \pi^2 k_m (k_m - k)} \right] \varepsilon_t^2$$

On the other hand, using (10) and (11) we obtain:

$$z_{t+1} = \pi z_t (1 - z_t) = \frac{k_m}{k_m - k} \frac{1}{\beta \pi k_m} \varepsilon_t \left(1 - \frac{1}{\beta \pi k_m} \varepsilon_t \right)$$

$$= \left[\frac{1}{\beta \pi (k_m - k)} \right] \varepsilon_t - \left[\frac{1}{\beta^2 \pi^2 k_m (k_m - k)} \right] \varepsilon_t^2$$

It is important because the dynamic properties of the logistic equation (10) have been widely analyzed (Li and Yorke (1975), May (1976)).

It is obtained that :

- (i) For parameter values $0 < \pi < 1$ all solutions will converge to $z = 0$;
- (ii) For $1 < \pi < 3,57$ there exist fixed points the number of which depends on π ;
- (iii) For $1 < \pi < 2$ all solutions monotonically increase to $z = (\pi - 1) / \pi$;
- (iv) For $2 < \pi < 3$ fluctuations will converge to $z = (\pi - 1) / \pi$;
- (v) For $3 < \pi < 4$ all solutions will continuously fluctuate;
- (vi) For $3,57 < \pi < 4$ the solution become "chaotic" which means that there exist totally aperiodic solution or periodic solutions with a very large, complicated period. This means that the path of z_t fluctuates in an apparently random fashion over time, not settling down into any regular pattern whatsoever.

3. CONCLUSION

The basic aim of this analysis is to provide a relatively simple chaotic real exchange rate growth model that is capable of generating stable equilibria, cycles, or chaos.

In an open economy, government budget deficit generates an appreciation of the real exchange rate. An appreciation of the real exchange rate expresses that the foreign price of a bundle of goods has risen relative to the domestic price. If the real exchange rate appreciates it means that the real value of the domestic currency has depreciated

A key hypothesis of this work is based on the idea that the coefficient

$$\pi = \frac{k_m}{k_m - k}$$

plays a crucial role in explaining local stability of the real exchange rate growth, where, k_m – the marginal capital coefficient, and k - the average capital coefficient.

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THE INFLUENCE OF THE EMISSION OF GREENHOUSE GAS ON MANAGEMENT DECISIONS

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Abstract: *The emission of greenhouse gas and global warming are one of today's greatest climate problems. In order to reduce the emission of greenhouse gas and the slowdown of global warming, the international agreements, such as the Kyoto Protocol and the European Union Emission Trading Scheme (EU ETS), have been arranged. Both agreements are obligatory only for developed countries. These agreements have imposed obligations not only for the governments of developed countries, but also for the companies that operate in these countries. However, global warming is a problem that influences all countries, both developed and developing. Therefore, the inclusion of developing countries in the contracts mentioned above has been initiated. If this initiative comes to life, it will be necessary for companies operating in developing countries to introduce some changes in their decision-making process. These changes will entail the companies to calculate the price of the emission of greenhouse gas and include it in the costs-benefit analysis of new investments. Furthermore, the cost of emission might influence the profitability of products that are already produced within a company. Companies that operate in developed countries have already included the cost of emission in their decision-making process. Companies operating in developing countries must try to do the same, or at least include the cost of emission in their long-term plans in order to prepare their activities for future changes that will inevitably occur. The implementation of the Kyoto Protocol and the EU ETS, the inclusion of the price of emission in the decision making process and some problems related to it, as well as changes in the agreements that will probably happen and possible gains of companies have been described in this paper.*

Keywords: *the Kyoto Protocol, the EU ETS, cost of emission, developed countries, developing countries,*

1. PREFACE

The emission of greenhouse gas is one of the major climate problems in the world. In its Third Assessment Report (2001) the Intelligent Panel on Climate Change presented evidence showing that in the last 50 years global warming has, by and large, been the result of human activities. Therefore, human behavior must change in order to slow global warming down. The United Nations Framework Convention on Climate Change (UNFCCC) is the first internationally binding instrument that addresses the issue of response to climate change. UNFCCC has one ultimate objective – to achieve stabilization of greenhouse gas in the atmosphere at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system. Other multinational agreements were also arranged in order to introduce the need for reduction of greenhouse gas emission in countries throughout the world. The Kyoto Protocol and the European Union Emission Trading Scheme are examples of these agreements. Those agreements are, for now, binding only for developed countries. Nevertheless, the global warming is a problem that affects all nations and all countries. Parallel with the industry growth of developing countries, the emission of greenhouse gas in these countries will rise too. The need for the inclusion of developing countries in the agreements mentioned above has already been discussed and it is probable that it will happen soon.

Agreements mentioned above have effect on the business activities of companies operating in developed countries. EC survey on corporate behavior indicated that 70% of companies were pricing the value of allowances into their daily operations and 87% into the future marginal pricing decisions. All industries stated that it was a factor in long-term decision-making. These companies had to include the question of reduction of emission and the valuing of emission in their decision making process. Entities that operate in developing countries, as Serbia, have not had to face this question yet, but they will probably have to do so soon.

2. THE IMPLEMENTATION OF THE KYOTO PROTOCOL

The Kyoto Protocol is an international agreement linked to the UNFCCC. Kyoto protocol set targets for 37 industrialized countries and the European community in order to reduce the greenhouse gas emission. Industrialized countries have agreed to achieve 20% of reduction of greenhouse gas emission by 2020, with 1990 as the base year. During the first commitment period, from 2008 to 2012, industrialized countries are

obliged to reduce their emissions, and minimum reduction should be equal to five per cent of the greenhouse gas emission in 1990. The difference between the UNFCCC and the Kyoto Protocol is that the former does not oblige countries to reduce emission of greenhouse gas and the latter does. The reason why only developed countries are obliged to reduce their emission of greenhouse gas is because developed countries are mainly responsible for the current level of greenhouse gas emissions, which is the result of more than 150 years of industrial activity.

The Kyoto Protocol is organized in the following manner: developed countries are given certain number of rights for emission of greenhouse gas annually. The quantity of rights every country has is called “cap”, and it is being reduced over time. Rights for emission are distributed to companies that operate in these countries. If a company does not have enough rights to cover its emission during a certain period, it can buy rights on the market. Also, if all emission rights are not used within a company, they can be sold on the market, or saved for future periods (when these rights will not be given free of charge). The possibility of selling rights on the market motivates companies to reduce their emission and earn profits.

Companies are given the opportunity to earn rights for additional emission of greenhouse gas through investing in the reduction of greenhouse gas emission in other Annex I countries (industrialized countries), or in developing countries. If a company decides to invest in reduction of greenhouse gas emission in Annex I country, it will earn certain number of “emission reduction unit” (ERU). If a company invests in reduction of greenhouse gas emission in developing country, it will earn “certified emission reduction” (CER). Both one ERU and one CER are equivalent to the emission of one tone of greenhouse gas. In both cases the result of investment must be controllable (the reduction of emission must be measurable).

3. THE IMPLEMENTATION OF THE EUROPEAN UNION EMISSION TRADING SCHEME

The organization of the European Union Emission Trading Scheme (EU ETS) is very similar to the organization of the Kyoto Protocol. The basic goal of 20% reduction of greenhouse gas emission by 2020, with 1990 as the base year, is the same as in the Kyoto Protocol. European countries are given rights for the emission of greenhouse gasses, which are distributed amongst companies. The difference between the Kyoto Protocol and the EU ETS is the existence of trading periods that last more than one year. The introduction of these periods was necessary in order to neutralize annual irregularities in emission of greenhouse gas that occur due to extreme weather events. The first trading period lasted from 2005 to 2008, while the second trading period still lasts and it will end on December 2012. Rights are also traded on the market, and their value is depended on the relation of demand and supply. It is not allowed to transfer rights that were not used from the first trading period to the second trading period (therefore, rights should be either used or sold on the market until the period ends). The third trading period will start in 2013. It is planned for more rights to be auctioned during the third trading period, which will probably have effect on entities' behavior.

4. THE POSSIBILITY OF INCLUSION OF DEVELOPING COUNTRIES

As it was previously said, the emission of greenhouse gas is a global problem. The reduction of emission in developed countries will lead to a partial solution of this problem. In order to address the problem adequately, developing countries must also reduce emission in their countries. Kyoto protocol encourages industrialized countries to invest in clean technology in developing countries, but the governments and companies operating in these countries must be motivated to do the same. The question is how to stimulate developing countries to invest in clean technology? The governments of developing countries have other things on their minds, and because industries in this countries are not big polluters (comparing to industrialized countries); the need for reduction of emission is often not being considered. More urgent problem developing countries must face with is the development of their industries. But, industrial development will inevitably lead to higher emission of greenhouse gas. If developing countries are not obliged to reduce emissions, all efforts from developed countries might prove to be pointless.

Some solutions to the problem have been suggested. One solution that is often being proposed is sectorial introduction of the Kyoto Protocol. This means that only sectors that are the biggest polluters (energy sector, for example) will be obliged to reduce the emission of greenhouse gas. Other possibility is that the Kyoto protocol will become obligatory for all countries. After the first commitment period of the Kyoto Protocol, some changes in the system will probably occur. One of the changes might be the introduction of greenhouse gas emission in developing countries.

5. THE INTRODUCTION OF COST OF EMISSION IN DECISION-MAKING PROCESS

The introduction of some of these systems for the reduction of emission in developing countries will influence business operations of companies that do not have to deal with this problem now. Same as with the governments of developing countries, top managements of these companies are struggling with the problem of managing day-to-day activities and developing the business.

If the Kyoto protocol or the EU ETS is adopted in developing countries, managers of companies that operate in these countries will have to face with the following question: Should we invest in clean technology, or should we buy additional rights for emission of greenhouse gas? Both options will influence future business results of the companies and their cash flows. The cost of emission of one tone of greenhouse gas will have to be integrated in their decision making process.

If, for example, management had to decide if the money should be invested in clean technology or not, total costs to total benefits related to this investment should be compared. If total benefits are greater than costs of investment in clean technology, the company will decide to invest. If, on the contrary, investment in clean technology is greater than benefits which can be earned by selling extra rights on the market, companies will opt for status quo.

The cost of investment in clean technology is relatively easy calculated. Price of filter that company wants to buy, for example, can be found on the market. Costs of maintenance and services will have to be included in total costs, too. Finally, costs of disposal of the filter will have to be calculated. All these costs are available on the market. In order to calculate present value of these costs, some of them will have to be discounted (one example of these costs is the cost of disposal).

The calculation of total benefits is far more complex. Total benefits include revenues earned from the selling extra rights on the market. Also, they might include some subsidies from government for the investment in clean technology. Finally, total benefits include auction price of rights that company will not have to buy in the following periods (comparing to the rights that would have to be bought if the investment was not made). In order to be able to calculate total benefits, company must forecast the reduction of emission (in tones) and price of one right for the emission of greenhouse gas. The biggest problem in this calculation is related to the prediction of the price of rights for emission.

To illustrate the difficulty of predicting the price of rights, we will use the example of the price of rights on EU ETS market. Variation of this price during the first trading period (from 2005 to 2008) will be depicted. As it can be seen from the Figure 1, the price of rights increased steadily until April 2006, when it peaked at 30 Euros per right. In the following month the price of right plummeted to only 10 Euros, because of news that some countries gave their industries such a generous emission cap that there was no need for them to reduce emissions. In March 2007 the price fell to 1, 2 Euros per right, and in September 2007 the price was only 0, 1 Euros per right. This big volatility and surge of price in the second half of the trading period made the managers recalculate their costs and change their decisions.



Figure 6: Spot price of European allowance

The biggest problem was the fact that until April 2006 no one could predict that price will fall. The change of price might have made the current investments in clean technology non-profitable. For example, a company has calculated that an investment in clean technology will reduce emission for 100 tons until the end of the first trading period. If a decision had to be made in February 2006, the price that would be used to calculate the value of saved rights would probably be equal to 30 Euros. Total value of rights that could be sold on the market would be estimated at 3.000 Euros. If the same company would calculate the values of extra rights one year later, the value of one right would be 10 times less (around 3 Euros, or even less than this). The value of extra rights would be estimated at only 300 Euros. If we assume that total costs of investment have been predicted at 1.000 Euros, the change of price of rights would have made the investment non-profitable.

The price of rights during the second trading period has also been volatile. The price of rights has also fallen, because of the economic recession in Europe and the whole world. According to research, the quantity of rights that countries distributed to companies during the second trading period was in line with their economic activity planned before the recession. However, after the recession the emission of greenhouse gases decreased drastically, leading to the increase in the supply of rights on the market and, consequently, to the fall of prices.

Managers must also be aware of the fact that most rights will be auctioned in the third (and all following) trading period. This means that companies will have to pay for the rights on the beginning of the trading period, and use them during the trading period. According to this, the market price of rights might not have to be used in the decision making process. It will be replaced with the auctioned price of rights. The quantity of rights will be calculated based on the predicted decrease of emission during the useful life of the investment. If we use the example mentioned above (the installation of filter), total value of emission cut during the second trading period will have to be increased with the total value of "saved" rights (rights that will not have to be bought in the future period due to the emission cut).

It is planned to use money earned from the auction of rights to subsidize new investments in clean technology. This fact will also have to be included in cost-benefit analysis, because it will affect the value of initial investment.

The price of carbon must not be used only for decision making for new investments. This information is very important for the calculation of profitability of both existing and new products. In order to include the cost of emission in the calculation of the profitability of every product, it will be necessary to distribute total company's emission to all its products. This is a complicated process and it cannot be done easily. There are usually more products made within a company or within one section at the same time, and the right key will have to be found in order to distribute total emission to all products. After the quantity of emission is calculated, it is necessary to determine the cost of emission of one tone, and difficulty of this decision is described above. In spite of the difficulties related to the distribution of total emission to a single product, this can be very useful information for managers, because they can see the quantity of emission that every product makes, and decide if that product is going to be produced in the future or not. Also, if emission related to some of the products is high, managers may try to find different method of production, or use different fuel in order to reduce emission.

6. THE POSSIBILITY OF WINDFALL PROFITS

Although the Kyoto Protocol and the EU ETS have imposed some obligations for the companies, some of them have used these systems to make gain. Those companies have been incorporating the price of carbon in the price of their products. This right has been reserved for companies that have monopoly on a certain market. If a company competes with firms that do not operate under the emission cap, it may not be able to pass on the full costs of rights to consumers. Also, if market is regulated by the government, the company will not be legally allowed to raise prices.

Under the EU ETS system, energy companies have had the opportunity to compute the price of rights for carbon emission in the price of electricity. The best evidence that can back up this behavior of companies can be found by monitoring the prices of electricity during the first commitment period. The fall of prices of rights in May 2006 was followed by the fall of the prices of electricity by 5 to 10 Euros. This price adjustment can be directly linked to the fall of prices of rights, because it was not connected to other energy market movements that could also affect electricity prices. These companies have treated rights that were given (free of charge) to them as a cost and increased the price of their products. To be precise, these companies have treated the price of rights as opportunity costs. The reason for this is the following: all allowances that

were given to a certain company could be either used to cover the emission of greenhouse gas, or sold on the market. The production (and emission of greenhouse gas) eliminates the latter option. Therefore, the companies have been giving up the profit they could earn on the market by selling those rights. Because of this, managers have been treated the price of rights that must be “saved” as opportunity cost, and increased the price of electricity.

As it was previously said, after the second trading period, most rights will probably be auctioned. Based on this, it will be legitimate for companies to include the costs of rights in the prices of their products.

7. CONCLUSION

The Kyoto Protocol and the EU ETS have imposed certain obligations to companies that operate in developed countries. These companies have been dealing with the problem of inclusion of the cost of the emission of greenhouse gas in their decision making process for some time. Along with their competitors from developed countries, the companies from developing countries will have to face with the problem of the reduction of greenhouse gas, now or in a couple of years. The managers of companies that think ahead will start to include the cost of emission in their long-term plans now and prepare their companies for future actions.

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APPLICATION OF MATHEMATICAL MODELLING IN VACCINE PROCUREMENT FOR CHILDHOOD IMMUNIZATION IN SERBIA

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Abstract: *In this paper, we wanted to demonstrate how methods of mathematical modelling could be used for the improvement of vaccines procurement, for mandatory children immunization, with an objective to minimize the cost of administering vaccines. For the study purpose, we chose mandatory vaccines which are meant to be applied against the following diseases: Hepatitis B (HB), Diphtheria, Tetanus, Pertussis (DTP) and Haemophilus Influenza Type B (Hib), for children immunization in the first six years of life. We considered four vaccines producers and ten vaccines (six combined and four single), currently available on the market in Serbia. According to the presented results, there is a significant gap related to minimal costs, between an optimal vaccine schedule and the optimal vaccine schedule in which multiple vaccines are favoured. That gap is 10,080 RSD (approximately 90 EUR) per child. This fact should be borne in mind when considering the effective allocation of resources in the national immunization programme planning.*

Keywords: *mathematical modelling, vaccines procurement, children immunization schedule, resources allocation*

1. INTRODUCTION

Vaccination is one of the primary strategies used by public health authorities to control human infectious diseases (Tanner, Sattenspiel & Ntamo, 2008). After general hygiene improvements, as the clean water supply is, vaccines represent the most effective and cost-saving public health intervention. Immunization is the process in which a person is made immune to an infectious disease, typically by the administration of a vaccine (Gledović et al., 2009). Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease.

There are a great number of communicable diseases for which effective vaccines are available. Most of the existing vaccines have some specific requirements: multiple doses that must be administered in a specific minimum or maximum time window, some of them are forbidden to be administered in the same time with other vaccines, some diseases are uncertain about evolution of the epidemic strains, etc. Furthermore, there are challenges in the vaccine manufacturing process including uncertain yields, quality control, supply chain logistics, and optimal storage location of vaccine supplies (Zhang, Mason, Denton, Pierskalla, 2011). Finally, many new vaccines, which are present on the market today, are multivalent: they are including the combination of vaccines that can cover multiple diseases. Furthermore, it is a challenge to determine an economic package of vaccine types and brands that should be procured and that will ensure the immunization schedule requirements.

Childhood vaccination is the most common means of mass vaccination. Numerous models are developed to aid in the selection of a vaccine formulary, pricing of vaccines, and design of vaccination schedules (Zhang, Mason, Denton, Pierskalla, 2011). Jacobson et al. (1999) proposed integer programming models to determinate the price of combination vaccines, and later (2006) investigated a child vaccine supply shortage problem to assess the impact of child vaccine stockpile levels on vaccination coverage rates of the current guideline during supply interruption.

2. PROBLEM DESCRIPTION

A childhood immunization schedule in Serbia is a very complex and requires several visits to health centres for receiving mandatory vaccines. These visits are sequenced based on specifications of each vaccine. Official childhood immunization schedule in Serbia requires immunization against ten communicable disease which could be prevented by seven mandatory vaccines (Pravilnik o imunizaciji i načinu zaštite lekovima, Sl. Glasnik RS 11/06).

In this paper, we wanted to demonstrate how mathematical modelling could be used for procuring vaccines for a childhood mandatory immunization in Serbia, with an objective to minimize the cost of administering vaccines. The study is based on the proposed modernized immunization Programme, given by the medical experts (Radlović et al) and includes all vaccines and vaccines combinations available from different manufacturers, official recognized in Serbia. The major goal of this paper is to suggest the mathematical model, which could be used in selection of a most economical set of vaccines that should be procured to satisfy above-mentioned proposed immunization Programme schedule.

For the study purpose, we chose mandatory vaccines which are meant to be applied against following diseases: Hepatitis B (HB), Diphtheria, Tetanus, Pertussis (DTP) and Haemophilias Influenza Type B (Hib), for the children immunization, in the first six years of life. For combined vaccines, which contain the vaccine against Poliomyelitis, this single component will not be considered. There are four producers (labelled with P1, P2, P3, P4) and ten vaccines (six combined and four single, labelled with X1, X2, X3, X4, X5, X6, X7, X8, X9, X10) available on the market in Serbia. Total vaccination administering costs include: vaccine costs per dose and the cost of vaccine preparation by medical staff (table 1).

Table 1: Vaccines applications and vaccines delivery costs

Vaccine	Producer	Total costs per dose (RSD)	HB	DTP	Hib
X1	P1	300	0	1	0
X2	P2	1300	0	1	0
X3	P3	1450	0	1	0
X4	P2	980	0	0	1
X5	P3	880	0	0	1
X6	P3	750	1	0	0
X7	P4	650	1	0	0
X8	P2	3200	0	1	1
X9	P3	3150	0	1	1
X10	P3	4950	1	1	1

3. INTEGER PROGRAMMING MODEL

In this paper we presented an integer programming model for children vaccination procurement. This model was created in order to define the most economical set of existing vaccines, individual and combinations, by the brand (manufacturer), which should be procured in the certain age and in order to satisfy an immunization schedule proposed by health experts, as well as to satisfy all the vaccinations constrains.

All decision variables in the model are binary (0-1). Vaccines could be administered in the age of 0-1, 2, 3.5, 5, 15-18 and 48-72 months of life, and that is presented with six phases, respectively (table 2). For every phase in which certain vaccine should be administered, a set of binary decision variables is defined: a value one (zero) indicates that the vaccine should or should not be administered in that phase. Having said this, HB, DTP and Hib vaccination ought to be conducted in six phases, where in each phase against one or more diseases the application should be executed.

Table 2: Phases and schedule of vaccination

Phase	HB	DTP	Hib	Optimization possibilities
1	1	0	0	No
2	1	1	1	Yes
3	0	1	1	Yes
4	1	1	1	Yes
5	0	1	1	Yes
6	0	1	0	No

Each phase can be optimized separately, as a multi-phased optimization, since decisions made in current phase are not inflicted by the decision made in previous phase/phases.

From the tables above it is obvious to conclude that vaccination in Phase 1 and Phase 6 will be executed with vaccines X7 (650 RSD) and X1 (350 RSD) respectively.

The plan for the application of vaccines for the phases 2, 3, 4 and 5 can be optimized by using the following mathematical model:

$$\min F(x)^P: X_i C_i \quad (1)$$

s.t:

$$\sum_{i \in V_p} a_{ij} x_i = 1, j \in D_p \quad (2)$$

$$x_i \in \{1, 0\} \quad (3)$$

$$x_i, c_i \in V_p \quad (4)$$

P -current decision phase

V_p -set of vaccines which could be applied in the phase P

D_p -set of diseases for phase P of which vaccination is executed against

a_{ij} -binary parameter which denotes whether a vaccine i could (could not) be used against a specific j disease, $a_{ij} \in \{1, 0\}$

x_i -decision variable

$\min F(x)$ -the objective function for minimization of vaccines administration costs

Constrain in equation (2) will ensure that for each disease in phase P , the vaccine will be applied only once and the constrain (3) represents the nature of the decision variable-binary.

4. RESULTS

Presented integer programming model described in section 3 was used to develop economically sound packages of vaccines, by producer and combination, to meet the national immunization program. The integer model contains ten integer-binary variables. Constrains represented in section 3 (equations 2-4) are related with application of specific vaccines against the specific disease (2) and with the nature of variables (3). The integer programming model was solved using the GLPK v.4.47 software tool. Two cases were considered: first, with the optimal vaccination schedule and second, optimal vaccination schedule with multivalent vaccines. It have to be noted that, the presented mathematical model of integer (binary) programming could be used for the optimization of the full-scale Immunization schedule for children vaccination in Serbia (or any other territory), with as many vaccines as proposed by the national immunization schedule. The model could include all vaccines and vaccines combinations available from different manufacturers in Serbia and could be applicable on every new vaccination program which will be presented by the health authorities every year. However, the optimal schedule of vaccination, regarding to minimal costs of vaccination, for the chosen mandatory vaccines (HB, P, Hib) in the first six years of children immunization program in Serbia, is presented in table 3.

Table 3: The optimal vaccination schedule

Phase	Proposed vaccine(s)	Costs
1	X7	650,00 RSD
2	X1, X5, X7	1.830,00 RSD
3	X1, X5	1.180,00 RSD
4	X1, X5, X7	1.830,00 RSD
5	X1, X5	1.180,00 RSD
6	X1	350,00 RSD
-	Subtotal	7.020,00 RSD

The optimal schedule of vaccination, using the combined multiple vaccinations available at this moment in Serbia, regarding to minimal costs of vaccination, for the mandatory immunization in the first six years of children immunization program in Serbia is presented in table 4.

Table 4: The optimal vaccination schedule using combined multiple vaccines

Phase	Proposed vaccine(s)	Costs
1	X7	650,00 RSD
2	X10	4.950,00 RSD
3	X9	3.150,00 RSD
4	X10	4.950,00 RSD
5	X9	3.150,00 RSD
6	X1	350,00 RSD
-	Subtotal	17.200,00 RSD

5. DISCUSSION AND CONCLUSION

The issue of immunization financing in developing and transitional countries has become more critical in recent years. It is a challenge to meet all demands of national immunization programs and to try to increase coverage, to improve immunization safety and to add new, more expensive vaccines to national immunization programs (Economics of immunization: a guide to the literature and other resources, 2005).

Immunization policies compete with other public health interventions for limited budgets both at the national and global level. Within immunization budgets themselves, resource allocation decisions have to be made between different policies and options and one significant subject matter are safe, effective and efficient vaccines in national immunization programs.

Operations research has the potential to point out how full immunization against childhood diseases can be achieved with an economically sound package of vaccine types, brands and combinations. Operations research models can serve to optimize the way childhood immunization programs can be designed and implemented. Moreover, the models can also provide vaccine manufacturers with a tool to assess the impact of new vaccine combinations, as well as to determine whether an investment in such combinations is warranted. Therefore, these models can be embedded in expert systems that can guide vaccine procurement, vaccine administration schedules, identify vaccine combination opportunities, and encourage or discourage investment programs in new vaccines and/or vaccines combinations (Jacobson et al, 1999).

This paper reports how operations research and mathematical modeling could be used to address a national immunization program for children vaccination procurement and delivery problem. Integer programming model, described in this paper, was used to develop an economically sound packages of vaccines (by manufacturer and combination) to meet the requirements of national immunization program.

On the first place, vaccine has to be safe on human's health. An ideal vaccine is effective, covers a wide range of diseases, administered in a single or small number of doses, will provide lifelong immunity, is stable, can be transported easily and is affordable (Spier, 1997). Multivalent vaccines are usual in national immunization programs in most of developed countries. Primary advantage of these vaccines is a reduction of number of injections per a child and decrease of number of clinic visits as well.

National immunization services and their capacity for integrating new vaccines and other innovations differ across countries. According to presented results in this paper, there is a significant gap, related to minimal costs, between optimal vaccine schedule and optimal vaccine schedule in which multiple vaccines are favored. That gap is 10.080 RSD (approximately 90 EUR) per one child. One have to note, that the main reason for identified gap between costs of sets of single and multivalent vaccines is vaccine labeled X1 which production is supported as a national product.

Under the socioeconomic conditions, when the average salary in the country is approximately 360 EUR (based on available data of Statistical office of the Republic of Serbia), in the moment when the multiple vaccines are in considering for introduction in national immunization program for children immunization, bearing in mind all the advantages of these vaccines, planners should take into account the efficient allocation of the resources as well.

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SUGGESTION OF A MODEL OF A CENTRALIZED SYSTEM FOR PROVIDING SERVICES IN THE FIELD OF CLINICAL TRIALS ON DRUG

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Abstract: *This paper deals with the problems of current decision-making system in the field of clinical trials in Republic of Serbia and with a suggestion of implementation of proposal of innovative project management model of a centralized decision-making system in clinical trials. The current decision-making model in clinical trials in the Republic of Serbia has been observed as time consuming, expensive and non-transparent, what is burdening the sponsors of clinical trials, the institutions that conduct clinical trials as well as the participants of the trials. Contrary to this divided and localized system of the management process of clinical trials, in some EU countries appears that a centralized and more efficient system for providing services in decision-making processes in the area of clinical drug trials is possible, and it makes a contribution to the quality of the whole process. Research demonstrated in this paper has value for Ministry of Health of Republic of Serbia, Medicines and Medical Devices Agency of Serbia, Local Ethics Committees of Investigational Institutions within Serbia and international and domestic Pharmaceutical Companies and Contract research organizations involved in clinical trials processes in Serbia.*

Keywords: *health care management, clinical trials on drugs, innovation, new service development model, decision-making processes*

1. INTRODUCTION

A clinical trial is a study performed on humans with the aim to establish or confirm the clinical, pharmacological and pharmacodynamic effects of one or more drugs tested, to identify any adverse reactions to one or more tested drugs. It has for its aim to examine the absorption, distribution, metabolism and excretion of one or more drugs, as well as to determine safety and efficiency of the drug (*The Official Gazette of RS*, 2010).

A sponsor of a clinical trial can be a producer, a legal or a natural person (hereinafter referred to as the sponsor) and is responsible for the initiation, management, quality and financing of the clinical trial. The sponsor may transfer some or all obligations related to the conduct of clinical trial to a Contract Research Organization located in the Republic of Serbia (hereinafter referred to as RS), which is responsible for the activities that the sponsor had transferred onto them in the process of approval and conduct of clinical trials on the territory of RS.

The sponsor is responsible for the activities transferred to the Contract Research Organization (*The Official Gazette of RS*, 2010). Prior to the beginning of clinical trials, the Local Ethics Committee of the Research Institution makes a decision on the conduct of the clinical trial (*The Official Gazette of RS*, 2010).

The Ethics Committee considers the request for conducting the clinical trial with documentation submitted and brings a decision within 60 days from establishing that the application is complete (*The Official Gazette of RS*, 2010). The Ethics Committee is obliged to inform the sponsor of the clinical trial or authorized Contract Research Organization as well as the Medicines and Medical Devices Agency of Serbia (hereinafter ALIMS) about its decision within 15 days (*The Official Gazette of RS*, 2010). If the Ethics Committee does not make a positive decision on conducting the clinical trial, ALIMS will not issue the authorization of clinical trials.

The approval for the new clinical trials on drug/drugs implies that the sponsor of the clinical trial, who does not have an approval for the drug in RS, or the drug proposed to be used, must apply for the authorization of clinical trials and submit to ALIMS complete documentation in conformity with the law and regulations. The sponsor submits the documentation that includes: a summary of the nature and characteristics of the drug, conducted research in order to define its pharmacological and toxicological properties, clinical experience, the protocol of proposed trial, a list of all researchers and institutions involved in the study, as well as the

approval of all Local Ethics Committees of the Research Institutions (*The Official Gazette* of RS, 2010). The content of the request i.e. documents necessary for the authorization of the clinical trial, as well as the protocol of the clinical trial, is prescribed by the Minister in charge of health affairs (*The Official Gazette* of RS, 2010). If all the requirements stipulated in this law and regulations adopted in order to implement this law are met, ALIMIS will issue the authorization to conduct the clinical trial (*The Official Gazette* of RS, 2010).

In the RS the decision-making in the field of clinical trials is conducted in several phases, which are long, segmented, and with an uncertain outcome. The basic problem in the decision-making system - the department of service provided by state institutions in the field of clinical trials - appears to be in localization and segmentation of certain phases of the service in the decision-making system. Based on EU Directive 2001/20/EC, it is possible to implement various decision-making models in this field. Ministry of Health of the RS through ALIMIS implements a system in Serbia that includes the decision-making structure during the authorization of clinical trials or the authorization of variations of and amendments to clinical trials provided in the graphic (Figure 1). Funding for the entire decision-making process is provided by the sponsor of the clinical trials. The sponsor of the clinical trial on drug/drugs pays the appropriate sum of money for the services received from the Local Ethics Committee and the ALIMIS. The amount of money paid for the services completed is in accordance with the statutes of these institutions, and is paid as a compensation for the bringing of the appropriate decision according to the conclusion of the meeting of the expert committee and submitted documents of the clinical trials on drug/drugs.

The time component in terms of the length of the entire decision-making process is of great importance for to the sponsor of the clinical trial as well as for the researchers and patients (i.e. potential users of the drug being tested). In divided and localized decision-making system, the changes of the expected deadlines are frequent and endless. It should be noted that in this paper the decision-making process is being reviewed at its most important and most complex processes within the clinical trials related to institutional decision-making systems such as obtaining the authorization of clinical trials in the RS and obtaining the authorization of variations of and amendments to clinical trials.

The model from the graphic (Figure 2), of a centralized innovative decision-making system for provision of services in the field of clinical trials, provides the opportunity to avoid some shortcomings in terms of time, cost and efficiency of the existing models.

The main contribution of this system would be in optimization of the decision-making within the Ethics Committees centralized at the national level. Thus, the speed of decision-making would be greater, the chances to delay the process would be smaller and, ultimately the cost of the process would be reduced. The centralized innovative decision-making system enables the concentration of certain parts of decision - making. At the same time the proposed model would reduce the number of procedural and administrative processes in each institution and thereby it would reduce the cost and increase the efficiency.

2. THE EXISTING SYSTEM FOR PROVIDING SERVICES WITHIN THE DECISION-MAKING PROCESSES IN THE FIELD OF CLINICAL TRIALS

As part of this paper, the current system for providing services within the decision-making in the field of clinical trials, based on the existing legislation, is presented (*The Official Gazette* of RS, 2010). The process presented (Figure 1) considers a situation in which the sponsor of the clinical trial requests for the services in the form of an authorization for conducting clinical trials or requests the authorization of variations of and amendments to clinical trials. These two procedures are considered as the most complex requests in which we can see the most clearly the decision-making process in Serbia.

The system is managed by the highest authority, the Ministry of Health of the RS, through the ALIMS. The set system can be modified only in case of changes of relevant legislation relating to the existing procedures.

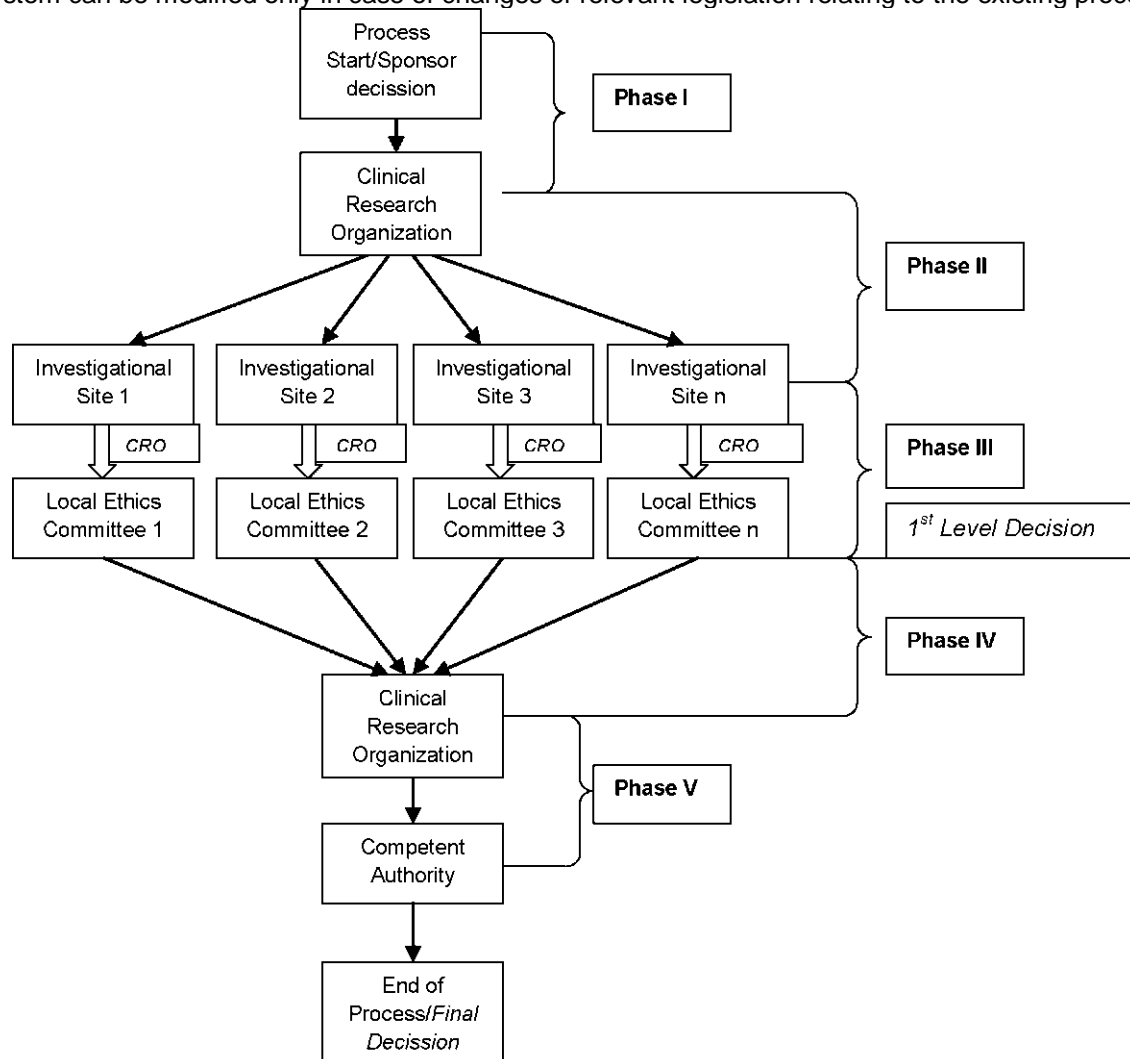


Figure 1: The current system of providing services in decision-making processes in the field of clinical trials, provided by the author

Phase I - According to the Law on medicines and medical devices of RS the sponsor of the clinical trial is required to submit all necessary documents to the decisions-making system within RS for assessment in order to obtain the authorization of clinical trials in RS or to obtain the authorization of variations of and amendments to the already authorized clinical trial on the territory of RS (*The Official Gazette* of RS, 2010). The sponsor of the clinical trial on drug/drugs e.g. a pharmaceutical company that wants to implement a certain stage of scientific trial on the territory of the RS, authorizes a Contract Research Organization (CRO) to apply for the conduct or variations within the clinical trial (*The Official Gazette* of RS, 2010). In the above mentioned graphic (Figure 1) the sponsor authorized the Contract Research Organization to submit the appropriate documents to the state institutions.

Phase II - The Contract Research Organization (CRO) is authorized by the sponsor of clinical trial (*The Official Gazette* of RS, 2010). Based on the contract between the Contract Research Organization and the sponsor, the Contract Research Organization has the authority to submit all legally stipulated documents to the authorities of the state responsible for the decision-making process related to clinical trials. In the case of the mentioned existing model in the RS, as shown in the graph (Figure 1), the institutions to which documents are being submitted to are Research Institutions, Local Ethics Committees of Research Institutions and the ALIMS, in the given order. In this step the necessary documents e.g. contracts, consents of the responsible persons, etc. should be submitted to Research Institutions and based on those documents the Contract Research Organization is able to move to the phase III. This phase includes the submitting of all documents related to the clinical trial of a medicinal product together with the documents

received from the Research Institutions of Local Ethics Committees. When the paid service is obtained in the form of approval of the Local Ethics Committees, that approval and all the documents are further submitted to ALIMIS whose services are paid additionally, depending on the type of service.

Phase III - The graphic (Figure 1) shows three Local Ethics Committees of Research Institutions and the fourth is shown as the n^{th} (there can be a maximum number within the number of existing clinical centers and medical centers in the RS, because each of them represents a potential research center for specific therapeutic indications (*The Official Gazette* of RS, 2010)). We can state that the number of 4-8 Research Institutions makes an average number of institutions participating in a clinical trial, and therefore the number of Local Ethics Committees that make decisions on clinical trials is 4-8 - each Research Institution has its own locally organized ethics committee that provides services in the decision-making process (*The Official Gazette* of RS, 2010). The Contract Research Organization (CRO) has the obligation to submit all the documents received from the sponsor (adjusted to the local laws of the RS) to the Local Ethics Committees under whose approval it may proceed with the process of submitting documents to higher instances (*The Official Gazette* of RS, 2010). In the case of RS the higher instance for decision-making is the ALIMIS. The Local Ethics Committees provide services related to appropriate decision-making according to specific demands of clinical trials on drug/drugs. They are being paid for their services by sponsors of clinical trials through the Contract Research Organization (*The Official Gazette* of RS, 2010).

Phase IV - shows the step in which the Contract Research Organization takes over the decisions made by Local Ethics Committees and with further adaptation processes submits the overall documentation received from the sponsor, together with the approvals obtained from the Local Ethic Committees to the ALIMIS (*The Official Gazette* of RS, 2010).

Phase V - shows the step in which the documents are being delivered to ALIMIS - (Competent Authority), and then within the legal deadline, depending on the service requested, final approval issued by the Ministry of Health of the RS is expected (*The Official Gazette* of RS, 2010).

Phases III and V, present the submission of documents by the authorized Contract Research Organization to the state authorities paid as a service provided by the state institutions in the name of provision of services in the area of decision making - making of appropriate decisions at the meetings of expert committees. Prices are determined by the statutes of the institutions to which the documents are submitted to. A number of institutions (committees for providing services in the decision-making process) lead to the multiplication of payments for basically the same service.

3. THE PROPOSAL OF AN INNOVATIVE CENTRALIZED SYSTEM FOR PROVIDING SERVICES IN DECISION-MAKING PROCESSES IN THE FIELD OF CLINICAL TRIALS ON DRUG / DRUGS

This section presents a proposal of a centralized system for providing services in the decision-making processes in clinical trials which is primarily based on the provision of such services on the territory of the Republic of Romania. Beside the Republic of Romania, many European countries have introduced a system for providing Centralized services in decision-making processes in the field of clinical trials (European commission, 2008.). Decision-making process itself is arranged differently from country to country and adapted to local laws. Among others, the Republic of Romania follows Directives of the European Commission 2011/20/EC, then Directive 2003/94/EC, 2005/28/EC and ICH E6, which make it one of the countries of the European Union that has fully harmonized its system with all the European and international regulations and standards (The European Forum for Good Clinical Practice, 2011). EU Clinical Trials Directive 2001/20/EC, allows the implementation of various models of the decision-making system - a department for providing clinical trials services. The system shown in the graphic (Figure 2), is primarily better due to centralized decision-making system. Within this centralization all Local Ethics Committees of Research Institutions (Figure 1, Phase III) that participate in clinical trials have created one, a National Ethics Committee, whose goal is to shorten the decision-making time and increase the quality of decision-making (Figure 2, Phase III). In the Republic of Romania (Figure 2), the National Ethics Committee for clinical trials is an independent body. National Ethics Committee is under the direct jurisdiction of the Ministry of Health of Romania (The European Forum for Good Clinical Practice, 2011).

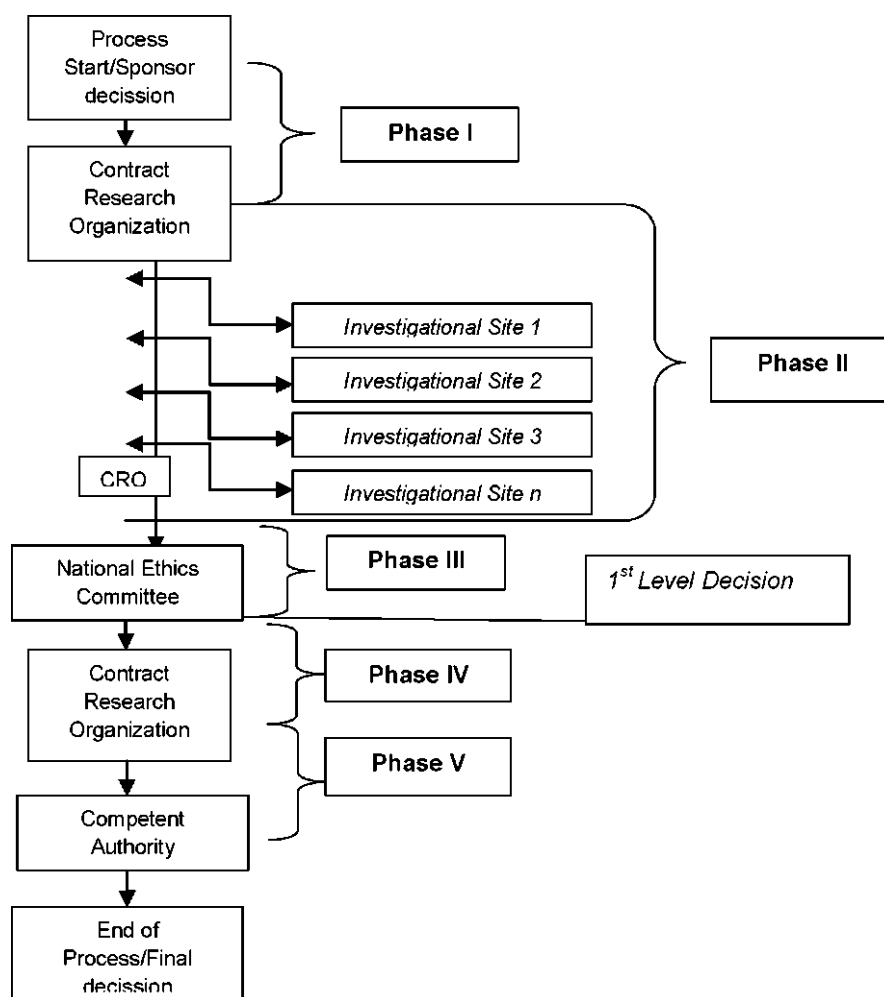


Figure 2: The proposal of an innovative centralized system for providing services in decision-making processes in the field of clinical trials, provided by the author

In the case of the innovative system based on the examples of service provision systems in the decision-making processes within clinical trials in the Republic of Romania, the sponsor of the clinical trial would be, as in the present system of the RS, legally required to submit the documents to the Contract Research Organization. This Organization would adapt the stipulated documentation to local laws, and submit it to the National Ethics Committee, instead of numerous Local Ethics Committees of Research Institutions. In that case the multiplication of the costs, prolongation of the decision-making process and non-transparency of the decision-making process in the form of paid services to local authorities, would be avoided. All other decision-making processes and procedural systems for providing services would remain the same as in the graphic (Figure 1).

4. A MODEL OF AN INNOVATIVE CENTRALIZED SYSTEM FOR PROVIDING SERVICES IN DECISION-MAKING PROCESSES IN FIELD OF CLINICAL TRIALS OBSERVED THROUGH A PHASE MODEL OF DEVELOPING INNOVATIVE SERVICES

The innovative system for providing services focuses primarily on the formation of a new National Ethics Committee and by that a new service provider in the decision-making process would be initiated. Activities of this innovative service would lead to cost reductions and greater certainty regarding time and finances within the decision-making process. In this paper, in the aim of further implementation of the model of centralized innovative system for decision-making in clinical trials, one of the well-known innovation project models in the services, the Sashimi model, can be used. Sashimi model is so called because it features overlapping phases, like the overlapping fish of Japanese sashimi (Ward, 1998). Initially it was referred to as the "waterfall model with overlapping phases" or "the waterfall model with feedback" according to Matkovic and Tumbas (2010). Since the phases in the Sashimi model overlap, it may point to existing

problems during the implementation of the project very well. The phase model of the development of the new service could be based on this model.

4.1 The phase model of the development of the new service

According to Milutinovic and Stosic (2011), the phase development of Sashimi model includes the following overlapping phases:

1. Possibility analysis
2. Feasibility and defining
3. Design and testing
4. Development
5. Implementation and a pilot test
6. Commercialization

4.1.1 Possibility Analysis

Within this analysis it is necessary to determine if the implemented service would be profitable and thus justify its implementation. If so, it is possible to move onto the next phase. Involved organizations estimate the prospects for implementation of such project in terms of capacity and support for further implementation of this project. The final decision on implementation in this case must be made by the state, i.e. the Ministry of Health of the RS. Within the Ministry of Health, organizational changes of the new service model would include institutions of the ALIMs as well as the Local Ethics Committees within research centers i.e. clinical centers and medical centers in the RS. Their network infrastructure would have to be eligible. The purpose of the implementation of this model of the decision-making process in terms of service, when making decisions about clinical trials, primarily is to provide transparent, more efficient and less expensive process that would bring relief to all participants in this process and mostly to the sponsor of the clinical trial e.g. cost reduction, the increase in speed of the decision-making process, then to researchers e.g. increase in speed of decision-making process, and finally to our patients e.g. enabling the use of the innovative drug in a timely manner. From the state's point of view, centralized innovative decision-making would contribute to a clearer and more transparent monitoring system of clinical trials that are underway, as well as to faster and more efficient decision-making and implementing decisions on existing or anticipated clinical trials. Also, with the increase of favorable business conditions and with the convergence of current conditions to efficient and applicable models in the world, the state would provide good business conditions and thus increase the number of sponsors to whom timely decisions and pricing could be crucial in the case of selection of the country where they would conduct their research and commercial activities. The increase in the number of sponsors enables the larger number of the above mentioned studies that can contribute to creation of new workplaces in the field of innovative technologies and services, as well as greater visibility and prestige of our Research Institutions in the world, which is partially reflected through a number of published and successful clinical trials in which our researchers were the participants. The innovative centralized service provision in the decision making process in the field of clinical trials cannot be initiated prior to the changes in the statutory legal framework that would enable its implementation. The ministry is also obligated to harmonize the internal affairs with subordinate legislations within 60 days from the date of enactment of the necessary legal regulations.

4.1.2 Feasibility and defining

Within the second phase the service provider/service should be defined. Getting out of this phase would be in the form of a draft of a final service. It should be defined in detail what the service implies. In the case of the proposed implementation of the model of the centralized innovative decision-making system in clinical trials main phases are listed in the graphic (Figure 1 and Figure 2). The graphic (Figure 1) represents the current service provision system within the decision-making process in clinical trials, and the graphic (Figure 2) represents an innovative model for centralized provision of services in the process of decision-making in the field of clinical trials. As stated in the introduction, this decision-making system is best to be observed through the most complex and the most important decisions related to the clinical trials in the RS. For providing the decision-making service and for revision of the submitted documents at the meeting of the expert board of a Local Ethics Committee of a Research Institution, as well as the ALIMs, certain compensation is provided in accordance with the statutes of these institutions. Such decisions include the authorization of clinical trials and the authorization of variations of and amendments to clinical trials.

The idea to implement the innovative model is based on the restructuring the existing decision-making process and the centralization of the existing decision-making system within which the service of the

decision-making would be transferred from the level of Local Ethics Committees of Research Institutions to the centralized innovative service of the decision-making system and thus avoid multiplication of submitting documents required for decision-making, reduce decision making costs i.e. one decision-making committee would be paid instead of all local committees for making individual decisions, and it would also reduce the possibility of prolonging the bringing of appropriate approvals - according to the centralized decision-making system (Figure 3).

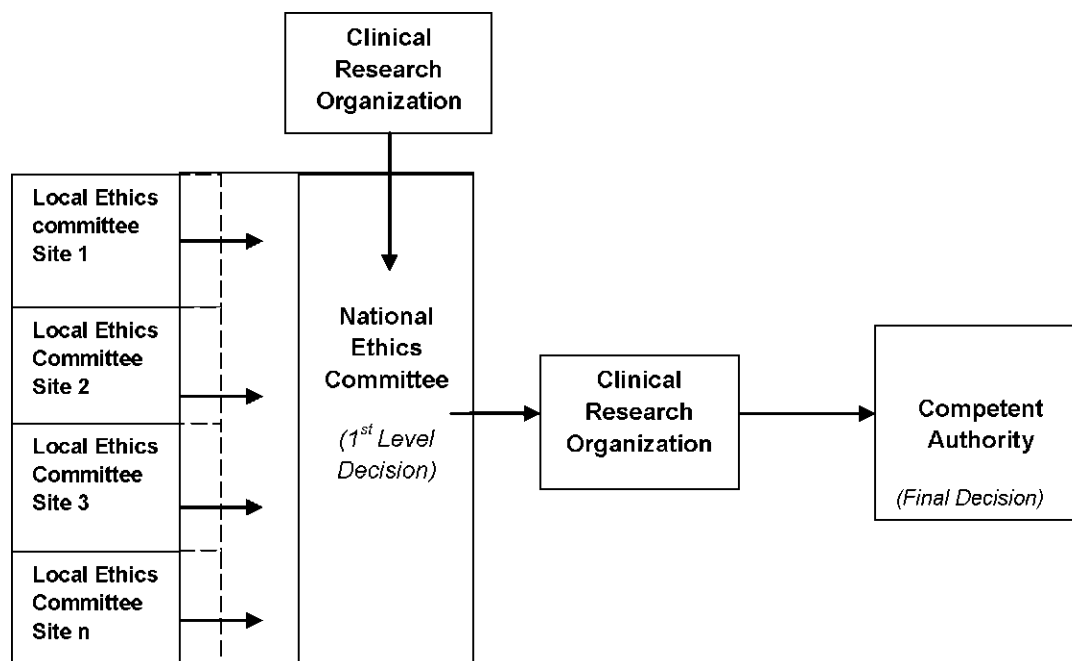


Figure 3: Proposal of substantial changes in the infrastructure network of the system for decision-making services from divided and localized systems into a centralized innovative system for providing decision making services in clinical trials, provided by the author

4.1.3 Design, development, implementation and pilot test

Within this phase, project should get a clear outline of the design in terms of further solving of the infrastructural problems. Declaration EU 2001/20/EC enables implementation of the innovative centralized service model for the providing services in the decision-making process in the field of clinical trials. Within this phase it is expected that all the components are included and the operational support systems are identified and defined precisely. The Ministry of Health should define a transition strategy to the innovative centralized service model for the provision of services in the decision-making process in the field of clinical trials. The design should be related to the Development of the project and it should be based on the action plan drawn up in accordance with the strategy. Given the specificity of the service that is being implemented, it is necessary to determine the position of the Central Ethics Committee i.e. National Ethics Committee, and official representative body for provision of service in the decision-making process. In order to reduce costs during the implementation, we suggest that the location of the Central Ethics Committee should be in the building of the ALIMS. In this way, the physical proximity of the two inevitable institutions in the service providing system of decision-making within clinical trials will contribute to the transparency of the service providing process. It is also necessary to establish a professional board of the Central Ethics Committee that would be responsible for providing services in decision-making in clinical trials on drug/drugs.

4.1.4 Development

The development is the phase of the model in which the infrastructure of an organization and the infrastructure of a service are combined and unified (Milutinovic&Stosic, 2011). After the planning process, the work on the infrastructural processes and the time component should be done. Ministry of Health of the RS is obliged to obtain all necessary documentation related to the implementation of the innovative centralized service for providing services in the decision-making process in the field of clinical trials.

4.1.5 Implementation and a pilot test

Serbian Ministry of Health should support all that is required within the implementation in order to carry out the listed services. The other segment is related specific testing of the innovative decision-making system in the field of the clinical trials. Within the implementation, it is necessary to analyze the very infrastructure and the needs for adapting the new services and to adjust them to enacted laws and regulations, in accordance with the desire for a more efficient service providing system in the decision making process in clinical trials.

4.1.6 Commercialization

Commercialization presents a phase of the Sashimi model which should sum all previous phases and thus ensure the readiness of the entire network for final functioning of the service in commercial purposes. The particularity of the project leads to further specificities of this phase. Namely, when a service system for decision-making in the field of clinical trials is changed once, it is not possible to proceed according to the previous decision-making system, i.e. the selection and the final implementation and commercialization of innovative system for delivering services in decision-making process in clinical trials would be a final and unique solution for all further processes of obtaining the authorization of clinical trials and obtaining the authorization of variations of and amendments to clinical trials. It follows that it is essential, before the project is finally commercialized, that all users of the innovative decision-making system in the field of clinical trials are clearly informed about the changes, as well as about the way of functioning of the new implemented system. Therefore, it is necessary to make a separate promotion system of a new innovative model of the centralized service within the decision-making process in the field of clinical trials that would provide all end users high quality information on time. These kinds of changes are made by the Serbian Ministry of Health in *the Official Gazette of RS*. According to the Public information law, new laws on which the future innovative system is based on will come into force eight days after its publication in *the Official Gazette of RS*.

5. CONCLUSION

Modern decision-making systems require optimization of resources and time. The present model is shown to be insufficiently flexible for various requirements of the pharmaceutical industry. In the RS, the decision-making system in the field of the authorization of clinical trials and the authorization of variations of and amendments to clinical trials is being conducted in several phases, which are long, segmented, and with an uncertain outcome. The main problem in the field of clinical trials, related to the decision making process, occurs precisely in the localization and division of certain phases of the service within the system of decision-making. Based on EU Directive 2001/20/EC the use of various decision-making models in this area is possible and the proposal of the model for implementation presented in this paper (Figure 2) would allow a significant improvement in the speed of decisions-making, or in terms of transparency and further cost reductions. Such services provided by the state and paid by foreign investors, in this case the sponsors of clinical trials, must be highly efficient and advanced to ensure the satisfaction of the end users of the mentioned services in order to fully optimize quality and time components. In a time of growing competition, we can say that every innovation in terms of service that enables optimization of resources represents a comparative advantage in relation to the countries that do not have such services. The investors who are satisfied with the clear and pragmatic solutions in the decision-making system in the field of clinical trials will be happy to re-engage in scientific research and commercial activity on the territory of RS. The benefits are multiple.

In this paper the proposed model of managing innovation projects in the area of new technical services is used. Based on the specifics of the innovative system, there are certain characteristics in the application of the Sashimi model. On the basis of adaptation according to the specifics of the innovative project for providing services in decision-making process in the field of clinical trials, Sashimi phase model of development of new service can be applied to this subject. Also, it should be noted that the phases of the Sashimi model may need further segmentation. Of great importance for the implementation of this innovative system is also legal - political framework, without which it is absolutely impossible to go into the process of changing the existing model. Experts need to initiate the process of changes on the basis of the evident shortcomings of the existing system, and the state should recognize further potential of the planned innovation projects. Also, the strategy and action plan should be done and in this way enable the implementation of the project. Considering the above mentioned, it can be concluded that during the development and implementation of new service the local environment must be taken into consideration, so that the phase model of the development of the new service could be applied in the right way.

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INTRODUCTION AND IMPLEMENTATION OF ELECTRONIC HEALTH CARD

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Abstract: *The EU has started a process of integration of information and communication technologies in healthcare intended to provide better health services for patients, achieve mobility of people and create an opportunity for control and analysis of the entire healthcare system in economic and qualitative terms, which leads to the capacity of managing large health systems. This article shows that there is no common or unique approach in this area. Each country, depending on its socio-economic opportunities, finds the best way of solving problems related to the management and control of its health system. The electronic health care system comprises the implementation of information and communication technologies, especially the Internet, for the purpose of improving and ensuring health of individuals on the one hand, and the overall healthcare system on the other. The electronic health card is a basis of successful e-health system functioning. There are several types of health cards, but the following three types are the most important: Patient Data Card, Health Professional Card and Health Insurance Card. Introduction of electronic health cards in Europe has well advanced, with different models emerging in different countries. The article presents examples of the introduction of electronic health cards in each of the EU countries.*

Keywords: *healthcare, electronic healthcare system, electronic health card, Patient Data Card, Health Professional Card, Health Insurance Card.*

1. INTRODUCTION

Evaluating welfare of countries is mostly based on development level of health sector. The healthcare systems need improvement in quality, efficiency and attainability of primary healthcare, as well as acquiring new approaches and models for better health of population on a national and regional level. The notion that patients will use the Internet for medical information should come as no surprise (Gao G.G., McCullough J.S., Agarwal R. & Jha A.K., 2012). Accordingly, the implementation of information and communications technologies can lead to: improvement of population's state of health, cost reduction (by increase in efficiency in delivery of healthcare and increase in users' satisfaction in regards to health service delivery, as well as service provider's satisfaction).

This leads to the emergence electronic service delivery and the emergence electronic health care system - E health.

The electronic health care system comprises the implementation of information and communication technologies, especially the Internet, for the purpose of improving and ensuring health of individuals, on one hand, and the health-care system, on the other. It can be described as a system that is complementary to the traditional system of health services delivery; it eliminates paper as a medium and ensures that all the data on the patient and his/her health status are recorded in an electronic format and are accessed promptly and efficiently via a computer network – the Internet (Jovanovic Milenkovic, 2011).

The article presents bases of electronic healthcare that is setting the foundation for a new approach to organizing and performing business processes in the healthcare system, supported by information and communication technologies.

The main characteristics of the new approach are: orientation towards the patient, healthcare based on evidence, exchange of information about patient's health, in order to improve the healthcare and to reduce costs.

The electronic healthcare system covers a wide spectrum of activities regarding patients, service providers and healthcare systems. It contains comprehensive electronic health records of patients and

enables connections and exchange with regional and central structures for gathering and processing information within a healthcare system. It should support all processes in basic healthcare:

patients' records, rounds, treatments and events in clinics, as well as events within a ward: patient reception, treatment, and release.

In this regard, the world trend in the new area is moving towards developing medical and expert systems for improving diagnostic and treatment processes. It implies the existence of the following systems (Gibbons, 2010):

- the expert healthcare systems
- the systems of managing electronic healthcare documentation
- the systems for filing and handling images
- electronic health records (EHR)
- electronic medical records (EMR)
- electronic patient record and
- electronical health card.

Our attention will be focused on the development and introduction of electronic health card in EU.

2. ELECTRONIC HEALTH CARD

Healthcare organizations worldwide are implementing smart health cards supporting a wide variety of features and applications.

Electronic health card is a basis of successful e-health system functioning. Health cards can improve security and privacy of patient information, provide a secure carrier for portable medical records, reduce health care fraud, support new processes for portable medical records, allow secure access to emergency medical information, enable compliance with government initiatives and mandates, and provide a platform for implementing other applications as needed by healthcare organizations (Smart Card Alliance, 2010).

Electronic health card connects all participants in the health care system, as shown in the following figure.

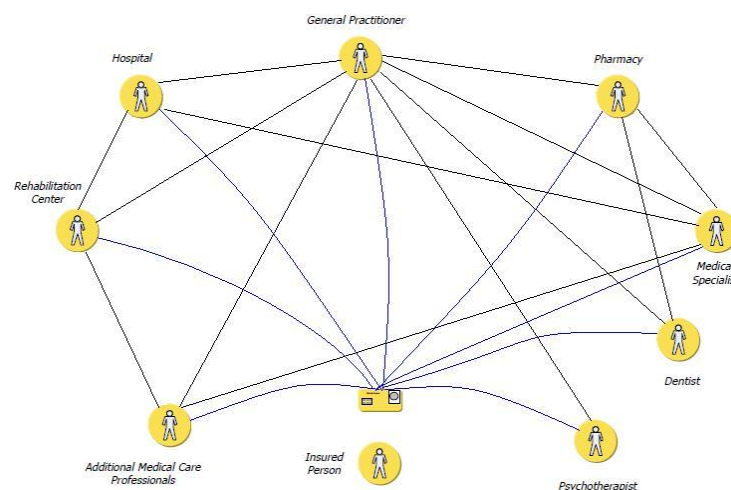


Figure 1. Electronic health card connects all participants in the health care system

There are several types of health cards, but the following three types are the most important (Istepanian, Laxminarayan & Pattichis, 2006):

- Patient Data Card
- Health Professional Card and
- Health Insurance Card.

Patient Data Card

Patient Data Card (PDC) is a mobile patient data carrier. It contains information about a patient that is essential for his/her treatment. Typical data on card chips are: the identity of a patient, information about insurance, emergency data, medical history and electronic prescriptions (Istepanian, Laxminarayan & Pattichis, 2006).

For patients, mobility means that they have complete and accurate health information at any time. Their essential patient data are always available when it comes to emergencies. Under normal circumstances, the usage of the card provides data finding and establishes an appropriate treatment for a patient. The card contains a record of all the prepared tests. This prevents excessive medical tests and examinations, and therefore results in urgency and efficiency in solving critical health problems of a patient (Partners HealthCare System, 2010). In this way, health professionals always have accurate medical information of patients. It is easier to find the best treatment and avoid risk of prescribing potentially dangerous drug combinations with these data.

Health Professional Card

Health professional has authorized access to health Professional Card (HPC). Health professional can read and write data to the card. Card carries a digital certificate and appropriate cryptographic keys for secure communication. Privacy and data security are guaranteed to patients in accordance with the rules of access, which prevent unauthorized access to their stored medical data (Istepanian, Laxminarayan & Pattichis, 2006).

For health professionals, HPC provides a quick and efficient information exchange between health professionals and other users in electronic health system.

Typical data on the card are: identification data of health professionals (name, address, phone number), a digital certificate, individual access rights for reading and/or writing patient's data, PIN to access the card. (Milenković, Jovanović Milenković, Vujin, Aleksić & Radojičić, in press).

Health Insurance Card

Health Insurance Card (HIC) is an ID card with an administrative function. It contains details of the insured, the insurance company ID and information about insurance model.

In some systems, PDC and HIC cards could be integrated into a single PDC card. In this way the administrative procedure for admission to the hospital, i.e. doctors' office is much easier for patients. HIC card increases patient satisfaction and reduces paperwork. Health information of the insured person are processed more quickly and accurately. A health professional gets fast, precise, easy and cost-effective data management. This means less paperwork, reduction of transaction costs and more effective payment. Insurance companies benefit because electronic data processing enables data on claims to be processed without error. Typical data on the insurance card are patient's insurance (insurance, social security number, expiry date), ID insurance, and insurance coverage (Milenkovic et al., in press).

The electronic health card is going to replace the now available electronic health insurance card. Its technology and functions will be extended and it shall be offered to the insured persons for use as a health card. For this purpose it is necessary to arrange the health card as a microprocessor card which is suitable for electronic identification, encryption and digital signature. In this way the best possible reliability and security of the data can be guaranteed.

3. INTRODUCTION AND IMPLEMENTATION ELECTRONIC HEALTH CARDS IN THE MEMBER COUNTRIES OF THE EUROPEAN UNION

Introduction for electronic health card in Europe are well advanced with different models emerging in different countries. The European Union (EU) is promoting their development through a range of projects and EU forums.

Electronic health cards in Germany

In Germany, electronic health card *The Gesundheitskarte* ('good health card') introduced in 2006. It contains basic patient data such as name, age, next of kin and insurance details, as well as electronic prescriptions (Figure 2.).

The Gesundheitskarte ('good health card') will contain information in a Chip-and-PIN style microchip on the side of the card, as well as a photograph and human-readable information. It replaces Germany's existing health insurance card. This card is only for patient. Healthcare professionals, including insurance companies, will need to use another electronic card to log in and read and change patients' card details (epSOS – the European eHealth Project, 2010).



Figure 2. Electronic health card *The Gesundheitskarte*

Electronic health cards and HPCs will become the electronic keys for the crossinstitutional cooperation of the stakeholders in healthcare, interlinking more than 80 million patients with about 123 000 physicians, 65 000 dentists, 2 200 hospitals, 21 000 pharmacies and more than 290 health insurance funds (Figure 3.) (epSOS – the European eHealth Project, 2010).

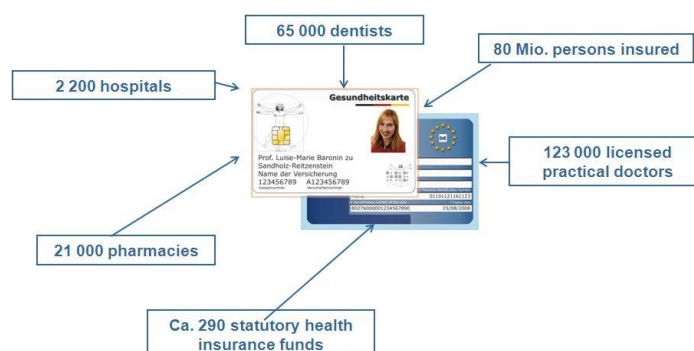


Figure 3. Connection between electronic health cards with other stakeholders in healthcare system

Electronic health cards in Italy

In Italy, electronic health card distributed in 2010. in region Tuscany is *Carta Sanitaria Elettronica* – CSE (Figure 4.). This card will replace the existing card. The card integrates all the information pertaining to hospital stays, examinations, vaccinations, medications, diseases, allergies and exemptions (ePractice, 2010).

In its new format the health card will allow accessing person's health data from home, from the doctor's practice, from the assistance points of the local health agencies. Although the cards belong to the citizens, general practitioners and pediatricians play a crucial role as they are the ones to collect most of the data that form the core of the citizen's health history building.



Figure 4. Electronic health card *Carta Sanitaria Elettronica*

Electronic health card in Slovenia

The Health Insurance Institute of Slovenia has announced that it will introduce a new electronic health insurance card system across the country. Initially will be used to obtain information on insurance. The electronic health card is the basis for access to electronic health records and getting e-prescription.

The national roll-out follows a pilot at the Dr Franc Deganc General hospital in the Nova Gorica region of Slovenia, which was completed in March 2009. After the pilot ended the system was extended to more than 100 organizations in the Gorenjska and Primorska regions. In 2010 electronic health card used more than 30,000 health professionals and two million patients. The system is the first in the country to cover both public and private insurance organizations (EHealth Insider, 2009).

Electronic health cards in Bulgaria

Bulgaria is issuing its first electronic health cards as part of the pilot project of the Ministry of Health and the National Health Insurance Fund (NHIF). Card was first distributed citizens in town of Slivnitsa and the village Aldomirovzi (both some 30 kilometers away from Sofia) in 2007 (The first European ehealth portal news, 2011).

With that card, the patient's insurance status and his/her assignment to a General Practitioner can automatically checked in the project. In addition, e-prescriptions for medications covered by the Bulgarian health insurance fund recorded on the chip (Figure 5.).

When visiting a physician, patients will identify themselves with the cards. The system automatically establishes a secure online connection to verify the patient's insurance coverage and his or her presence in the patient list of the physician. After the tests and trainings, the pilot project will go live and the first e-prescriptions will be issued and filled in Bulgaria.



Figure 5. Electronic health cards in Bulgaria

Electronic health cards in Republic of Serbia

In Republic of Serbia, we differ cards which issues Ministry of Defense of the Republic of Serbia and The Republic Fund Of Health Insurance.

The Republic Fund Of Health Insurance introduce electronic health cards during 2012. The cards will first be introduced in and after that pilot project, it will be in another town in Serbia. Valjevo is chosen because all health centers, hospitals and pharmacies are computer related with The Republic Fund Of Health Insurance (Figure 6.). It plans to change million cards in 2012, and another three years The Republic Fund Of Health Insurance will provide for all citizens (The Republic Fund Of Health Insurance, 2012).

This kind of medical identification will enable faster and easier with a doctor and raising drugs in pharmacies. On the card will be printed name, registration number and address of the insured. Medical records will be visible only by activating cards and entering the password. For verifying cards will be no need to collect receipts, but will perform automatic verification of the employer contributions paid to the insured.



Figure 6. Electronic health card which will be implemented of The Republic Fund Of Health Insurance

Currently the Ministry of Defense of the Republic of Serbia is aimed at the development of electronic health system which includes the introduction of military electronic health cards, as well as a rapid implementation of certain applications such as electronic drug prescription, durable medical summary, electronic records (Ministry of Defense of the Republic of Serbia, 2010). The usage of electronic ID cards reduces costs in the Ministry of Defense produced by an inadequate and uneconomical use of available resources - human, material, financial and information. It also increases productivity and data and information safety in information systems.

The card contains two chips – a contact and a contactless. There is an electronic record of data about a card holder in the visual part of the contact chip. The chip has such characteristics that it can accept all the other contents needed for record, by using security system to protect those contents from being accessible to unauthorized personnel.

On the body of the card there are the following data: name, identification number, capacity, serial number, personal number of the insured, issuing date and expiry date of the document, whereas the official data such as rank, military post, place of service, name of unit or institution (Figure 7).



Figure 7. Electronic health card applied at the Ministry of Defense and the Serbian Armed Forces

The introduction of electronic health cards in healthcare system of the military insurance is an integrating factor for the entire future military healthcare information system. Their introduction and application will ensure an organized and synchronized connection of military healthcare facilities. The usage of electronic cards and a gradual linking of all healthcare institutions in an internal computer network will enable the creation and safe use of a centralized electronic healthcare documentation. The main characteristics of access to the centralized EHD are patient orientation, the exchange of information about health of patients in order to improve health services and reduce treatment costs.

The centralized EHD establishment and electronic health cards implementation will enable the linking of medical data from different sources (electronic patient cards from the Military Medical Academy, military medical centers (MMC), pharmacies), forming a complete „health image“ of a patient and providing the data about a patient, such as allergies, reactions to certain drugs, contraindications, etc., currently available to a doctor in order to make the process of treatment efficient and effective (Commission of the European communities, 2004)

4. CONCLUSION

E-health system provides a foundation for a new approach to organizing and carrying out business processes in healthcare system supported by information and communication technologies. The main features of the new approach are orientation to a patient, exchange of information about the health of a patient in order to improve health services. The introduction and implementation of electronic health card will increase the capacity of collection, storage, copying, transmission, sharing and manipulation of information. Introduce an electronic health cards is of a strategic importance because it will mean a simpler procedure for users of healthcare services system, easier and more reliable operation of health professionals at primary, secondary and tertiary level of health care, more efficient control of the status of the insured and more efficient and effective process of treatment.

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MANAGEMENT EFFICIENCY AND EFFECTIVENESS IMPROVEMENT CONCEPT IN SERBIAN HEALTH CARE SYSTEM

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Abstract: *The importance of studying management in one of the most complex and most sensitive human activities such as health care is of great importance for the future provision of high quality and efficient health care available to all and is also making key strategic decisions for the continued development of a new, reformed health care system. The aim of this study was to define specific suggestions for improving the efficiency and effectiveness in Serbian health care system through the analysis of advantages and disadvantages of several systems of EU countries (Germany, Poland, France, Austria, Slovakia), and conducting comparative analysis of these systems with the current situation in the health sector in Serbia. The final section discusses the specific suggestions for improving the efficiency and effectiveness of the health system of Serbia, which will strengthen the functions of health care system.*

Key words: *efficiency, effectiveness, health system, health care management.*

1. INTRODUCTION

Health of the population of each country is conditioned by the influence of many factors, the most by distinguished lifestyle, environment and biological characteristics. Achieving a certain level of health of individuals and society as a unit is directly caused by the influence of the health system and its institutions at all levels of care, both public and private health institutions.

Public health policies which create change towards healthier lifestyles, can empirically demonstrate their effectiveness in various areas: from tobacco products control to the procedure of screening for cancer. However, if the health care system does not implement a public health policy in a way to respond by delivering services adequately, health interventions will not achieve anticipated results, and ineffective delivery of services is always inefficient.

Health care costs in the world continue to grow faster than national income. In recent years, initiatives to overcome this problem were based mainly on maintaining a certain level of costs. Instead of concentrating only on reducing the total cost of health care, internationally invested considerable efforts in order to adopt the view that increased spending on health services are an effective contribution to the productive economy and a way to improve health.

Decision-makers across the European region give priority to improving population health as a result of improved health care system. By combining the functions of the health system, population health can be improved by: providing quality and effective services in a way that ensures equality and meet the patients needs, financing of health care services, which separates provision payment, investment in improving the health of employees and innovative technology, and health system management in a way that all its functions take place towards the realization of the main strategic goal. To make these improvements sustainable, as with any other production functions, inputs (human resources, infrastructure, technology, procurement) must be restructured in a way that will enable the provision of the most effective procedures.

When it is possible to provide more funding for health, additional investment costs can be justified in terms of achieving better treatment outcomes and health outcomes, but should try to choose the most effective way of treatment or interventions whenever the different options are available.

In these circumstances, Serbian health institutions with inherited organizational structure and working methods of an earlier period, and with set rigid limits, can be very difficult to reorganize in order to ensure provision of adequate care. Inefficiency is always a risk, and it could be a source of irrationality in the use of resources. Serbia is currently facing this kind of challenges. Indicators of population health are relatively low compared to other countries, which requires fundamental changes in the organization of health services,

which includes a comprehensive transformation of the way that the founders, managers, professionals, and of course the patients refer to the health system.

The experience of other European countries shows that the strategic vision, good governance and political will, can substantially transform the system, even under less favorable economic situation. This involves designing the integration of health services at different levels of care, clearly defining the rights of health workers and patients in the newly established system, and ways of implementation of such changes.

The question of equality deserves special attention. Equity must be ensured in the provision of effective health care for people with similar needs, which is not only a moral obligation but also a requirement to ensure the efficiency of the entire health system. Finally, the health system must become more competitive at the same time, and in the process of European integration, maintenance and capacity development is important because of the challenges of free movement of patients within the European Union.

2. SERBIAN HEALTH CARE SYSTEM EFFECTIVENESS INDICATORS

Death rate, birth rate and life expectancy are used as effectiveness indicators of the health care systems in some countries (Garrin G, 2009). According to available data, the number of births in Serbia is increasing from year to year. This ratio is favorable compared to certain EU countries (Germany, Poland, France, Austria, and Slovakia). Life expectancy is another indicator used in determining population health in one country. In 2010 life expectancy for men in Serbia amounted to 71, while for women amounted 76 years. In comparison with the EU, this indicator is not satisfactory, and it can be concluded that among the lowest in the region. Adult mortality rate in Serbia is much higher than in selected member countries. In Serbia, 140 people of the 1000 inhabitants die between the age of 15 and 60, and in selected member states about 80 people of the 1,000 inhabitants die. (World Health Organization, 2010)

The main causes of death are different in Serbia and in the European Union. In Serbia, the largest cause of death is non-infectious diseases: cardiovascular diseases are in the first place, and they cause 55% death cases, and they also cause cancer with about 20%. The aging of population and high mortality rate which was caused by non-infectious diseases, have led to the constant growing of the death rate in Serbia, which reached 13.97% in 2010. Cancer is the second largest killer of the Serbian population, and it is responsible for more than 20,000 deaths annually. Cancer mortality is a big concern, especially cervical cancer (the incidence is three times the EU average), breast cancer (incidence is greater than twice the EU average) and all types of lung cancer, especially among women. A large number of patients with non-infectious diseases is closely linked with the existence of high levels of risk, i.e. unhealthy lifestyles, such as the high rate of smokers (about 30% of the adult population is smoking for more than 20 years) and increased number of obese children and adults. (World Health Organization, 2010)

The number of beds and the length of hospital stay are used as efficiency indicators. With 528 beds for 100,000 inhabitants, Serbia is below the EU average, and the average length of hospital stay in Serbia is 9.2 days, while in the EU average length of treatment is 8.8 days. In comparison to selected countries of the European Union, Serbia doesn't have necessary resources, and this is indicated by the following parameters: number of hospitals for 1,000 inhabitants, number of dentists for 1,000 inhabitants, the number of primary health units for 1,000 inhabitants, the number of doctors for 1,000 inhabitants and the number of nurses for 1,000 inhabitants. (World Health Organization, 2010)

Serbia lags behind most countries of the European Union by health indicator value. Poor health is the result of poor economic and social situation. Even though the general situation in the past few years has a positive trend, we cannot expect a rapid improvement in basic health indicators. Identified main problems of the health system, which have a stronger impact on health indicators and the population health, are arising from the fact that, at the secondary and tertiary levels, capacity and resources are the dominant ones, while the efficiency and quality of health care weren't a priority. Because of that, irregularities are starting to appear in the system, so it cannot function in a coordinated and integrated manner.

3. KEY ISSUES IN SERBIAN HEALTH CARE SYSTEM

The main problems, which are identified by comparison with key countries of the European Union, and which should be set as priorities for solving the problems are (S. Thomson, 2009):

1. There is a gap between established rights to health insurance and financial capabilities, large part of the private funds and the existence of informal payments indicate unsatisfactory access to health services in the public system - the basic package in the secondary and tertiary level is not defined.
2. The structure of health workers is inadequate and does not match the expectations and needs of the citizens, the number of non-medical staff in the structure is large.
3. Health care control and security system are not developed; there is no control over capture and the quality of registered data.
4. Inadequate health services payment method and ambiguous way of financing health institution - Health Service is funded by capacity, not by people's needs.
5. The lack of quality health care information systems and other mechanisms for better governance - without good data it is impossible to effectively lead a good health policy, to set priorities and allocate resources.
6. Private health care is not adequately regulated and it doesn't complement the public system network in a way that would lead to coordinated and integrated process of residents' health care needs.
7. Active two-way communication about the importance of taking care of your own health and about the need for the health care services has a large impact on population health indicators.

Although many of the health policy goals on the secondary and tertiary level are achieved to a considerable extent, for example development and efficiency of the health institutions network, with the available personnel and financial resources, it is still necessary to continue monitoring, reviewing and setting newer and higher goals, taking into account the emerging population needs. In addition, the quality improvement process needs to be continually accelerated, just like the improvement process of rationalization, optimization, resource management, transparency of funding and functional connection between the public and private health services for the better functioning of health care system and health care financial sustainability. The health policy main objective is to preserve and improve population health with sustainable health care system by upgrading through a continuous process of diagnosis and analysis of the problem causes, setting priorities and timelines for appropriate activities, evaluating redefinition of certain objectives. Natural health system status and evolution is a constant upgrading and improvement.

4. SUGGESTIONS FOR IMPROVING THE EFFICIENCY AND EFFECTIVENESS IN SERBIAN HEALTH SYSTEM

Improving the health care system to improve efficiency and effectiveness, based on previously done analysis done, involves intervention (reform) to reinforce the basic functions of the health system: resources (staff, IT), the provision of services (network / integration, package, quality, technology assessment), funding of the health care system (basic principle: payment services or payment capacity), management.

Defining the priority areas of reform provides the basis for the selection of optimal programs and activities to improve public health and ensuring a stable and financially sustainable health care financing system. The main objective of the company, including health facilities, which are its strategic goal is further specified through two main strategic objectives, ensuring continuity of operation and ensuring the continuation of efficient operation (planned development of the company) (Jovanović 2007).

Based on the analysis, one of the basic features of Serbian health system is the idleness of the existing personnel, due to inadequate geographic distribution, and consequently the dispersion of specialty and sub specialty, ways of organizing work dominantly directed towards the supine patient and the work of the department and ways of conceiving of job descriptions that causes overwork of specialist staff with jobs that require lower levels of expertise.

For the efficient performance of health services and effective management of the health care system, beside the personnel, premises and equipment, information's are also needed. Information is the key resource of health services. E-Health solution would improve progress in health services, provide better management, dissemination of medical knowledge and would help development of health services (medicine) based on evidence.

Montenegro Ministry of information society point out that: "The strategic priorities for the development of e-Health include:

1. Establishing basic information of infrastructure in healthcare and the creation of organizational, human and technological preconditions for the development of information system, defining basic collection of medical and social data for establishing and maintaining electronic patient records, which will form the basis for the definition of electronic health records.
2. Defining of security and technology standards for secure communication, management and data storage in the health system (medical records).
3. Building an integral information system in health.
4. The merge of all health and social information systems into a single information system through the construction of an electronic portal." (p.39)

Available data indicate that the Serbian hospital's health care system is faced with a paradox. Starting from the vital health indicators, health needs of the population of Serbia are approximate health needs of residents of EU countries, while the hospital capacity in Serbia is not only smaller than the hospital capacity in the EU, but also their utilization rates are significantly below the EU average also. Montenegro Ministry of Health point out that: " In order to increase capacity utilization it is necessary to:

1. Review and revise the organizational model of providing hospital care to ensure adequately overwork of doctors in order to rationalize the use of available.
2. Review and revise the model of work organization to the special attention devoted to providing health care in day hospitals and ambulatory care health priority programs.
3. Channel underutilized capacity as support the realization of public resources and improving the quality of health care." (p.44)

New model of health care organizations should facilitate the introduction of private service providers in cases where this is necessary only to ensure the availability of high quality and efficient health care, which also excludes the possibility of the parallel existence of the public health department that the low quality and inefficient way of providing services. The application of this approach should be carefully considered in each case. Montenegro Ministry of Health point out that: "The decision to include the private sector should be made:

- After conducting the analysis of health needs to determine whether there is a misbalance between the "bid - providing health care services and" demand-health needs.
- When it is evident that all feasible options and options for improving the effective and efficient access to quality services as a result of reorganization measures and rationalization of the existing service delivery models.
- After a detailed analysis of costs and benefits of introducing private sector. When assessing the benefits of providing services by the private or public sector, the risk may be important to measure and therefore has to establish a framework for assessing issues related to risk. " (p.48)

It is recommended to identify areas in which it is desirable to consider the possibility of the introduction and use of private sector initiatives (cancer, emergency medical services, respiratory diseases, diabetes, CVDs, mental health, palliative care, hip replacement, maternal health...).

Analysis of the health care system in Serbia shows that this system is based on the principle of universal access to free health care. However a major lack is that Serbia has defined the standard package of services and it is one of the first things to do in carrying out reforms.

Conceptually speaking, the basic package of health services should include three aspects (Corrigan, et al., 2002):

1. Breath (co): refers to the proportion of the population covered by the basic package,
2. Scope (what): refers to services that are the subject / content of the package,
3. Debt (as) refers to the existence of arrangements aimed at reducing the financial pressure on health budgets in terms of being able to introduce cost sharing arrangements and the cost of the patient for each service provided.

These three aspects of the basic package are key determinants of the extent of the protection of the population / insured from financial risk. It should be noted that the scope and cost-sharing is strongly affected by the exercise of the principle of equality in terms of burden of financing the system and accessing to health services. The basic package has a very important role in improving transparency, particularly in circumstances where informal payments registered a considerable extent, which represent a serious barrier to achieving effective access to the health care quality care.

5. CONCLUSION

Protect the Serbian health system requires urgent reform. Improving the health care system to improve efficiency and effectiveness, based on an analysis that was the subject of this work involves interventions to reinforce the basic functions of health care systems: resources (staff, IT), the provision of services (network / integration, packaging, quality, technology assessment), the financing of health care system (basic principle: payment services or payment capacity) and management. It is necessary to define priority areas for reform, because it provides a basis for selection of optimal programs and activities to improve public health and ensuring a stable and financially sustainable health care financing system.

The goal of any health system is in a qualitative manner and accurate respond to citizens' needs for health services to solve health problems that can be cured, and ensure the provision of care and treatment, in cases where the disease is not curable. The challenge set before the current health system is to be as efficient as possible, which means that you need to achieve the best possible results and achieve improved health outcomes for a similar amount.

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ASSESSOR DISTRIBUTIONAL ERRORS IN EVALUATING EMPLOYEES' WORK QUALITY – IDENTIFICATION AND DECREASE

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Abstract: *Work results have become the primary measure of employees' values and therefore the implementation of a model for assessing the quality of their performance becomes imperative for any organization that seeks growth and development. If used well, the assessment of work quality can be the most powerful tool that an organization can use in order to achieve its strategic objectives, direct the organization members' energy towards the achievement of their mission and corroborate the importance of living in accordance with the organization's vision and values. However, the realization of these principles is only possible through the application of valid and reliable assessment systems, i.e. systems that focus on objective assessment of performance results.*

Given that the assessment of the employee's work quality is usually a result of the assessor's subjective judgments on the quality of his work, one must take into account possible errors that can occur in such judgment. There are several types of errors that can be committed by the evaluators when assessing the employees' work quality. This paper offers an approach to the identification and reduction of distributional errors made by assessors (most widely used in organizations with large numbers of employees) in assessing the military drivers' work quality.

Keywords: *assessor distributional errors, evaluation, work quality*

1. INTRODUCTION

Given that the process of evaluating the employees' work quality- requires the assessors to make subjective judgments about others, it is necessary to take account of possible errors that are always related to a subjective judgment which can occur accidentally or not.

The assessment errors are the judgment errors that can occur systematically when observing and evaluating another individual. These can be defined as a difference between the results of human judgment and an objective, accurate assessment that is not colored by prejudice or other subjective effects (*Bogicevic Milikic 2008*).

The errors can seriously affect the quality of assessment system, i.e. the objective and reality assessment results. It is extremely difficult to eliminate them from the evaluation process; given that the evaluators are often unaware they make them. Even if they were aware, they are often unable to correct them.

There are several types of errors that can be committed by the evaluators in assessing the employee's work quality ("halo" and "mermaid" effect, the effect of similarity with the evaluator, contrast error, context error, timing error, the attribution error, first impression error, the effect of physical attractiveness, high potential error, previous results error, stereotypes). However, the errors that often distort the evaluation results within the organizations with more employees are "assessor distributional errors" (*Noe, Hollenbeck, Gerhart & Wright, 2006*).

2. ASSESSOR DISTRIBUTIONAL ERRORS

Distributional errors are assessors' tendency to use only one part of the rating scale. This means that almost all employees receive the same assessment marks-high, low or average. Accordingly, there are two basic types of distributional errors (*Bogicevic Milikic, 2008*):

- mild and/or strict evaluation error;

- central tendency error;

“Mild” and/or “strict” evaluation errors indicate a tendency of giving higher or lower ratings than according to actual results. In such cases, there is a moving up of the mean value of the scores in regard to the mean value of the assessment scale (mild evaluation) or down (strict evaluation).

As previously stated, the existence of distributional errors is connected to the evaluation of a large number of employees. In every organization with many employees it is expected that the score distribution performance approximates to the bell-shaped curve, which represents a normal distribution- Gaussian curve. In the case of rigorous evaluation errors, a score distribution approximates to a curve which is shifted to the left from the standard distribution curve, Figure 1.

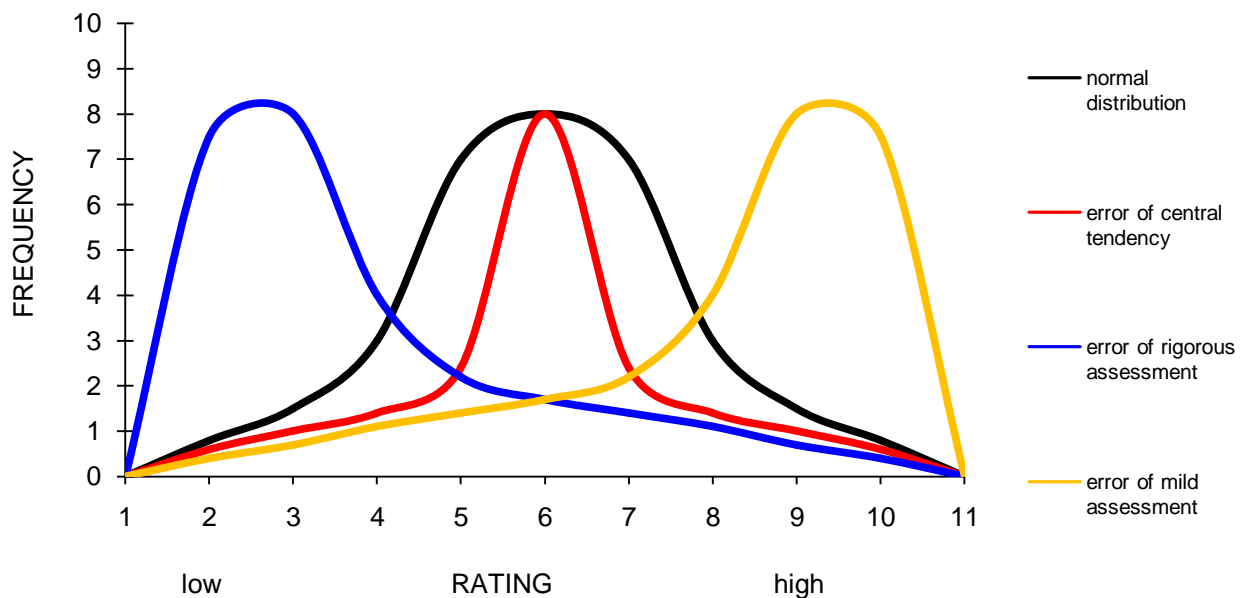


Figure 1: Assessor Distributional errors

Central tendency error occurs when the assessor evaluates all employees so that their ratings are close to middle value on the assessment scale, Figure 1. Only a few employees or none receive very high or very low scores.

The existence of any type of distributional errors indicates a situation in which no distinction is made between good and poor quality of work. Also, these errors can create problems when comparing the quality of the individuals evaluated by different evaluators. If one of the evaluators is mild and other severe, the employee judged by a stricter grader will get less reward than the one rated by more lenient grader.

3. AN APPROACH TO THE IDENTIFICATION OF ASSESSOR DISTRIBUTIONAL ERRORS

An establishing of the existence of these distributional errors is possible in several ways. One of the most popular approaches is the calculation of standard deviation. A small standard deviation indicates the existence of distributional errors but for proving the presence of mild or rigorous assessment errors or central tendency errors it is necessary to compare the mean value and the mean value of the scores on the assessment scale.

If the mean value of the scores is less than the mean value of the assessment scale, then there is an error of rigorous evaluation. If the mean value of the scores is higher than the mean value of assessment scale, then there is a mild assessment error. Finally, if the mean value of the scores approximates the mean value of the assessment scale, there is an error of central tendency (*Bogicevic Milikic, 2008*).

In this paper, we present the approach to investigate the presence of any of the above types of distributional errors when evaluating military drivers' work quality in Serbian Army. Checking is done within the transport troop which consists of 56 drivers, civilians, and was conducted after the regular assessment of this category of drivers at the end of the calendar year (Lukovac, 2010). The distribution of performance ratings on a 5-point grading scale (unsatisfactory, satisfactory, good, stands out, particularly stands out) is shown in Figure 2.

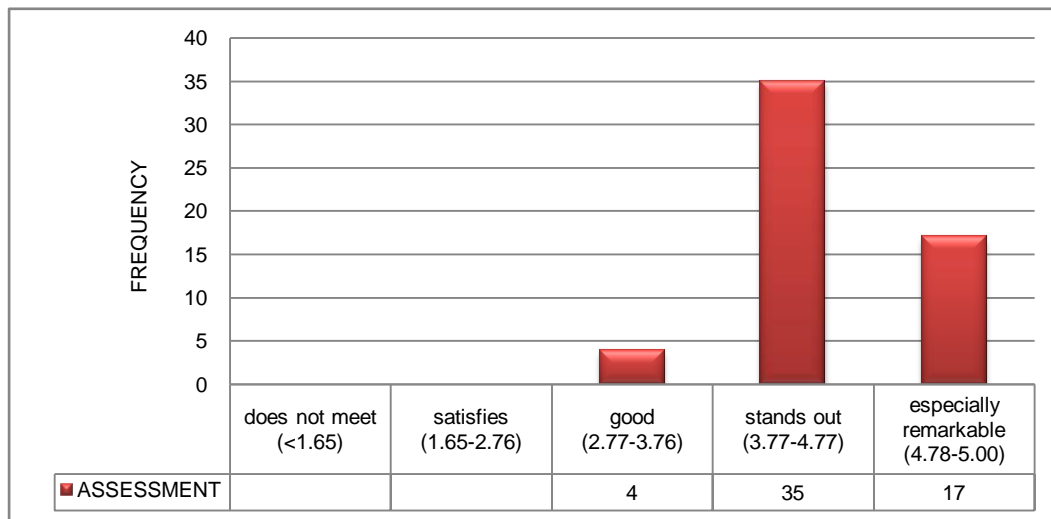


Figure 2. The distribution of military drivers' ratings on an assessment scale (Lukovac, 2010)

According to the described approach for determining the presence of distributional errors within the evaluation process in order to calculate the standard deviation (Std. Deviation) and the mean value of the scores (Mean), all scores were statistically handled by SPSS 11.5 for Windows. The distribution of all grades at the troop level after their processing in SPSS 11.5 is shown in Figure 3.

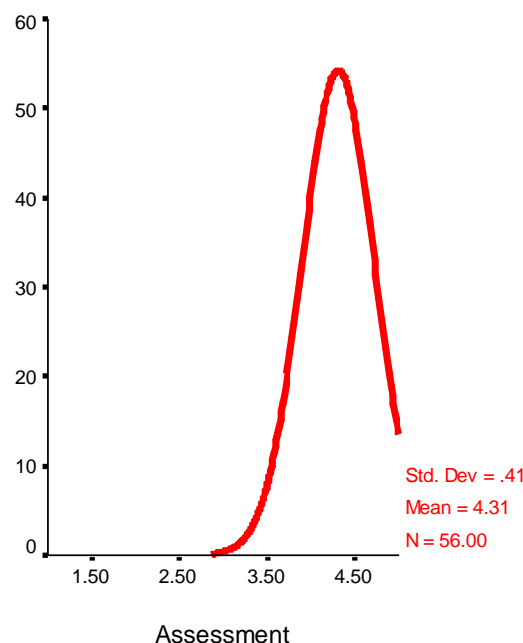


Figure 3. The distribution of military drivers' ratings after their processing in SPSS 11.5 (Lukovac, 2010)

The third Figure shows the small standard deviation score (0.41), indicating the existence of a distributional errors within evaluation process. Given that the mean value of the scores (4.31) is significantly higher than the mean value of a grading scale (3.00), it is evident that there is a mild assessment error.

Based on analysis results, it can be concluded that in the appraisal drivers' work quality within the transport troop which was subject to a review, the assessor had committed a slight assessment error.

4. AN APPROACH TO DECREASE ASSESSOR DISTRIBUTIONAL ERRORS

Despite many errors made by the assessors in the process of work quality evaluation, there are ways to significantly reduce them to an acceptable level. In order to accomplish this, it is necessary to have appropriate measures and activities the organization must take into account, and the following suggestions may help significantly to the objective and equitable evaluation process:

- **Conduct related to the quality of work document in the log.** Evidence suggests that the ratings are usually more accurate and more resistant to assessor errors, if the log is kept of specific critical events for each employee. Diaries, in which the critical events are recorded for each employee, should encourage evaluators to focus on behavior related to the task performance rather than the employee's characteristics, and thus reduce the number of assessment errors.
- **You should involve multiple evaluators.** As the number of assessors rises, thus the likelihood of obtaining reliable information is increasing. If the assessor error follows the normal curve, increasing of the number of evaluators will result in a gathering of most of them somewhere around the middle. This approach can be seen in sports competitions such as figure skating and gymnastics. A group of evaluators (judges) judges the performance, the highest and the lowest score are omitted, and the final score is compiled from the cumulative points of those that remained. The logic of multiple assessments applies to the organizations. If the employee's work was monitored by ten people and was assessed excellent by nine of them, one can neglect the value of a bad grade. Accordingly, the likelihood will increase to obtain accurate and reliable score if more appraisers are involved (like with the 360-degree assessment).
- **The assessors should be trained.** Training of assessors is one of the most important and popular mode of operation in order to improve and raise the quality of their estimates. Introducing the usual

assessor errors, their actions and so, can positively affect the assessors and their relation to the evaluation process. Assessor training generally includes (Jones, 2001):

- Introduction to the most common assessor errors;
- Introduction to individual differences and the fact that they regularly show Gaussian curve, which suggests that it is quite logical that a big difference in performance between employees occur (identify);
- Training to identify and define the appropriate criteria and standards for the identification and evaluation of behavior and the differences in performance;
- Training to conduct effective conversations about performance, in order to improve and develop associates.

Many surveys indicated that the training had a positive effect on reducing errors in the evaluation process. Ideally, each organization should conduct a formal and comprehensive training program that must be attended by all of the evaluators as a prerequisite for the implementation of the assessment. This training usually lasts one to three days but it may not always be necessary to take you so much time. The organizations also need to repeat training for all appraisers, immediately before the assessment and discussion of results.

The lack of such an ideal situation, every organization can afford to conduct a one-hour briefing, which will help the assessors to implement their authority with minimal level of security. Cited a case in which the halo and distributional errors are reduced immediately after evaluators passed an instructive session that lasted only five minutes. The allowance of such minimum level of training, in addition to the actual benefits training provides by providing a more accurate assessment is also useful for organizations if accused of discrimination as a result of the work quality appraisal.

- **Evaluate horizontally.** A Horizontal evaluation is technique to reduce assessment errors. The evaluator first assesses one work performance dimension (one evaluation criterion) of all people to be assessed,

then the other dimension, then the third and so on. The Horizontal evaluation goes beyond the usual vertical assessment in which all dimensions of a person's success are simultaneously evaluated.

According to these suggestions for reducing assessor errors, the person who previously played the role of assessor in the transport troop which was subject to verification, had been trained. Upon completion of the training, he was now tasked to re-evaluate all 56 drivers, using the horizontal evaluation technique. The time difference between these two assessments was only seven days, and the distribution of scores on the drivers' grading scale after this assessment, that is, the assessment after the training (horizontal evaluation technique) is shown Figure 4.

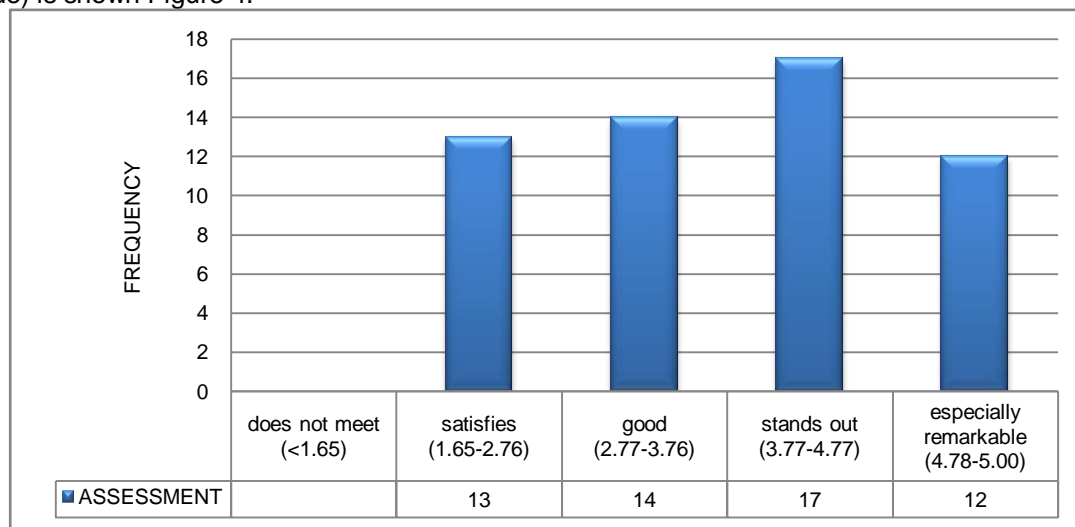


Figure 4. Distribution of drivers' ratings on assessment scale after the assessor training

These ratings (evaluation after the assessor training), were also statistically analyzed in SPSS 11.5 for Windows and are shown in Figure 5.

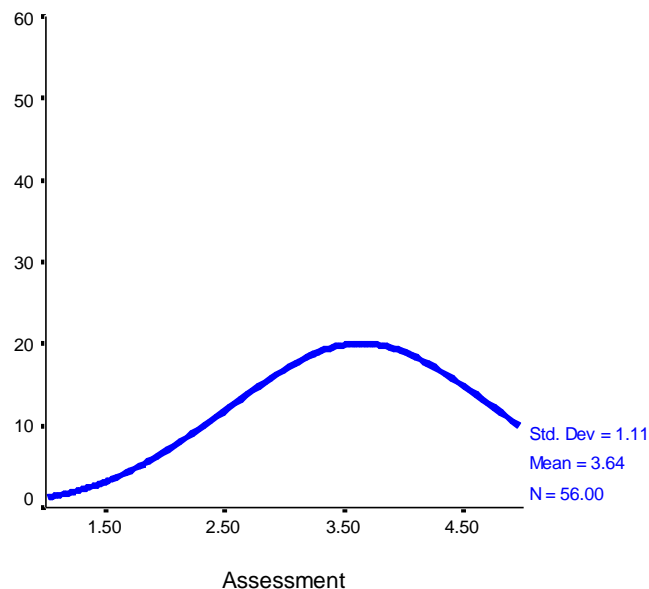


Figure 5. Ratings distribution in SPSS 11.5 after the assessor training

The Figure 5 shows that the standard deviation score (1.11) is almost three times higher than the assessment prior to the assessor training (0.41). The mean value of the scores (3.64) is also much closer to the mean value of the grading scale (3.00) in relation to the assessment before the assessor training (4.31).

According to these results, it can be concluded that the training of assessors and horizontal evaluation techniques contributed to a measurable reduction of mild assessment errors committed by the assessor before. Also, one can conclude that the involving of more assessors in the assessment process and keeping a diary to document the behavior of employees, have further contributed to a fairer and more objective work quality evaluation.

5. CONCLUSION

An analysis to identify the possible errors that evaluators might make when assessing the work quality of an employee to the transparency of appraisal system and thus a greater employee acceptance of the system. Only such an approach to the evaluation can motivate employees to a maximum engagement, commitment and influence them to do better and more efficient.

The most common errors in assessing within the organizations with large numbers of employees are "assessor distributional errors". Knowing that the standard deviation score indicates the presence or absence of assessor distributional errors, and the relationship between the mean value of the scores and the mean score on evaluation scale defines the type of distributional error, is the basis for conducting the analysis in order to recognize these assessors errors in the work quality evaluation.

Using the appropriate software for statistical data processing, namely SPSS 11.5, only contributes to the effectiveness of this procedure.

It is important to emphasize that although there are no protection measures that can guarantee an objective assessment, there are ways to significantly reduce assessor errors to acceptable levels. Training of appraisers, horizontal evaluation, the inclusion of more appraisers in the assessment process and logs in which critical events are recorded for each employee, are the measures to help reduce errors and contribute to a more objective work quality appraisal.

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IMPORTANCE OF VARIOUS EDUCATIONAL PROGRAMS FOR EMPLOYEES

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Abstract: *Modern business requires continuous training and education of employees. The manner in which employees evaluate various programs of education and development, and the degree of importance which they give to it can significantly affect their motivation, commitment, and satisfaction with their participation and their acceptance. The aim of this study was to find out how employees evaluate various educational programs offered to them within the organization. The study included 275 respondents from 23 organizations. The study included a total of 12 different training programs that often occur in practice. Respondents evaluated the importance of each particular program. Employees of different genders and age, coming from organizations of different sizes, evaluated different individual education programs. Classical training was evaluated by respondents as the most important education program, whereas the one based on role-playing was estimated by them as the least important. In this study we made an initial review of the situation in the area that will allow further development and adaptation of the programs concerned. These findings may have broad application in designing future training programs for employees, paying particular attention to the efforts of these programs to be better adapted to the participants, and as specific. The results emphasize the need for tailor-made programs, specially designed for each individual organization. Such educational programs will have a positive effect on the organization itself, provide better adapted employees, reduce costs, and save time.*

Keywords: *human resources management; employees perception, employees training, training and development programs, management and business.*

1. INTRODUCTION

Technology, accounting, financial practices and the like can be copied and transferred to other companies. Employees are the only element of the success of companies that can not be replicated and which gives a certain tone to all other activities of the company.

Simply, the total intellectual, professional and other skills are not a simple sum of individual abilities, but a new quality, which depends on other factors whose influence may be lower or higher. This is the reason that employees are now the most important competitive advantage of each company, and their successful innovative management is the most important way of achieving and maintaining this highly desired goal. One segment of that innovative human resource management is related to education of the employed (Ackermann, 1989; Barjaktarović & Ječmenica, 2011, Šiber, 1999).

The high quality standard for all other functions of the organization and the overall success of the organization depends on the quality of staff, which makes the human resource management so specific. No other business function has such a comprehensive and immediate impact on what happens in the organization and each of its segments as this one has. Human resource management is a key for achieving competitiveness and effectiveness of each organization (Zerbe, Dobni & Harel, 1998).

The perception of the overall state of education and development in the organization. As Drucker (1999) says the most valuable asset of any organization in the 20th century was a manufacturing technology, but in the 21st century the most valuable guidelines do not apply to technology but to people. People are now becoming the most valuable asset of any organization. The most successful organizations are those whose workers are the most educated, skilled, creative and most able to adapt to constantly changeable business environment.

Contemporary studies concerning "best practices", of high commitment, high involvement of human resource management imply that organizations are required to provide for their employees the resources and opportunities that will enhance their motivation, skills, attitudes and behavior (Kuvaas, 2008). These opportunities are provided by a large number of organizations through the training of the employees. The continued need for individual and organizational development can be traced to numerous demands, including maintaining superiority in the marketplace, enhancing employee skills and knowledge, and increasing productivity. Training is one of the most pervasive methods for enhancing the productivity of individuals and communicating organizational goals to new personnel. Given the importance and potential impact of training on organizations and the costs associated with the development and implementation of training, it is important that both researchers and practitioners have a better understanding of the relationship between design and evaluation features and the effectiveness of training and development efforts (Arthur, Bennett, Edens & Bell, 2003).

Organizations in the present business environment have an urgent need, if they want to remain competitive, to set up the education of their employees as the key organizational activity (Ivancevich, 1974; Stewart, 2001). They are necessarily focused on education and development of their employees, so that their knowledge and skills can be used to improve the organization's operations in return. More specifically, investment in education and development of employees increases the value in the value chain through the larger production, better quality of products / services, increase of the customer/consumer satisfaction, altogether leading to higher efficiency and competitiveness of the company (Vokić & Grizelj, 2007). This means that organizations have to continuously invest in knowledge, skills, motivation and behavior of each employee to ensure competitive advantage (Boxall, 1998; Lado & Wilson, 1994; Pfeffer, 1995; Schuler & Jackson, 1987; Wright, McMahan & McWilliams, 1994).

Numerous studies have confirmed the above-mentioned reflections on the connection between the competitiveness of the organization and its investment in the education of employees (Appleyard & Brown, 2001; Delaney & Huselid, 1996; Fey, Björkman & Pavlovskaya, 2000). In these empirical studies, no matter how different they were and that different organizations were involved in them, almost always there was the result that showed the positive correlation between the amount of education that was offered to employees and the success of such organizations.

It is interesting that when we talk about competitive advantage, education and staff development, business improvement, the whole issue is seen only or mostly from the perspective of the organization as a whole. Very little or almost none of the surveys have addressed these problems by looking from the perspective of employees (Ansari, 2011; Gellatly, Hunter, Currie & Irving, 2009). The employees are ultimately those who determine the competitiveness of the organization, they are the ones in which the organization invests and which are expected to give feedback in terms of business improvement (Kuvaas, 2008). Although the evidence clearly showed that education and staff development are needed and desirable factor in the improvement of business organizations, still, the process is bidirectional, and it seems that we are in a constant lack of information concerning the other side, the employees. We know that different methods of education and staff development are being used, but it is hard to know how employees react, how they assess their importance. Some studies show that employees of different ages differently perceive the practice of human resources, and it includes the training of employees (Stassen & Lee, 2009). The older employees who estimate that their organization is "relatively old" significantly better evaluate the practice of human resources, than those older employees who estimate that their organization is "relatively young". These employees also impart a greater sense of importance that the organization shows for them, greater trust and respect are given to them.

This kind of information can be crucial for when and what methods should be used, the benefits or disadvantages of one over other can be discovered. In order to have a full potential of the employees' education and development, to make that activity come to an end with a practical use and with the performance and profitability maximization, information about the perception of these methods, these organization efforts done by the employees is needed. To make education and development successful practice, the employees themselves have to agree on that, because it is intended for them. In our opinion, obtaining the consent of employees, designing customized training and development is a key to obtaining high-quality and long-lasting results. By providing the consent of employees their readiness for training, development is increased, their commitment to change, which is inevitable in the present modern business environment is also increased, as well as their willingness to apply new knowledge and skills in the improvement of business organization (Kegan, 1971; Kuvaas, 2008; Zerbe, age & Harel, 1998). It is already proven many times that the way employees perceive different practices in the organization significantly

influences many outcomes such as satisfaction, intention to leave the job, affective commitment and the success and acceptance of different training programs for employees can increase if we find out of what importance it is for the employees (Chang, Rosen & Levy, 2009).

Therefore the specific aim of this study was to obtain a description of the perception of employees about the different methods, different training and development programs that are aimed at employees. The aim was to find out how employees perceive various education and development programs, how much importance they assign to each other and how much to others. The answer to this question provides insight into the problem from another perspective and takes into account the view of employees, who are the ultimate beneficiaries of such programs, therefore it provides the ability to adequately adapt these programs, thereby increasing the willingness and commitment to employees for them.

2. METHOD

Sample. In this study, the sample consisted of 275 subjects (Table 1), employees in organizations of different sizes, different education, different age and gender. The study involved employees from 23 organizations based in 13 towns in Serbia.

	Total	Gender		Age			Degree					No. of employees		
		Male	Female	To 29	30-39	Over 40	Secondary school	Two-year college	University	Postgraduate studies	Doctorate studies	To 200	201-500	Over 501
N	275	143	132	95	95	85	99	42	93	35	6	85	101	89

Table 1: The survey sample

The variables and the instrument. Independent variables in this study were gender, age of the respondents (to 29, from 30 to 39, over 40), education (secondary school, two-year college, university, postgraduate and doctorate studies) and the size of the organization (up to 200, from 201 to 500, over 501). Dependent variables were the importance that employees attach to special education programs. Assessment of the importance of different training programs was conducted by the direct question : " How important is role-playing as a type of training programs and employee development". The instrument designed specifically for this study consisted of 12 direct questions pertaining to various programs, methods of training and staff development (theoretical lectures, individual instruction, simulation games, role playing, case studies, classic training, staff development, multimedia , movies, interactive video, education, computer-assisted learning). This instrument follows the Likert procedure with five answers: not at all important-1, unimportant - 2, Neither important nor unimportant - 3, Important - 4, Very important -5.

The process of research. Researchers have personally visited 23 organizations that participated in the study gave to the employees an instrument of paper-pencil type. Before completing the instrument respondents were informed about the research, the mode of anonymity protection of the respondents data, after which they started the test.

3. RESULTS

Statistical analysis was performed in SPSS program 15. For the easier presentation of results we will often use the tables in the further text, in which the cells that we want to emphasize will be in bold.

We started the results display with the table that informs us about how the respondents' answers were arranged by percentage on every item in the instrument (Table 2). From the results shown it can be seen that the employees as the most important programs designed for their education and development, estimated classical training, which is associated with about 77.5% positive responses. The program, which was assessed as the least important in their education and development program was the role-playing, which was assessed by 71, 3% of employees as absolutely irrelevant.

Table 2: Percentage response display

Education programs	1 Not at all important	2 Unimportant	3 Neither important nor unimportant	4 Important	5 Very important	Total
Theoretical lectures	17.1	13.5	14.5	34.9	20.0	100%
Individual instructions	12.7	7.3	17.8	27.3	34.9	
Simulation games	29.5	20.7	25.5	20.4	4.0	
Role playing	47.6	23.6	09.1	15.3	4.4	
Case studies	24.4	20.4	24.7	13.5	17.1	
Classical training	3.6	0.7	18.2	13.8	63.6	
Employees development	8.4	4.0	32.4	24.4	30.9	
Multimedia	58.5	10.9	9.1	8.0	13.5	
Films	24.4	22.5	27.6	12.0	13.5	
Interactive video	46.2	10.5	21.5	8.7	13.1	
Education	15.3	10.5	27.3	5.8	41.1	
Computer assisted learning	29.5	14.2	27.3	10.9	18.2	

This research enables us to see if there are any significant differences in the perception that employees have of the various programs of education and development in connection with their gender, size of organization, their education, and their age. The results (Table 3) reveal whether and how men and women differ in valuing the various training programs

Table 3: Correlation between the respondents' gender and the perception of various programs

Education programs	Hi-square	sig.
Theoretical lectures	83.833	.000
Individual instructions	41.799	.000
Simulation games	40.495	.000
Role playing	30.496	.000
Case studies	38.217	.000
Classical training	74.801	.000
Employees development	72.613	.000
Multimedia	19.604	.001
Films	112.304	.000
Interactive video	70.533	.000
Education	40.953	.000
Computer assisted learning	40.885	.000

As it can be seen, all the differences for each program of training and development are statistically significant. In the column "educational program" in bold are those programs that women significantly value more than men do. It can be said that men and women give importance to completely opposite programs. When you see only positive responses, i.e. responses that are highly value the program, those are the answers 4 and 5, it is showed that women generally evaluate most programs lesser, therefore in absolute values, although some programs were assessed as more important than men did, the importance is not of not at a much higher level.

The employed in this study, regardless of age, have the same estimation of most programs' importance (Table 4).

Table 4: Correlation between the age of the respondents and assessment of the significance of some programs

Education programs	Hi-square	sig.
Theoretical lectures	83.833	.000
Individual instructions	41.799	.000
Simulation games	40.495	.000
Role playing	30.496	.000
Case studies	38.217	.000
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Employees development	72.613	.000
Multimedia	19.604	.001
Films	112.304	.000
Interactive video	70.533	.000
Education	40.953	.000
Computer assisted learning	40.885	.000

The exception is the simulation game and theoretical lectures. Theoretical lectures are more significant to middle aged respondents, from 30 to 39 years of age, then a little less importance is given by the youngest, and the smallest importance is given by the oldest employees. This is somewhat surprising finding which will be discussed. When talking about the simulation game greatest importance is given first by the oldest, then by the youngest and finally by the middle aged employees.

The correlation between the staff education and their perception of the relevance of education and development programs designed for employees reveals that regardless of the level of education, the employees give importance to different programs in equal measure. By this criterion the employed do not differ significantly and there is no need to show these results in the text.

The correlation between the size of the organization in which employees work and their assessment of the relevance of education and development programs is presented in Table 5.

Table 5: Correlation between the size of the organization and assessment of the significance of some programs

Education programs	Hi-square	sig.
Theoretical lectures	83.833	.000
Individual instructions	41.799	.000
Simulation games	40.495	.000
Role playing	30.496	.000
Case studies	38.217	.000
Classical training	74.801	.000
Employees development	72.613	.000
Multimedia	19.604	.001
Films	112.304	.000
Interactive video	70.533	.000
Education	40.953	.000
Computer assisted learning	40.885	.000

In the front line there are the results of a program that imply classical training, where employees, regardless to the organization they work for, give the same, high degree of importance to the education and staff development. When you take a closer look you can see that the program "theoretical lectures" is significantly higher estimated by the employees who work in the larger organizations of over 500 employees. Also the program "computer assisted learning" is estimated as more significant by the employed in the smaller organizations, in contrast the employed in the larger ones. These findings can show the experience that the workers had in the course of their work in these organizations. For a great number of workers it is very difficult, time-consuming and expensive to organize some kind of computer-assisted learning, and it is assumed that employees in large organizations had little experience with these type of programs, while,

because of the size of the organization, some theoretical programs were more available to them, they encountered them more often, and that is the reason they assess them as very important.

4. DISCUSSION AND CONCLUSION

As can be seen so far there is an ample evidence to justify and emphasize the quality of human resources as a decisive preponderance in achieving greater competitiveness of any organization. Constant improvement of employees, systematical occupation with them, the investment proved to be profitable in many ways, better productivity, greater satisfaction, less absenteeism and resignation are all the results obtained by changing the focus from just technological progress and improvement, to the improvement of human capital. Between the competitiveness and improvement of human capital there is a positive feedback connection (Chang, Rosen & Levy, 2009).

Although with all this knowledge and experience accumulated over the years, there are frequent lapses in planning, organizing and implementing educational and development programs. These are solutions that often can not simply be copied from one organization to another, because each is specific in its own way. Regardless of how the organization is confident in its program, its development strategy and education, we need information from the other side, from the employees themselves, because these programs were made for them.

The manner in which employees evaluate various programs of education and development, the degree of importance which they give, can significantly affect their motivation, commitment, and satisfaction with their participation and their acceptance. In this study we made an initial review of the situation in the area that will allow further development and adaptation of the programs concerned. It can be assumed that programs such as "role-playing, simulation games, case studies" that are rated as the least important will be to the extent be accepted and adopted as the preferred forms of training and staff development. In contrast to these "classical training and individual instructions," employees assess as highly significant and their intensive use and improvement can help organizations in their efforts to provide employees the best conditions for progress.

The results show that men and women have significantly different assessments of the importance of some programs. When planning and implementing programs certain attention has to be given to this, and where necessary, adjust the programs to the actual users. The importance of the more specific solutions is revealed. Furthermore it is noticeable that women give much less importance to education programs, which can significantly impact their engagement and activism necessary for successful implementation. A possible explanation is that most of programs are designed in that way that they are fit for the men and are not adequately designed for all the participants. This knowledge can be practically be applied in such organizations operating in the typical economic activities and where there is great disparity in gender representation.

The findings somewhat are not consistent with the previous concerning the perceptions of the human resources practice by older employees (Stassen & Lee, 2009). The results reveal that assessing the training program disappears the difference between employees of different ages, and that they are equally evaluate different programs as important. The only difference is expressed in terms of "theoretical lectures". One explanation might go in the direction that the oldest employees have already mastered the theory and have no more need for it and failed to distance themselves from the present moment, when they do not need that kind of program any more. Middle aged employees evaluated this program significantly more important than other respondents, perhaps because after the initial entry into the job and work for a certain number of years, they realized that no matter how practice was important, it must develop parallelly with the theoretical part, which allows the transfer of knowledge to other contexts, and provides a good basis for further progress.

Also the results show that the significance of some programs has a different estimation in the organizations of different sizes. This again emphasizes the fact that it is almost impossible to copy and transfer solutions from one organization to another. Again there is need for more specific solutions.

It is up to the organizations to adopt these findings and begin dealing with their own employees in a manner that will enable them to better prepare and empower in the modern world of business which requires continuous changes. Continuous changes require timely intervention, education of employees in accordance with the preservation and enhancement of competitiveness, which means that organizations can not allow

any errors in the process. Waste of time, resources and staff often questions the survival in the market. Therefore the organizations long for specific, tailor-made programs with which they will achieve the best results. These findings may help them in this way and open to them the new possibilities in improving human resource practices. This study can serve as a good basis and a springboard for further, more specific studies, such as e.g. when talking about different industries, different regions in which they do business, the different ownership structure... These are all suggestions for further research which will enrich our knowledge in this area, and which has great practical significance.

There are many questions related to human resource management, and in providing the answers all the interested parties should participate, from the researchers, over the employees and the employer, to even the state.

Emphasizing the importance of the employees for the company success and scientifically dealing with the human side of the company and management is not new. What is relatively new is the real, practical interest of companies and their management for employees' potential and their development as an objective assessment of the vital interest not only of the business development and success but also of a clear determination and definition of what makes this company different from the others. This difference is reflected in some elements which represent a key competitive advantage, and are considered an important element of the appearance on the market. The goal of every corporate subject is to develop such a competitiveness or gain it, and in global processes it is the only formula for survival and for realizing the mission and vision of each company.

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STAFFING FOR INTERNATIONAL ASSIGNMENTS IN MULTINATIONAL COMPANIES: EXPATRIATES VERSUS LOCALS

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Abstract: *More and more organizations tend to extend their operations to international markets. Globalization and growth of international business have led to more extensive internationalization of human resource management (HRM). Nowadays it has been widely recognized that effective human resource management is a key to success of multinational companies (MNCs). This paper seeks to address the issues that multinational companies are faced with in managing diverse human resources in an international context. The paper explores the key role which global staffing plays in international human resource management, particularly focusing on one of the most critical decisions a multinational company has to make, which is the one concerning decision on an appropriate mix of parent and host country nationals in foreign subsidiaries. The aim of the paper is to reveal advantages and disadvantages of employing each type of staff in terms of their nationality and summarize the common reasons for transferring expatriates abroad or employing locals in foreign subsidiaries. Conclusion of the paper is that both options – employment of parent and host nationals in a MNC's foreign subsidiary may create advantages and disadvantages opposing to each other, so that in the course of the staffing of a foreign subsidiary MNC needs to elaborate all relevant aspects of the decision, from legal, technical and cultural to financial. This paper may present value to multinational companies intending to enter new markets when deciding whether to employ parent or host country nationals in the managing positions in the foreign subsidiaries and what aspects to consider in order to create a mix of the human resources which will ensure successful operation of the subsidiaries.*

Keywords: *human resource management, international human resource management, multinational company, global staffing, expatriate, parent country national, host country national*

1. INTRODUCTION

Global competition encourages companies to invest in foreign countries with an aim to create or to maintain competitive advantage. Whilst postulates of human resource management can successfully be implemented in companies operating in one single country, human resource management in international environment is much more complex in view of differences between countries in which the company operates and the diversity of employees. Growing number of companies which tend to spread their operations beyond the borders of parent country led to emerging need for definition of different approaches to human resource management.

According to Schuler et al. (2002) the purpose of international human resource management is to enable multinational companies to be globally successful, i.e. to be: competitive all over the world, efficient, sensitive to local environment conditions in foreign country, flexible (adaptable in a shortest possible term) and capable of transferring knowledge throughout globally dispersed subsidiaries. Many authors agree that international human resource management refers to human resource management all around the world (Schuler & Tarique, 2007) aiming to help organizations effectively use their human resources in international environment (Shen, 2005). International human resource management may be considered as a set of activities intended for managing human resources in organizations in order to accomplish organizational goals and gain competitive advantage at the national and international level.

2. SIGNIFICANCE OF STAFFING IN INTERNATIONAL HUMAN RESOURCE MANAGEMENT

Multinational companies operate in many different countries through their subsidiaries – “semi-autonomous entities with entrepreneurial potential, within a complex competitive arena, consisting of an internal environment of other subsidiaries, internal customers and suppliers, and an external environment consisting of customers, suppliers and competitors” (Birkinshaw et al. 2005, p. 227). In the process of establishing subsidiaries in foreign countries MNCs may face different problems. Even though all aspects of international human resource management are important, staffing is often considered the most significant international HRM activity, crucial for efficiency and success of foreign subsidiaries (Widmier et al., 2008). Making staffing decisions in MNCs is usually based on applicant's nationality. This approach to staffing helps reaching numerous strategic goals, such as achievement and maintenance of global integration and control, response to business conditions in a foreign country and transfer of knowledge beyond national borders (Colakoglu et al., 2009). Scullion and Collings (2006) define staffing in international context as “the critical issues facing multinational corporations with regard to the employment of home, host and third country nationals to fill key positions in their headquarter and subsidiary operations” (p. 3). This means that a company has an option to fill its key management positions in foreign subsidiaries by mixing three categories of employees: parent country nationals, host country nationals and third country nationals. Parent country nationals (PCNs) are employees of MNC who are citizens of the country where MNC's headquarters is located (home/ parent country); host country nationals (HCNs) refer to citizens of the host country where the foreign subsidiary is located, while third country nationals (TCNs) represent employees of MNC who are neither citizens of a parent country nor citizens of a host country (Tarique et al., 2006).

Employees moved across national borders in order to take different roles and perform various tasks have traditionally been called expatriates (Dowling & Welch, 2006). An expatriate is a term used to define a foreign service employee, or an individual working and temporarily residing in a foreign country, but planning to return to his/her home country or transfer to another country (Cascio, 2003). It may be concluded that an expatriate represents a global manager, regardless of his/her parent country. Parent country nationals and third country nationals are always considered expatriates, because they are sent to foreign subsidiaries to perform particular assignments. Even host country nationals may become expatriates in case a MNC decides to transfer them from the subsidiary in their home country to the MNC's headquarters. In such cases those employees are called inpatriates (Reiche, 2007).

Expatriation may include the transfer of all types of employees working in a MNC (De Cieri et al., 2007). Choosing a mix of host, parent and third country nationals that will achieve organizational goals in the best possible manner seems to be a serious challenge for MNCs. However, even though all three categories of employees may be seen as expatriates, the vast majority of the literature examining expatriates is focused only on parent country nationals. In this paper the term expatriate will also be used to indicate only the employees of the same nationality as the MNC.

3. APPROACHES TO GLOBAL STAFFING

The approach a MNC will use for filling vacancies in foreign subsidiaries depends on: general staffing policy for key management positions in the MNC's headquarters and subsidiaries, limitations regarding employment policies defined by host governments, and availability of human resources (Dowling & Welch, 2006). As far as subsidiary staffing policy is concerned, this paper will refer to widely accepted categorization of global staffing approaches given by Perlmutter (1969), indicating that the global staffing policy chosen by a MNC depends on attitudes of top managers in the headquarters towards building company's worldwide operations. Three general approaches to staffing foreign subsidiaries were identified: ethnocentric (home country oriented), polycentric (host country oriented) and geocentric (focusing on the whole world). This means that a MNC may choose to fill its subsidiaries only with parent country nationals, may recruit individuals both from parent and host country, or may adopt an international perspective focusing on unlimited employment of different nationalities.

In an ethnocentric staffing strategy all key decisions are made in the headquarters. Key management positions in both home and host country are filled by PCNs. As knowledge from the home country is seen as the most useful, home country policies and practices are usually established in MNC's parent country

and then transferred to all foreign subsidiaries. Polycentric approach focuses on cultural and other differences between countries. According to this approach MNC treats each foreign subsidiary as a distinct entity with a certain level of autonomy in decision making. Subsidiaries are managed by HCNs who are rarely transferred to headquarters, while PCNs hold key positions in the headquarters and are rarely sent to foreign subsidiaries. HRM policies and procedures are developed in the host country. Geocentric policy means that MNC has a global approach to its worldwide operations and understands that each part of organization provides its unique contribution to company's performance (Dowling & Welch, 2006). PCNs, HCNs and TCNs may be promoted to top positions both in the headquarters and the subsidiaries solely based on their capabilities, regardless of their nationality or location (Shen, 2005). Later, one more approach to staffing was added – regiocentric (Heenan & Perlmutter, 1979), which allows MNC's employees to be transferred to foreign subsidiaries, but only within their geographic region.

The key strategic issue regarding the MNC's international orientation refers to the level of control of the headquarters over subsidiaries and to the practices of managing human resources in the subsidiaries (Briscoe et al., 2009). Monks et al. (2001) suggest that in early phases of internationalization process companies usually tend to use ethnocentric approach, meaning that they send expatriates to the foreign subsidiaries in order to transfer corporate culture and ensure implementation of the company's procedures in the foreign subsidiary. After a while, companies usually move to polycentric policy. As confidence of parent company in local managers in foreign subsidiaries is growing, they are promoted to the top positions in the subsidiary. With the increasing level of internationalization, companies are getting closer to adopt a geocentric or regiocentric approach to staffing.

4. REASONS FOR TRANSFERRING STAFF FROM MNC'S HEADQUARTERS TO FOREIGN SUBSIDIARIES

An apparent difference between domestic and international human resource management is that in international HRM employees are moved outside of the borders of one country to undertake various roles in international operations of a company. Employees in MNCs may be transferred in different directions – between the headquarters and subsidiaries, or between subsidiaries. A key characteristic of MNCs as employers is their ability to transfer HRM practice across the borders (Edwards et al., 2007). There are numerous reasons for sending expatriates to foreign subsidiaries instead of using host nationals.

The main reasons for transferring MNC employees from one country to another include filling of vacant position, management development and organization development (Edström & Galbraith, 1977). Companies usually send employees abroad when it is necessary to fill the positions in foreign subsidiaries where host nationals with required qualifications (specific knowledge) are lacking or when it is too demanding to train them for a certain job. Lack of qualified local staff is the most common reason for sending employees abroad. Companies encounter this problem most often when investing in the developing countries. In such cases function of expatriates is to bring expertise in the company's foreign subsidiaries, i.e. to transfer technical and managerial knowledge and train local managers in the subsidiaries (Harzing, 2001a).

International assignments are often considered as a mandatory step in career development of top managers (Dessler, 2011) which means that even when qualified individuals are available among local staff, companies will send employees abroad to enable them to acquire experience needed for their own career development. Such transfers provide international experience to the managers and prepare them for undertaking important tasks in foreign subsidiaries or in the headquarters in the future (Harzing, 2001a).

As per Reiche (2007) the development of an organization involves the establishment of control and coordination over its geographically remote entities. Expatriates are an important tool in control and coordination mechanism of a MNC. They are familiar with the strategic goals, policies, procedures and practices of MNC, and will ensure that they are adopted in the subsidiaries with an aim to enable the company to maintain control over its subsidiaries (Tarique et al., 2006) and provide efficient connection between the subsidiaries and the parent company. Key positions in foreign subsidiaries are filled with employees from the parent country with an aim to provide consistency in operations of different subsidiaries around the world with the organizational goals and ensure that the subsidiaries comply with

company's general objectives and policies. Those employees manage subsidiaries in compliance with behavior models established and approved by the headquarters, which enables MNC to apply a unique management technique in all countries where it operates. Also, the use of parent country nationals enables effective liaison and communication with parent country staff.

Moreover, employees from the parent country are familiar with the corporate culture of MNC (Tarique et al., 2006). They transfer knowledge related to the strategy and organizational culture from the parent company to the local staff in a foreign subsidiary (Selmer, 2004), with an aim to facilitate knowledge sharing among employees in different parts of the organization, creating international corporate culture and developing common corporate values. In addition, they encourage the local staff to develop their international perspective.

According to Brewster et al. (2007) the main reasons for transferring employees abroad include professional development of employees sent to foreign subsidiaries, transfer of knowledge, provision of scarce skills, control and coordination. The authors explain that all of these factors bring certain direct values to a company (financial value, value to relationship with stakeholders, human resources, international business processes or virtual infrastructure).

Harzing (2001) uses certain metaphors to explain the roles of expatriates in MNCs. It has already been mentioned that expatriates are seen as agents of direct control over a subsidiary, ensuring that the subsidiary complies with the MNC's rules and procedures (Dowling & Welch, 2006). Harzing (2001) labels these expatriates as "bears", underlining their domination and control in the subsidiary. Expatriates may also carry out indirect control over subsidiary through socialization. In this case they are viewed as "bumble-bees" moving from one organizational unit to another. While being transferred from one unit to another, expatriates build informal communication networks in the MNC, performing the role of "spider". Dowling and Welch (2006) add a few more advantages that expatriates may bring to a MNC. They serve as boundary spanners, or a link between MNC's home and host country, collecting necessary information about the host country to which they are transferred and act as representatives of their MNC in the foreign country. Also, parent country nationals act as language nodes in the host country.

5. REASONS FOR RECRUITMENT OF LOCAL STAFF IN FOREIGN SUBSIDIARIES

The staffing decision is often considered as an appropriate choice between PCNs and HCNs. Traditionally MNCs are sending their employees abroad to ensure that the policies and procedures of the parent company are implemented in foreign subsidiaries in the same manner as in the headquarters (Schuler et al., 2002). However, many employees are not willing to move abroad for work-related purpose (Dessler, 2011). In addition, transfer of employees abroad is associated with significant costs (Harzing, 2001a). Having in mind that expatriates are paid better than local staff (Selmer, 2004), their movement to foreign subsidiaries may be much more expensive than employment of local workers. With increasing costs of sending PCNs, while career development issues made international assignments less attractive, MNCs started to turn to local human resources to meet their international recruitment needs (Black et al., 1999).

In addition to lower costs of hiring local staff in comparison to PCNs, as a primary goal, there are other reasons for using local human resources instead of sending expatriates to foreign subsidiaries.

One of the most important reasons for employment of the host country nationals in top management positions in foreign subsidiaries is their familiarity with local market and business practices, as well as with cultural specificity of the host country (Harzing, 2001a). Locals have the ability to respond effectively to the local requirements (Tarique & Schuler, 2008). These employees know well cultural, economic, political and legal environment of their country (Tarique et al., 2006), as well as business practices in the host country, while, on the contrary, employees from the parent country need a lot of time and effort to get familiar with characteristics of local environment to reach the level of familiarity of local staff (Harzing, 2001a). Local staff knows business customs in their country much better than any foreigner.

By assigning local staff to top management positions in foreign subsidiaries MNCs may successfully avoid problems of getting expatriates (and their families) adjusted to a foreign country, which may be very serious – particularly in cases of big cultural differences between parent and host country (Harzing, 2001a). In this way a need for expensive trainings aiming to prepare expatriates for living and working in a

foreign country and facilitate their adaptation to another culture will be eliminated (Dowling & Welch, 2006). Employment of locals also overcomes language and cultural barriers (Selmer, 2004), which otherwise may cause numerous problems in communication and doing business.

Employment of local staff in top positions in foreign subsidiaries may have a positive impact on the moral of local staff (Selmer, 2004). It provides opportunities for advancement and promotion to HCNs and increases their commitment and motivation. Having in mind that local employees work in their country of residence, it is more likely that company will keep them for a much longer period than expatriates, who usually work in a foreign country for a limited period of time and then return back to their home country or transfer to another country. Another advantage for organization is that there is not a need for transferring these employees to other countries.

Additionally, HCNs are usually preferred by host country governments, as employing locals brings advantages to the host country. That is one of the reasons why sometimes host governments may encourage hiring HCNs and limit opportunities for employing foreigners.

6. CONCLUSION

Effective human resource management is perceived as a competitive advantage of multinational companies.

MNCs recognize that human resources have a crucial role in achieving a competitive advantage in a highly competitive global market. Even though all aspects of human resources management are very important, staffing continues to be an essential international HRM activity. Staffing key management positions in foreign subsidiaries is a strategic challenge for a MNC. That is why a successful international assignment is often seen as an integral part of establishing a host country subsidiary (Olsen & Martins, 2009).

There are different goals companies tend to accomplish through the use of international assignments. Some of them wish to improve business performance, solve technical problems, develop and share best practices, develop international leadership or control financial results (Brewster et al. 2007). Some of these objectives may be achieved by sending expatriates to foreign subsidiaries. However, primarily due to high costs of transferring parent country nationals to foreign subsidiaries, companies often need to turn to host country nationals to satisfy their recruitment needs.

It may be concluded that both options - using expatriates and locals to staff a foreign subsidiary - may bring a MNC some disadvantages. Usually disadvantages of employing one category of employees are at the same time the advantages of using another, and vice versa. When deciding on which of the options to use MNCs have to take into account all aspects of this issue which include consideration of associated costs, availability of appropriate staff, cultural differences and language barriers, specific requirements of host country government, level of control over subsidiaries. Choosing an appropriate mix of expatriates and locals still remains a crucial issue in international staffing, often having a significant impact on foreign subsidiary performance.

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ROLE AND IMPORTANCE OF THE LEADERSHIP IN MUSEOLOGY - EXAMPLE OF THE MUSEUM IN PRIJEPOLJE -

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Abstract: *How could one of the smallest and youngest museums in Serbia, Museum in Prijepolje, which does not meet even the most basic working conditions achieve such success, become the first candidate and get nominated for the museum's most prestigious European award in the field of museology? This question has initiated the project and represents the main objective of this research. Specific objective of the research is to analyze the character of the Director of the Museum in Prijepolje who has been working at the museum since its founding, and is at the position of the director for 18 years. This research investigates the relationship between personality traits of the director of the Museum in Prijepolje and the success of the museum.*

Keywords: *Museum in Prijepolje, director, manager, leader, European Museum of the Year Award 2012*

INTRODUCTION

Analyzing the beginning of this institution, it can be assumed that the Museum in Prijepolje either stops working or becomes part of the National Museum in Užice. But the fact that record its history since 1994 until today, says the exact opposite, telling the story of a surprising twist. Instead, under the Act, the Ministry of Culture Museum in Prijepolje close or submit them to the jurisdiction of another museum, the Museum of Prijepolje on the basis of several national projects that have been realized, financed by the Ministry of Culture of Serbia, given the status of a regional museum and recognition for its highly successful operation. Following the implementation of important national projects, which are still funded by the Ministry of Culture, along with receiving prestigious awards, the museum acquired conditions that, according to strict criteria of the European Museum Forum in Liverpool, for the first time in history of Serbian museology, applied for the largest museum prize in Europe "European Museum of the Year 2012" and become the nominee.

Hypothesis: The role of leadership characteristics, which owns the director of the Museum in Prijepolje, has a decisive importance in achieving the success of the museum.

The research methodology included qualitative method of interview with the director of the museum, observation/ monitoring (extensive biography of the director, analysis of documents from the archives of museums, as well as articles about the museum in the media), a qualitative analysis of collected content, analytic and synthetic use of the information. In order to bring relevant conclusions, the methodology also includes an interview with the employee ethnologists and museum audience's survey, using random sampling method.

THEORETICAL FRAME OF THE RESEARCH

Bass(1981) points out that "the most useful studies, from the stand point of understanding of leadership, are those in which the leader's behavior is described and analyzed on the basis of direct observation and analysis of biographical data and historical data in case" (p.66). Proper analysis of leadership includes not only the study of the leader, but also situations in where the leader is present.

Presenting the problems of the unsuccessful organizations, Bennis and Nanus (1985) are in study of leadership concluded that they are seen in a great number of managers, and a small number of leaders. They show on a significant difference between managing and leadership." Leadership is based on ability

to create a good vision which attracts followers to concrete number of ideas or values. Managers, on the other hand, are capable to do things right, while leaders are interested only to do the right thing. Leaders are very engaged persons and they must be in order to keep their role which dismisses all doubts and uncertainties, giving a clear picture that represents base for action" (p.4).

Although studies about leadership characteristic have a long and controvert history, research shows that possessing of the certain values doesn't guaranty successful leadership, although it is obvious that efficient leaders are different from other people with certain key aspects. (Kirkpatrick, Locke, 1991).

What characteristics make a manger-a leader? There are three types of characteristics which are most frequently in studies of leadership, Brayman points out (1986). "First, there are physical factors like height, weight, look and age. Second, researchers have investigated values such as intelligence, language fluency, education and knowledge. The third thing is broad personality, conservatism, introversive-extroversive person, domination, adjustability, confidence, interpersonal sensibility, and emotional control" (p.19). Despite a great amount of negative proof, results points on week connection between leadership and age, height, weight, physical appearance, energy, domination and mood control. Proofs are equally divided with characteristics as introversive- extroversive person, self confidence and emotional control. (Bass, 1981)

According to study done by Kirkpatrick and Locke (1991), key leadership characteristics are urge (broad specter includes desire for accomplishment, ambition, energy, durability, and initiative), desire to be a leader (not a desire for power itself), truthfulness and integrity, confidence (which is in direct connection with emotional stability), cognitive abilities, and knowledge of business. These are six characteristics that make difference between leaders and non-leaders¹ (p.48).

Managers can have some of these characteristics, but only if they have each one of them, they can be leaders. , Kirkpatrick and Locke believe that key leader characteristics help leaders get necessary skills, form organization vision and efficient plan, and necessary steps that implement vision and reality.

CONTEXT

After he graduated at the Faculty of Philosophy in Belgrade (at the department for general and national history), director of the Museum in Prijepolje started working in 1981 as a curator-historian in just opened museum of Yugoslav pioneers and youth, which was located in the Memorial Center Bosko Buha in Jabuka near Prijepolje. As a historian at this museum he worked as a curator-educator, related to the presentation of cultural monuments. He also organized educational excursions in a way that was many years known, and very popular in primary schools, which keep visiting this Memorial Complex. Thus designed and unusual program of participation and communication between museums and specific target groups of the school population sparked the attention of not only participants but also the Ministry of Education and Culture Ministry, which were positively evaluated this way of organizing the museum and educational work.

The desire for accomplishment in this, museum director could be seen at the beginning of his career, according the days spent in the museum. That need is an important motive among effective leaders, and even more important among successful entrepreneurs. Leaders, who achieve their goals, get satisfaction for successfully performed tasks; achieve standards of excellence and finding better ways to do the job. To build their way up to the top of the organization, leaders must possess the desire to complete challenging tasks and projects (Kirkpatrick, Locke, 1991:49). It also provides the acquisition of technical expertise (expert opinion), through education (Faculty of Philosophy in Belgrade) and work experience, as well as initiating and passing through organizational change.

As the permanent exhibition at the Museum in Jabuka was exclusively related to the participation and crimes against children in the NOB (concentration camps at Jasenovac, Jastrebarskom, Gradiski), the director of the museum dealt with the study of historical materials related to this problem, as he prepared to change a part of permanent exhibition and fill it with new data. The 90-ies events have led to the

¹ Proofs for characteristics such as charisma, creativity and flexibility are less clear.

change the museum exhibits concept of the Museum in Jabuka. Director of the Museum in Prijepolje, at this point, still working as a historian, formed an expert team that prepared a synopsis of the new museum exhibit, which was submitted to the Ministry of Culture of the Republic of Serbia, to finance it. Because of the changes in the system in 1991, and changes in entire former Yugoslavia the memorial complex Bosko Buha was closed.

How is the director of the Museum in Prijepolje overcome this obstacle? Kirkpatrick and Locke (1991) point out that "leaders have the ability to objectively look at the problem and have a degree of strength and endurance. They must be relentless and persistent in their actions and must follow the changes. The course of action is not the only thing that counts; there is also the selected direction that they have to stick for. Effective leaders must continue to primarily "push" themselves to the goal, so that they could "push" others as well. Persistence, of course, must be used intelligently" (p.51).

In the final stage (1991) the director was involved in the work of this working group, where he became a curator of a recently opened museum.² At the recently opened museum he takes a historical collection and as a curator-historian he starts studying The River Lim and Lim valley medieval period. Another feature identified in this part of the biography of the director of the Museum in Prijepolje is activity. "Effective leaders do not sit with their arms crossed and wait for something to happen, but make decisions and take actions that lead to changes, i.e. showing high degree of initiative. Instead of sitting around waiting to be "fate smiled", the leaders themselves initiate this process" said Kirkpatrick and Locke (1991, p.50).

Since its foundation until 1993, the Museum in Prijepolje hasn't been organizing any significant project or exhibition. Employed professionals were working on the museum collection, worked in the facility that wasn't suitable for museum operations and trying to make a plan on how to work. The Museum in Prijepolje had the status of local homeland museum. In the period between 1991 and 1993, the museum staff was director, and three expert workers: curator - historian, archaeologist and ethnologist, librarian and hygienist. Archaeologist and ethnologist have just started their first working day in the newly opened institution, with no experience and vision of what should be done. In the first years they have just acquired a basic museum knowledge, while museum director, on the other hand, had 10 years experience in the museum at the time of establishment.

Law on Protection of Cultural Property ("Official Gazette of RS", no. 71/94) identified conditions that a museum institution must meet in order to start working, and that also applied to the Museum in Prijepolje. The building had to be determined by standards relating to the gallery space, office space for employees and what is most important for the museum-existence of the depot. When the Museum in Prijepolje registered, it had no depot, but a small ancillary building on the south side facility (kitchen at the time the facility was in elementary school). The museum collection was placed in the space of 20 m². The museum exhibits are not permitted to be stored in such a space (which was not adequate and did not have the basic conditions of care), but the small number of artifacts was found in it, because the rest of the few collection was on permanent display. Number of professional employees is another condition of the said Act. In addition to all the conditions when it comes to building and museum collection, the institution must have employed three professional workers. Since the beginning of the Museum until 1993 that requirement was met.

However, when a museum director left his office and went into retirement, a new director was elected in December 1993, curator- historian, and Museum in Prijepolje automatically was no longer fulfilled the necessary condition to begin working as a museum institute. The situation became dramatic in 1997 when the curator-archaeologist left the museum. Museum then left without any options, not only for the realization of national and major projects, but in general the existence of a functioning museum. Jokic (2010) point out that "the fact is that human resources play a special role in unfavorable material and socio-economic conditions, especially when it comes to professions and employees who represent a stable core of the organization in unstable conditions" (p.7).

Museum in Prijepolje, despite attempts, since 1994 has not been able to hire a qualified person. So at the Museum in Prijepolje work only two professional staff and one of them is still performing the function of director.

² Then the Museum in Jabuka became a part of the Museum in Prijepolje.

After three years of work at the Museum in Prijepolje, curator-historian takes over position of the museum director. Kirkpatrick and Locke (1991) point out that “effective leaders are very ambitious in their jobs and careers and have a desire for continuous improvement” (p.50). Although working as curator-historian, he also accepted the post of director of the museum. In addition to initiatives, this data reflects the ambition and desire for leadership, which implies a desire to lead and influence others. “People with high managerial motivation often affect other people, by the conquest of arguments or greater authority possessions. They prefer to direct rather than having subordinate role. Jon Bentz describes successful managers as those who have “a strong desire to compete for the position ... power ... and they need to be known as people of authority.” (p.52)

The recommendations of the municipal authorities were the same as for the establishment of the museum that the museum should remain an institution that will deal with all efforts of preservation locally, as part of the Cultural Centre, together making a whole. This time director who takes over has his own, different vision of the Museum in Prijepolje as a significant cultural institution. Formulating plan to implement a bold goal, as it then seemed³, steps towards realizing the vision he saw in big projects, in cooperation with relevant institutions and prominent scientific individuals, by which museum could fight for his place among the institutions for the protection of Serbia. Dragicević Šešić and Dragojević (2005) point out that: “the vision of its future, given in the form of development scenarios, should be realistic but ambitious representing a step forward from the daily, ongoing routine, and to be mobilizing and inspiring factor for selection of brand new, sometimes radical and risky strategies” (p.120). The director of the museum in Prijepolje knew the answer to the question “how”, in 1994, he saw the museum in his vision almost twenty years later, he also knew the answer to questions “what, where, where to”. Is this enough to conclude that this manager is a leader?

Therefore, this vision that the director hasn't given up, tells about self-esteem. A person imbued with self-doubt will never be able to take necessary action and gain the respect of others. Self-confidence plays an important role in making decisions and gaining someone's trust. Obviously, if a leader is not sure what decisions to make or express a high degree of suspicion, it is less likely that his followers will believe him and follow his vision (Kirkpatrick, Locke, 1991).

On the other hand, self-confidence helps effective leaders to remain calm. The leader, who loses self-control quickly, will not encourage trust and team work as one that has emotional control (Kirkpatrick, Locke, 1991). Describing the supervisor, an ethnologist at the Museum in Prijepolje said: “Director speaks to me in the same way, even in a crisis situation is not angry and does not react impulsively”.

Various defined vision necessary brings the different strategies and methods of operation (Dragicevic Šešić, Dragojević, 2005). Leaders should be intelligent enough to formulate suitable strategies, solve problems and make the right decision. If someone wants to lead, followers want that person to be more skilled in these things from them. “The collection, integration and interpretation of vast amounts of information reflect the cognitive ability of a leader”, point out Kirkpatrick and Locke (1991) and also say: “These requirements are now higher more than ever because of the rapid technological progress” (p.55).

There is no document, from the period of creation of his vision, which defines and closer explains the planned concrete steps, except the oral narratives of director. Creatively chaotic state (Ichak Adizes) which is incorporated in an imaginary vision was difficult to observe in its entirety only by in-depth interview with the director of the museum. On the other hand, vision without concrete actions to materialize and embody, is just an idea. Is this vision converted in concrete projects that have contributed to its realization? To answer this question, director of the museum has placed at the disposal extensive documentation which enables getting more complete picture.

Projects of the Museum in Prijepolje are than being systematized (science meetings, seminars, exhibitions, science- examinations and art projects, lecturers and other things that can be considered as models of culture projects) in the aim of forming the sequence of their initiation and realization⁴. Thanks to

³ Especially considering the inadequate facility, depot, and only one expert employee, as well as lack of support of the municipal government.

⁴ Analyzing of the gathered information, and by retrospective view of the newest till the oldest projects, we come to the identical year-1994.

the projects, in few years Museum in Prijepolje was given a status of the regional Museum on territories of Prijepolje, Priboj, with inherency for organizing important projects of research on this important historic territory. Museum in Prijepolje is also one of the rare museum institutions that exhibited out of the country and organized several international meetings, as well as exhibitions of National Museums of other countries.

Beside initiating and realization all of the projects, the director of the museum himself personally leads all of the organization, actively involves in their realization and successfully fulfills the aims of every project started. Leaders must possess a lot of energy. Kirkpatrick and Locke (1991) said: "long work hours, intensive work during many weeks (and many weekends) during years; they must be physically active, mentally and emotionally ready. Leaders possess high level of energy, durability and are generally active, full of life and be able to keep stable productive tempo of work" (p.50). The need to have energy is today even bigger, because more and more institutions expect that all employees, including directors spend time traveling and visiting parts of organizations which are on other locations.

If the leader wants to be efficient, he must possess a high level of knowledge about institution, work and technical issues. Technical expertise makes a leader able to understand worry considering technical questions. Harvard professor John Crotter claims that the expertness is more important than formal education. Although cognitive abilities are needed for understanding of business, formal education is not necessary. Only 40% of business leaders according to studies of Bennis and Nanus had degrees from business. Kirkpatrick and Locke point out that: "knowledge of organization and industry allows efficient leaders to make decisions based on exact information and understand implications of those decisions" (p. 56).

Integrity is a connection between words (vision of the director of the Museum in Prijepolje) and works (the list of realized projects), and honesty implicates the truth. *Morgan McCall* and *Michael Lombardo* from the Centre for creative leadership conclude that managers, who have reached the top, used the following formula: "I will do exactly what I have said I will do, and if I change my mind, I will inform you in advance so I wouldn't imperil you with my actions." Successful leaders are open with their coworkers, and they are also direct, but without hurting the confidence. (Kirkpatrick, Locke, 1991). One of the employees of the Museum in Prijepolje- ethnologist says: "The director was consistent in his work". Sincerity is absolutely necessary for efficient managing. "If we are ready to follow someone, to the battle or to the meeting room, we must believe that that person is trustful. We want to know if he or she is truthful, ethically correct and principled. We want to be completely sure that integrity of that person is correct", point out Kirkpatrick and Locke (1991, p.54).

While working on projects, the director of the museum, makes a lot of contacts and cooperation with the most important and most eminent science institutions of Serbia and in the region (which was also one of defined aims of the vision), but it also upgrades communications of museums with public. At the same time, without open dialog with state, society and media, about different political possibilities, where people included are aware of their responsibility for society in whole, museums will stay some kind of necessary aim, that won't be clear. (Gavrilović, 2008).

Vujičić, Stankov and Besermenji (2010) point out that: "Definition of the museum as elitist, academic, educational institution that works according to strict rules is a long time history. Now the museums are in race with competitors, where they fight for the free time of the potential visitors. This fight overcomes inter institutional levels, turning into competition with new cultural attractions. (Industry of fun, culture, subculture) that becomes more frequent day by day." (p.324). It seems that the director of the museum was lead with the same conclusions, which were said many years later and which are still not recognized in many museums in Serbia.

Šola's presentation on conference „Best on heritage 2009“ in Dubrovnik, gives definition of the museum success using a formula (Vujičić, Stankov, Besermenji, 2010) : $E=m \cdot c^2$. Perfection (excellence) is accomplished with formula: museum times communication square, amplifying the importance of communication in work of modern museums. With amplifying the importance of communication and its constant upgrading, we come to improvement on the field of interpretation, which comes from two way communication between museums and visitors.

Gavrilovic (2008) points out that: "Unfortunately, museums (and museum employees) in Serbia are still far away from those new ideas." (p.48). Is the museum in Prijepolje exception? We must say because innovation in museum work is said to be the main reason for nomination for the reward from the European Museum Forum, and brought Museum in Prijepolje a specific approval that kind of innovation?

The director of the museum, in 2009 in Paris, on the meeting of ICOM, for the first time read the text of the competition and conditions for reward "European Museum of the Year 2012". After careful analyses with colleagues from the region, he gave out his idea that projects realized in Museum in Prijepolje can be nominated for this greatest European Museum reward. His colleagues believed that the projects of the museum deserve such reward. In the year 2011, in May, director collects documentation, without much financial support, shoots amateur film and sends data to the jury in Liverpool. In a very short time, he gets the answer that the Museum is a candidate for the reward. In October, a president of the Jury comes to Prijepolje, museum expert Hartmut Praš⁵. Conversation with director was lead in the museum, and more documentation was checked. Two months after this visit, the director of the museum was informed by the jury panel of the European Museum Forum in Paris, that the Museum in Prijepolje was nominated for the reward.

RESULTS OF RESEARCH

The director of the Museum in Prijepolje planed, organized, lead, coordinated, controlled and was also involved in realization of every project of the museum. He is a manger, but is he a leader? Starting from this study as a theoretical frame, director of the Museum in Prijepolje possesses all key characteristics of the leader. Activity, movement, and finishing all the assignments (project realized by the museum) according to Bass (1981) are leadership. "Leader is a person that takes responsibility (plans and realizes the vision he believes in) and coordinates activities of the people in their eager to reach the aim" (p.66).

If we suppose that leader is not only manger that possesses certain combination of characteristic, which is claimed by many researches, than it is only work relationship between members of the group, where leader gains status trough his active work and demonstration of ability to cope with assignments until reaching a goal (Bass, 1981). According to this presumption, director of the Museum in Prijepolje is a leader, considering that every project was successfully finished with his active involvement, and realized at end.

As we wanted to see public opinion, and see these positions from their perspective, we have done questionnaire amongst 100 people. Most of the people involved had university degrees 55%, high school degree 27%, 2% finished only secondary school, while 16% were students. More than half of the people involved go to Museum very often (51%), 43% sometimes, and never 6 %. As an occasion of visit, 34% choose special programs (all of them said they attended basketball farewell of Vlade Divac, one of museum's projects), and other things (exhibitions, promotions and lectures..), 21% people said they came to the museum for work and school obligation, while the smallest number of 5%, answered the occasion of their coming to museum is permanent exhibition of the museum. (People, who said they don't go to museum, didn't answer these questions). On the question: "What was your greatest impression from Museum visit?" most of the people 89%, said interior and atmosphere in museum, as well as kindness and commitment of the director to answer all the questions. Only 5% circled exhibits. 97% of the people know that the Museum was nominated for some European reward (45% knows which one). From 97 which knew about the reward, on the question "What do you think who should take credit for the success of the museum?" 85% answered – the director, while 15% said that they don't know. This question had no offered answers.

Results of the questionnaire weren't surprising, although a small number of people involved, is a bit restricting. It is not unusual a high number of people who are informed about the work of the museum and reward nomination, because Prijepolje is a very small town where only a few number of institutions, especially cultural, work with success. Low percentage of people who come for permanent exhibits is

⁵ Director of the Museum of National culture *Spittal*; earlier, EMF national correspondent 1999; member of the Board of Austrian Museum association since 1994; vice-president of the Museum association *Carinthian* since 2005; member of the board ICOM, since 2007; member of the executive council of ICOM-Austria, in the period from 1998 to 2004

expected because of the fact that there are not many permanent exponents in the museum. But being informed about projects of the museum (farewell of Vlade Divac, promotions, lectures) shows the good communication of the museum with audience, audience who maybe never would visit the museum if they weren't animated in an adequate way. The picture, that public has, about personal director's credit for the museum's success⁶, is another kind of data that matches the quality analyses.

CONCLUSION

Leadership characteristics of Directors' of the Museum in Prijepolje, and personal commitment and his contribution to the success of the museum, testify about the importance of leadership in a museology. With newly founded institution, director has managed to achieve an enviable status that is registered and validated in scientific institutions, museum and other preservation institutions. Museum in Prijepolje by the implemented projects and programs is one of the major museums, and undoubtedly the leader in the region and southwestern Serbia.

It is very important to note that during the civil war in former Yugoslavia, and later, director of the Museum in Prijepolje organized projects related to history, culture and traditions of national minorities that live for centuries in the area and Polimlje and Lim valley. For the first time, monuments of Islamic provenance were listed, exhibitions and lectures of Bosniak-Muslims were organized, which contributed to the respect and appreciation of the Museum in Prijepolje and beyond. The Islamic community Prijepolje, Society for Science, Culture and the Arts of Bosniaks "Ikre" Prijepolje through public statements in the media evaluated the work of the Museum in Prijepolje with great respect with sincere gratitude.

Thanks to the projects, huge personal engagement in the field of protection of cultural heritage and museology, He is one of the few managers whose re-election, six times, followed the unanimous support, although not a member of any political party.

Dragicevic Šešić and Stojkovic point out that: "awakening the entrepreneurial spirit, especially in small towns and communities, can do much in the cultural field" (p.116). The success of the smallest and youngest museums in Serbia, Museum in Prijepolje and its director, was crowned with the candidacy and the nomination for the prestigious award "European Museum of the Year 2012". The jury of the European Museum Forum will bring decision on the winner on 19 May 2012-International Museum Day in Penafiel in Portugal.

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⁶ Gerth and Wright Mills (1954) point out that: "each individual is not only what he thinks he is and he thinks others think about him, but also what others really think about him" (p.91).

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DATA BASED SYSTEMS EVALUATION FRAMEWORK

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Abstract: *This paper presents an outline for a comprehensive data based systems evaluation framework and characterizes some novel approaches to validation as illustrations of the framework's use. Furthermore, the framework effectiveness as a tool for directing research is indicated by exposing gaps in or insufficient coverage of the existing evaluation approaches. Our primary motivation was to elaborate the evaluation process by defining user's involvement, to select important general characteristics of evaluation methods and to recognize model elements to be covered by the evaluations. Main contribution of the paper is a simple framework for systematic characterization of evaluations for data based systems. The approach used in the research follows the modelling tradition of systems design combined with the analysis of small case studies. The cases are also used as a mechanism to illustrate both the proposed evaluation framework and effectiveness of recognizing problems in empirical designs. Key contribution is an independent framework enabling the definition of evaluation processes over the entire scope of a data based systems evaluation lifecycle.*

Keywords: *data systems evaluation framework, validation by domain experts, Sharp's method, database application testing, SQL testing, data warehouse testing*

1. INTRODUCTION

The complexity as well as rate of change is increasing rapidly in all areas of organizational life and data based systems development is not an exception. While new agile paradigm evolved to match the expectation in terms of speed (see for example Scott and Sadalge 2006, Scott 2007, Jovanovic 2008) and novel methods are introduced (Sharp 2002, and Ratklif et al 2011) it appears that database evaluation practice lacks some systematization as well as vigorous empirical research compared with a strong research stream available in software engineering field (compare extensive survey in Juristo et. al 2004, with Eppler and Witting 2000). This situation motivated our on-going research involving specific methods for database design evaluation as well as an extensive exploration in evaluating and testing of SQL code. One observation became apparent, namely that database evaluation scope is broad but that approaches used are narrow in focus and methods and techniques are not easily comparable with alternative approaches. This led us to recognize that something may be missing, and to postulate possible value of an overarching broad database (that scope later evolved to cover broadly all types of data based systems, data warehouses, mater data management, heterogeneous and distributed data systems, multimedia record preservation systems, data stream based systems, archives, backup systems etc.) evaluation framework that will include testing and verification, as well as validation activities. That thought provided motivation for the research whose preliminary results are presented in this paper. The scope of the framework as given here should cover both the database and the data warehouse systems, but it is worth noting that most of the testing and evaluation literature so far dealt with data bases.

The existing body of literature dealing with evaluation and testing frameworks of interest to database/data warehouse area of study is diverse and includes prominent focus on data quality, see Wang et. al 1994, Hoxmeier 1997, Hoxmeier 2000, Peralta 2004, Bouzeghoub 2004, Gasdoue et. al 2007, an industry standard GS1 2010, and Borek 2011. There is also a well-grounded stream of research focused on queries (Graefe 1993, Brass and Goldberg 2008, Tuya et. al 2010), and on testing entire data driven applications (see Chays 2000, Kappfhamer and Soffa 2003, Cabal and Tuya 2004, Willmor and Emubry 2005, Zhenyu and Chen 2007 dealing with automatic test generation for database driven applications, Smith et. al 2008 addressing security, Alalfi et. al 2009 addressing dynamic web applications with databases, Gollfareli and Rizzi 2009 assessing data warehouse system testing, and Blanco et al 2012 addressing specification based testing of DB applications. In the requirements for white-box testing for database-driven applications, Haller 2009, provided broad perspective approaching what we may call a framework for white box testing. Structural testing of SQL is covered in cabnal and Tuya 2009, and Tuya et. al 2010.

The extensive literature deals with SQL testing and database application testing, but considerably less with data model or database design validation. As Celco 2005 pointed out, the best SQL programmers can not compensate for bad schema, so more needs to be done in the area of validation (beyond Sharp 2002, Jovanovic 2008, Ratklif et. all 2011, and Jovanovic 2012). One of the first observation, uses of our framework, was to recognize a very limited role of users in existing evaluation approaches. In addition to presenting a simple framework it is quite appropriate to illustrate database evaluation approaches with some less known but fairly simple approaches namely the Fitness test and the Independent model validation (by domain experts). This paper illustrates evaluation with two novel methods of interest specifically by providing for more domain expert involvement and thus supporting a more balanced validation.

2. PROPOSED EVALUATION FRAMEWORK

The term evaluation is used here to encompass verification and validation activities, execution based testing, human and automated assessment and specific quality assurance activities dealing with evaluation of the evaluation artefacts such as tests and checklists.

Primary goal of a framework is to organize comparison and help identify relevant evaluation approaches, methods, and techniques, in a manner that may possibly help in organizing and comparing research in the data based systems evaluation. Furthermore, simplicity and effectiveness are what we may refer to as meta requirements or salient expectations from a framework.

The essential (mandatory) aspects and its corresponding requirements for a comprehensive evaluation framework (for data intensive systems) are:

- Subject of evaluations; to recognize major categories and typical artefacts as subjects of evaluation in a broad scope of entire data system (database and/or data warehouse) lifecycle,
- Mode of evaluations; to systematize general classes of evaluations
- Classes of participants; to identify roles for humans (developers, users, professional testers, etc.).

In order to maintain simple representation any more detail characterization of specific evaluation methods (approaches and techniques) may be standardized in a pattern like format, and is subject of our on-going research. Among the generic but optional features of evaluation methods to be elaborated upon are: a) grounding theory and/or principles it is based upon (that is a model of the artefact the evaluation is based upon), b) specific coverage achievable by the method, c) possible tools and documentation involved, d) exemplar or guidance for use, e) supporting competency source, or major reference etc..

To indicate what major evaluations are to be expected to be under the umbrella of one such framework, we started our first approximation of the scope by broadening a defined scope of agile database testing according, to Scott 2007. Our first visualization, shown as Figure 1, expanded the scope to include model validation and human based usability evaluations, see artefact Design Model and related activities of expert validation, design review and fitness test as well as usability testing among evaluation types. The intended meaning of the symbols are: a) thick arrows depicts data flows, b) thin arrowed lines indicate evaluation methods, pointing to the subject of evaluations, and c) other symbols name major artefacts to be evaluated.

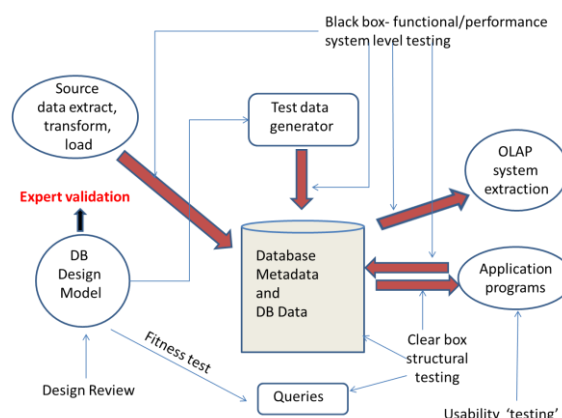


Figure 1: Broadening the Scope of Database Testing to Data Systems Evaluation

Note the usage of the word testing both for fitness test and usability test, is an example of common use as opposed to formal or reserved use of the word testing, for execution based evaluations with the intent to discover existence of defects.

The coverage of artefacts by evaluation methods, from Figure 1 as a straw-man of a framework is informally checked against a generalized database application development work breakdown, such as the one maintained by authors (shown as Figure 2). This served as a form of preliminary validation of the scope in terms of artefacts before an abstracted, stone-man schema is proposed. The framework version 0.2 is shown as Table 1, note abstracted categories of artefacts and modes of evaluation, as well as broadening of the scope to explicitly cover evaluation of systems performance and security, as well as to cover evaluation artefacts themselves. A future, ironman, version for the data systems evaluation framework (as version 1.0) will be formulated after a detail analysis of feedback data expected from the on-going research involving comprehensive characterization of existing method. The way to populate the framework is to enter name of the method and defined roles of human participants, for example Shapr's method for independent data logical (relational DB model) evaluation and Data Model Fitness Test are positioned within the framework version 0.2. It is worth noting that even a cursory review of possible entries into the framework (matrix that is Table 1) reveals one of the problems with current evaluation methods namely imbalance favouring developers over domain experts and focus on verification (testing), notable exception are the two novel methods indicated.

Table 1: Evaluation Framework for Data Based Systems

V 0.2	Evaluation Mode:	Static	Dynamic	Combined
	<i>Examples -></i>	Review, Normalization, Code Inspection	Unit Testing	Refactoring, Test data generation
Subject Category:	Subject:			
1.System:	.1 Conceptual Model	<i>Data Model Fitness Test:</i> a) <i>Users prepare questions</i> b) <i>Developers visualize Queries over Data Model and validate</i>		
	.2 Logical Model	<i>Sharp's independent LDBD validation:</i> a) <i>Developers prepare sample</i> b) <i>Domain Experts validate</i>		
	.3 Physical			
2.Data:				
	.1 Test data			
	.2 DB data			
3.Code:	.1 Queries			
	.2 Application programs			
	.3 Triggers, Constraints			
	.4 Load/Extract/Transformation Rules and/or Procedures			
4.System:	.1 Usability			
	.2 Performance			
	.3 Security			
5. Planning:	.1 Requirements			
	.2 Change requests			
	.3 Risk			
6. Evaluation:	.1 Test code			
	.2 Checklist			

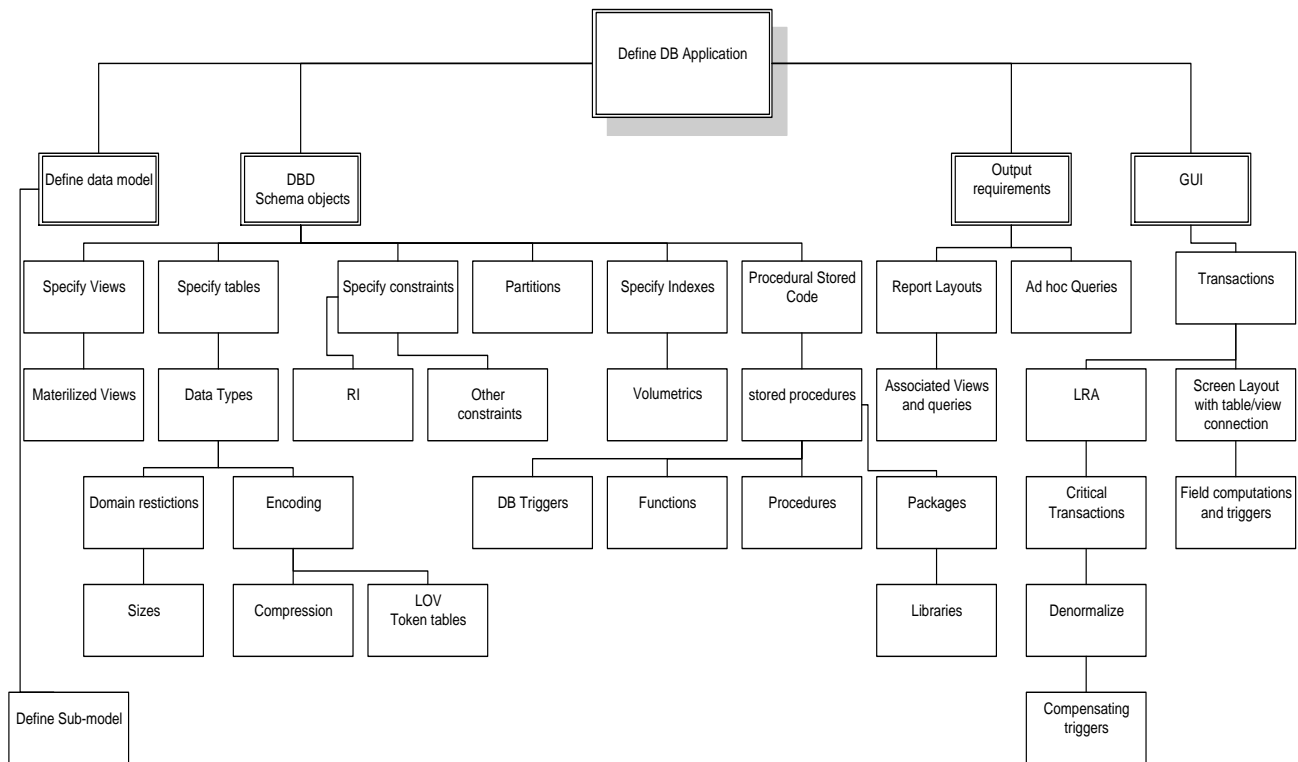


Figure 2: Database Application Development Work Breakdown Outline

The Figure 2 addresses database environments but can also be used as a baseline for similar work breakdown chart for data warehouses and business intelligence systems as well as any other data based systems (at least in outline).

3. EVALUATION METHODS CHARACTERIZATION PATTERN

Here we will illustrate expected characterization pattern using as example an approach applicable to evaluation of conceptual data models, which is an early and inexpensive internal (for use by developers) validation method based on input from users as domain experts. The Data Model Fitness Test approach (pointed to, among others, by Jovanovic 2008) consists of the two related activities separated in time, one performed by users and one by developers. In addition to whatever requirements developers may collect prior or during the modelling and design of databases, the Fitness test requires a sample (usually of about ten questions per subject area model) of valuable questions, expectations from the future database under development.

Proposed (preliminary) pattern for characterizing evaluation method includes following elements:

1. **Name:** Data Model Fitness Test
2. **Subject:** Conceptual Data Model
3. **Mode:** Static
4. **Roles:**
 - a) Users (as domain experts) post a sample of validation questions in natural language,
 - b) Developers evaluate feasibility of queries over the data model
5. **Principle:** Reachability of attributes by queries targeting original questions
6. **Coverage:** Most of the Entities and Relationships
7. **Tool:** (recommended) Visio Stencil for Relational Algebra Query Trees (see Figure 3.) for query visualization;
8. **Guidance:** the procedure involve light and fast mental exercise in conceptualizing potential queries and depends on developers proficiency in SQL/relational algebra as well as in assessing suitability

of a data model; if developer can make a SQL (or relational algebra with a benefit of visualization) query for every validation question.

9. **Source:** Jovanovic 2008.

10. **Effectiveness and efficiency claims** in the context of suggested timing and applicability of the method. Effective in uncovering missing relationships, takes under one hour per 10 questions.

To explain or to use the Fitness testing by experienced developers it is not necessary to use query visualization as the queries can be 'parsed' as a mental experiment of evaluating reachability per each question. We not only recommend but support use of visualization of queries in teaching Fitness testing especially to students. In order to standardize relational algebra visualization we developed the following Visio stencil (see Figure 3). One example of the stencil use is shown in Figure 4, for a question: show all guests names, if any, that have booked all the hotels in London.

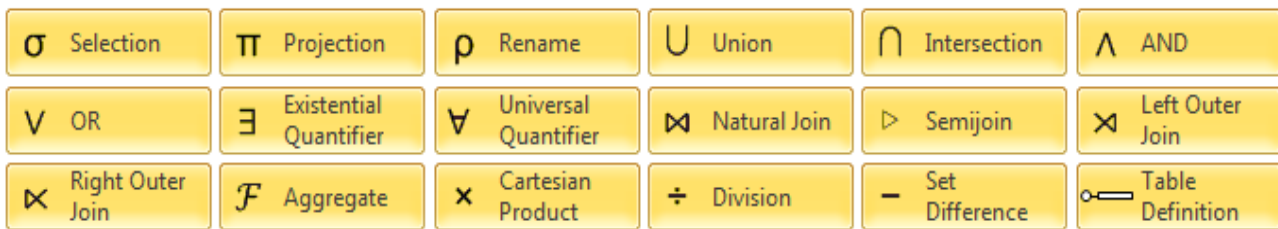


Figure 3. Visio Stencil for standardized representation of Relational Algebra Query Trees

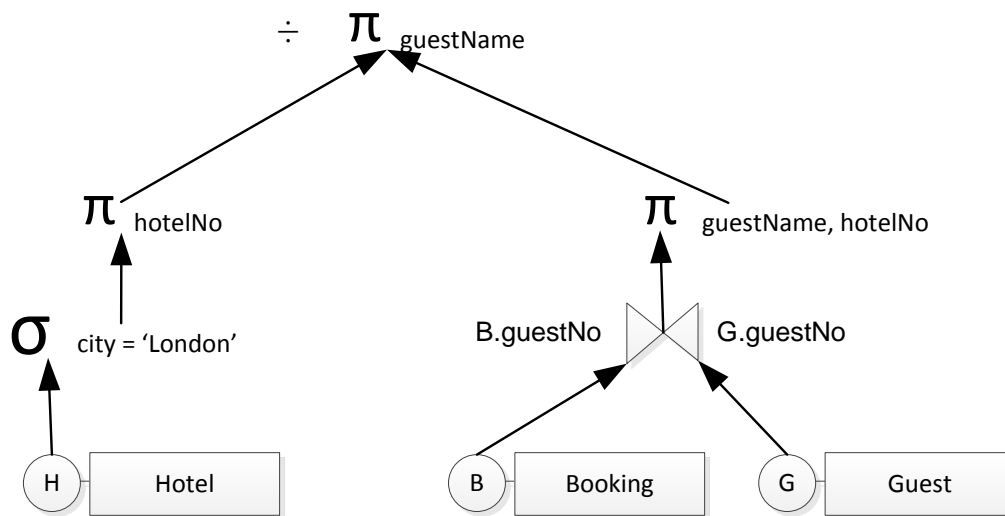


Figure 4. A Relational Algebra Tree

4. CONCLUSION

Among the contributions presented in the paper are: a preliminary version for a comprehensive framework for data based systems evaluations, and a characterization pattern as shown for the Data Model Fitness Testing, demonstrating use of the framework in defining novel/improved methods and supporting planning and other efforts on organizing research in the evaluation field. The characterization pattern is a set comprised of a method's name and nine describing elements (facets), three of which are explicit part of the Evaluation Framework (and obviously necessary). Among remaining elements only 'Tool' is optional while the last element 'efficiency and effectiveness claim' is clearly important (it may not be readily available) and defines very clearly open research problems, for those methods that do not have them yet explicitly.

This paper can be used by database and/or data warehouse practitioners in assessing scope of coverage and potential risks/deficiencies in intended evaluation methods (due to lack of certain aspects of database evaluation coverage for example) as well as by researchers, of data based systems, in setting up research

directions and for comparison and analysis of research results in the area of data based systems evaluation techniques, methods and approaches.

We intend to 'test' and standardize characterization facets and support formation of a catalogue of evaluation approaches, methods, techniques and eventually tools.

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IMPACT OF METHODOLOGY IN THE SUCCESS OF ENTERPRISE RESOURCE PLANNING (ERP) IMPLEMENTATION

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Abstract: Organizations need to use a proven methodology to reduce implementation risks and enable the ERP solution to be put into operation as quickly as possible. The right implementation methodology will also help ensure that the ERP implementation fully addresses the organization's business goals and objectives. Modern ERP methodology in implementation encourages and supports a progressive approach to management for users of ERP systems. The company is constantly seeking better methods and models for decision support in all kinds of decisions, developing / copying new products / markets that generate the growth of the company. On the other hand, the company creates efficient and effective operations that improve return on investment (ROI), because ERP is always considered as an asset. This paper focuses on the interaction of the company culture, business strategy and organizational skills, and balances the relationship among ERP methodology, ERP implementation and performance of the company. Considering the fact that different ERP systems use different methodologies, at the beginning of this paper short descriptions of each brand name ERP should be analysed (OracleFinancials, PeopleSoft and SAP implementation methodology). Although all the methodologies may look similar, the selection of proper methodology is the most critical part in ERP investment. The focus of this paper is on SAP methodology. Accelerated SAP methodology, known as ASAP methodology, is most frequently used on the worldwide market of ERP systems. In particular, the paper will provide an analysis of the impact of ASAP methodology on business processes in companies.

Keywords: ERP system, SAP, OracleFinancials, ASAP methodology, AIM methodology, implementation

1. INTRODUCTION

Enterprise Resource Planning (ERP) system is based on an information technology (IT) infrastructure that facilitates the flow of information within the organization. ERP systems integrate all information and processes of an organization into a unique system with unified database that concerns how organizations gather, collect, store, access, summarize, interpret, and use business information. An ERP system integrates different components through the technical integration of software, hardware and business processes. In a typical organizations structure an implementation cost of the ERP system consists of 15% software, 30% hardware, 40% systems integration, and 15% personnel (Malhotra&Temponi, 2010).

Unfortunately, ERP systems are not successfully implemented in many companies. For example, in Indonesia, more than 80% of companies implementing the ERP systems did not succeed in their implementations, more than 50% of the companies implementing ERP in the world failed to gain optimal return value, while in China, only 10% of the companies gained success. Some researchers show that 50% of the companies implementing ERP failed to gain success (Dantes&Hasibuan, 2011).

An ERP solution will provide no return if users are unable to use it effectively. It is interesting that more than 40% of mid-size companies had two or more ERP software packages, where more than 15% companies had three or more ERP packages. Based on Aberdeen Group surveyed it follows that 10% companies plan to replace strategies supporting by appropriate ERP system for the next year, while 15% companies plan to replace existing solution in next two years. Almost 25% companies are looking for a new ERP solution that will replace existing one in next three years. The main reason for replacement of existing ERP solution in 50% cases is a need for more functionality, 40% are unhappy with clumsy user interface, and 35% need a standardized solution with international capabilities.

There is a long list of companies that have problems in implementing ERP systems, such as the most known and successful Dell computers, Apple computers, or Whirlpool (Shahin, Sadri,&Gazor, 2010). An inappropriate application and implementation of Enterprise Resource Planning system can harm

performance of organization. Some authors report that the success rate of ERP implementation is very low, and in some countries the failure rate is up to 90%. Therefore, it is very important to find out a framework for the evaluation of ERP as managerial and organizational aspects rather than technical aspects. Even more, aspects such as managerial and organizational can decrease the risk of failure in the implementation of the system in an organization.

ERP implementation methodology involves various processes and procedures, which constitute the conditions or means for formulating the actual implementation of ERP projects. The most famous ERP methodologies are developed by the biggest worldwide ERP systems such as SAP and OracleFinancials.

ERP methodology is essential in each ERP project; if company insists on deviation of standard ERP methodology, it could have the great impact on the whole implementation. Normally, ERP methodology is stipulated in pre-sales phase of the ERP project. Progressive management in the company must to push the best solution for them and to choose the right methodology considering with specifics in the project.

SAP ERP system is an ERP system that covers most of the world market of information systems. SAP has developed ASAP methodology and it will be analysed in details in second part of this paper. There are many positive and negative factors in each ERP implementation. Identification of brake factors to successful implementation on the time is the key to a good implementation. The best methodology must to provide the tool for it.

2. IMPLEMENTATION METHODOLOGIES – SAP, ORACLEFINANCIAL AND PEOPLESFT

2.1. ASAP - Accelerated SAP Implementation Methodology

Generally there are two organized ways of implementation: Conventional method and organized method of implementation. The conventional method is known as “SAP Procedure model” methodology and lately has been replaced by ASAP methodology (AcceleratedSAP). However, an old SAP methodology is also in use today, primarily because of the flexibility in applying the huge company, with revenues overcoming trillion dollars.

SAP procedure model consists of the following stages:

- Organization and Conceptual Design.
- Detailed design and customization of the system.
- Preparation of production.
- Support to production.

Such a methodology requires a detailed design of the existing system, implemented existing functionality and business processes. Considerable time is required to spend on AS IS and TO BE analysis. Decision making is very slow and is based on by consensus, which requires time to achieve.

The negative side of this approach are the following:

- Given that this is the analysis of existing functionality, SAP implementation using SAP procedure model often become a mirror of the existing implementation. In other words, do not get the significant added value of such an ERP system implementation.
- Another negative consequence is that the the company implementation is used as the basis of existing business processes or does not use SAP best practice.
- The long implementation period, as the phases of analysis and conceptual design often prolonged.

In order to keep costs under control is introduced ASAP methodology that significantly accelerates the deployment and ends at the time ordered by the project plan. While the conventional method requires a number of years, ASAP implementation methodology is usually one year.

ASAP methodology or Accelerated-SAP provides proven, comprehensive, rich and operationally feasible method for managing an implementation of the project. ASAP cover the implementation, upgrade-e, strategic studies and more. Some of the key tools that support the methodology include: SAP Solution Composer, SAP Roadmap Composer and SAP Solution Manager. Testing software from SAP during 2011

implementation showed that over 30% of projects considered to have failed because they lacked an effective project planning, while, on the other hand, less than 10% rated as failures due to technological reasons.

The main features of this methodology are:

- Using predefined templates (Solution Map).
- Q & A db - database of questionnaires.
- Diagram Explorer - model of the process.
- The use of auxiliary, prepared draft documents, spreadsheets and presentation of the implementation.
- Intensive user involvement in the implementation process.

Roadmap defines the phase of implementation of SAP ERP systems that are supported by a comprehensive plan.

The speed of implementation is supported by numerous tools, models, examples, reference facilities that provide a complete structural development of all the jobs that followed the accession of resources respectively. Each ASAP process is supported with a comprehensive set of tools, the tools contained within the ASAP products provide continuous education and addressing current issues, problems and requests. Using ASAP methodology, supporting tools and features in mySAP ERP implementation phase, significantly reducing total cost of the project reaching the deadline indicated. The quality of work performed at a high level, while the risk of failure is minimized.

ASAP as methodology was launched in 1996 in order to accelerate the implementation and meet the world market ERP systems in the domain of middle-sized company with more than a year 2.5 billion US dollars. ASAP has brought a change in the domain of SAP ERP systems, focusing on the implementation of the methodology rather than on software. ASAP is a methodology that supports project management, team members, business process consultants, external consultants and technical people.

2.1.1.What ASAP can do?

ASAP is designed to standardize the implementation of SAP. Anyhow, it initiates a straight implementation of SAP ERP system. ASAP methodology characterized by the following:

- Optimizes time, quality and resources.
- Forces the best business practices.
- Delivers process-oriented project folder (ASAP Roadmap), which describes the incremental phase.
- Defines the terms and costs of implementation.
- Provides the processes, tools, training and services.
- Detailed help through the various stages of implementing.
- Answers questions of implementation costs and time to ensure quality, have chosen appropriate tools and optimize resources.
- Check-List, technical questionnaires and manuals.
- Supports continuous improvement in implementation.

2.1.2How ASAP is implemented?

The client that implements the ERP system has no usually internal expertise that is necessary for the implementation of complex software. Thus, the client engages an external consulting company to actively lead and participate in the implementation of the ERP project.

SAP recommends that you usually choose ASAP certified partner in the SAP implementation project. The consulting company becomes a partner of ASAP if at least 70% of its staff of consultants have completed training ASAP and therefore are completely familiar with ASAP methodology.

2.2. ORACLE Implementation Methodology

Oracle Financials uses AIM methodology as management model for implementation of Oracle Financials. AIM incorporates two things. First, it is a methodology showing what tasks are required, what order they should be completed in, and what resources are required. Secondly, it provides deliverable templates for all

the tasks that require them. Hence the hybrid of methodology with a deliverable template tool makes AIM a powerful product.

One biggest disadvantage of AIM methodology is that it is very complicated. Complicated in the sense it has a large number of deliverables which are more than 225 in number. In other words, the project time frame can have a direct impact on this methodology. AIM is supposed to be used by experienced project managers that pick and choose the tasks they require for each project. Most consulting companies have fine-tuned and taken a tailored approach for AIM's methodology, based on their standard implementation practice.

AIM defines business needs at the beginning of the project and maintains their visibility throughout the implementation. It defines internal, external, and time sensitive business events and maps each event to the responding business and system processes. Using this method, the client gains an accurate understanding of the business requirements that need to be focused on during the course of the implementation.

The processes in AIM represent a related set of objectives, resource skill requirements, inputs, and deliverable outputs. A task can belong to only one process. Project team members are usually assigned to a process according to their specialization and background. A brief description of the AIM processes is given below:

1. **Business Requirements Definition:** Business Requirements Definition defines the business needs that must be met by the implementation project. You document business processes by identifying business events and describing the steps that respond to these events.
2. **Business Requirements Mapping:** Business Requirements Mapping compares the business requirements to standard application software functionality and identifies gaps that must be addressed to fully meet business needs. As gaps between requirements and functionality emerge, they are resolved by documenting workarounds, alternative solutions, application extensions, or by changing the underlying business process.
3. **Application and Technical Architecture:** During the Application and Technical Architecture you design an information systems architecture that reflects your business vision. Using the business and information systems requirements, this process facilitates development of a plan for deploying and configuring the hardware required for a successful implementation.
4. **Module Design and Build:** Module Design and Build produces custom software solutions to gaps in functionality identified during Business Requirements Mapping. Custom software solutions include program modules that must be designed, built, and tested before they can be incorporated into the system.
5. **Data Conversion:** Data Conversion defines the tasks and deliverables required to convert legacy data to the Oracle Applications tables. The first step of this process explicitly defines the business objects that are required for conversion and the legacy source systems that store these objects. The converted data may be needed for system testing, training, and acceptance testing as well as for production.
6. **Documentation:** Documentation begins with materials created early in the project. Using detailed documents from the project, the writing staff develops user and technical material that are tailored to the implementation.
7. **Business System Testing:** Business System Testing focuses on linking test requirements back to business requirements and securing project resources needed for testing. It supports utilizing common test information including data profiles to promote testing co-ordination and to minimize duplication of test preparation and execution effort.
8. **Performance Testing:** Performance Testing enables you to define, build, and execute a performance test. Use the results to make decisions on whether the performance is acceptable for the business and to help propose tactical or strategic changes to address the performance quality shortfall. Performance Testing is closely related to Application and Technical Architecture; they are interdependent.
9. **User Training:** Training prepares both users and administrators to assume the tasks of running the new application system. It includes development of materials and methods as well as administration. Instructors and courseware developers orient their material toward roles and jobs, and not toward application modules.

10. **Production Migration:** Production Migration moves the company, system, and people to the new enterprise system. Following production cutover, it monitors and refines the production system and plans for the future. The Production Migration process encompasses transition to production readiness, production cutover, and post-production support.

2.3. PEOPLE SOFT Implementation Methodology

PeopleSoft uses PeopleSoft methodology consisting of the followed phases: project planning, analysis and design, configuration and programming testing transition and post production, that is

1. **Project planning:** Plan the engagement to the task level based upon the current information.
2. **Analysis and Design:** Gather additional data in order to prepare preliminary designs to meet the desired results.
3. **Configuration and Programming:** Configure the application to process in such a manner to meet expectations using best practices.
4. **Testing:** Test the functionality of the configured system and the operational readiness.
5. **Transition:** Coordinate and inform all organizations of the solution.
6. **Post Production:** Make appropriate adjustments and fine tune the solution.

PeopleSoft methodology is practically fits in AIM methodology since the Oracle acquisition of PeopleSoft completed in 2005. Until 2005, PeopleSoft was the dominant ERP in South and North America.

3. HOW THE METHODOLOGY AFFECT THE SUCCESS OF IMPLEMENTATION?

There are several factors to consider when selecting the methodology used for implementation. Some of the factors that are external to impose some strict procedures, and some are internal.

External factors might include the following:

1. **Invitation to tender a public sector procurement information system.** As part of the tender, there is a functional specification of the future information system. Functional specification defines a list of all the functionalities needed to implement the ERP system in the future. During an initial preparation of functional specifications, the potential consulting firm does not know the functionalities (basic and advanced) that are built into the logic of a particular ERP system. Functional specification in most cases is an analysis of existing processes and does not take into consideration specifics of an ERP system. Therefore, there is a large discrepancy, if during the implementation strictly adhere to the functional specification that represents a major obstacle to successful implementation. In this case the recommendation is to use SAP procedure model implementation as the only solution for the successful implementation of the the company.
2. **Legislative requirements.** Each brand name ERP system (SAP or Oracle Financials) has embedded localization part. Localization is the set of processes / reports that the state has prescribed. If it is not financially approved due to the same reasons (a few of the clients, the industry line, etc.), the central management of an ERP system does not decide to make a localization set for a given business process / report that is required of a state of the company. In this case, the consulting company can do extensive editing code (programming), and therefore the deviation from the ASAP methodology that offers the best solutions and shorten implementation time.
3. **The turbulent market environment.** Continuous changes in business processes caused by market factors consequently impose a change in the information system. For example, the company X was the case that the sale of product A, which generated 65% of income stopped, but there is a niche market to sell the product B, which is obtained by re-processing of the product A. In this specific case, it was necessary to implement new business processes for the transfer of goods under an operating system and a new business process in the production module. However, changes imposed by the market are often unpredictable. If the company wants to be competitive, it is imperative that they must follow and incorporate business processes in the information system.

Internal factors might include the following:

1. **Regressive company`s policies** defined by the non-active, sluggish top management of the company. If top management does not want changes in business processes due to various factors (profit is still a big risk if something changes, there is no interest to participate), the risk of failure of implementation is very large.
2. **The project team has no motivation to participate in the project.** Often, employees in company are unhappy with the current working conditions and have no motivation to spend even more time by participating in implementation of ERP solutions. In this case, consulting company recommends two solutions:
 - The company to hire new graduates, fresh people who are exempt from the burden of outdated business processes and are ready to prove the new environment.
 - Management of the company to create the rewarding model that motivates employees participating in the ERP project.

Some of the mentioned factors as turbulent market conditions are unavoidable and the client and consulting company has no effect on them. Practically, the recommendation is that the company and especially management in the company must to pay attention on braking factors and eliminate them or at least minimize them. That would be led to successfully implementation of an ERP system. Anyhow, the progressive management of the company has to bring a huge influence in implementation in order to maximize implementation and consequently improve business processes.

ASAP methodology has also implementation costs. There are no two SAP implementations identical, because there are many variables included such as company size, no. of divisions, project scope, approach, company culture etc. Therefore, it is very difficult to measure implementation costs. However, Aberdeen group made case study in 2010 based on their SAP implementation using ASAP methodology. This study determined that implementation costs at these sites could be broken down as follows

- Consulting fees 36%.
- In-house labour 21%.
- Licence costs 20%.
- Training fees 6%.
- Hardware costs 17%.

The main difference is that consulting fees decreased portion in overall cost of the project comparing with congenial methodology whereas consulting company spends about 50% project money. ASAP is now established as standard SAP methodology. A very large pool of expert comprising more than 140 000 consultants worldwide has been trained in this methodology (ASAP, 2012).

3. CONVENTIONAL VS. PROGRESSIVE IMPLEMENTATION METHODOLOGY OF SAP ERP SOLUTIONS

As all methodologies, there are reasons for and against using a certain methodology. The table below compare to compare certain characteristics of ASAP and SAP Procedure Model's implementation methodology. It is clear that the ASAP methodology complete winner.

Table 2: Characteristics of ASAP and conventional methodology

	Characteristic	ASAP	Conventional method
1	Time	Fast	Slow
2	Reingenering of the business processes	Time consuming due to new processes	Very fast because existing processes are implemented
3	Approach	Fast, without deeper analysis	Based on detailed analysis and consensus
4	Implementation	Focus and narrow	Comprehensive
5	„Upgrade“	Less testing required a minimal code changes are implemented	More testing required due to extensive code modification
6	Cost	Minimal	Very expensive
7	ABAP development	Minimal	Extensive due to excessive

			custom requirements
8	Number of consultants	Relatively few are required	Large team of experts
9	Employee turnover	Low, due to less knowledge during implementation	High, as extensive knowledge gained can be leveraged for a better job
10	Knowledge transfer for employees	Low, since project is rushed and consultant allocate insufficient time	High since feature are configured gradually with employee participation

Also, progressive company management always prefer to accept new business processes based on SAP best practice. In this manner, they can avoid costly arguments for ERP implementation and consequently vastly reduce business blueprint phase. When best practice are adopted configuration is also reduced since the best practice processes are already configured. The following Table 2. is displaying standard cost via SAP procedure model and accelerated costs.

Table 3: Characteristics of ASAP and conventional methodology

Phase	Standard cost	Accelerated cost	Savings
Project Preparation	\$50,000	\$100,000	-\$50,000
Blueprinting	\$125,000	\$50,000	\$75,000
Realization	\$175,000	\$80,000	\$95,000
Final Preparation	\$125,000	\$125,000	\$0
Go live	\$25,000	\$25,000	\$0
Total	\$500,000	\$380,000	\$120,000

AIM methodology of Oracle Financials and Peoplesoft's methodology are considered as conventional methodologies due to fact of their standardization and long existence.

6. CONCLUSION

Top management of the company must to be progressive in choosing of the right methodology. Additionally, they must to participate as control factor in each phase of an implementation. Also, top management must to provide appropriate conditions for ERP implementation. Balanced interaction between consulting company and top management of the company lead to optimizing of ERP implementation.

Anyhow, top management of the company is responsible for creation of the company culture and their influences in each ERP implementation is the biggest. Progressive top management initiates new business processes according to best practice embedded in newest ERP methodologies. New business processes is needed in order to response on market environment and continuous challenges from competitors.

A future work will be on analysis of methodology influence on ERP solutions in such a way that the future ERP solutions will be simplified, more accessible and easier to use, based on cloud computing, and agile methodology.

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KEY NOTES FOR FRAMEWORK DEVELOPMENT

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Abstract: *This paper presents key notes for framework development, based on practical experience. Framework is a very important aspect of software development. Nowadays there are already lots of frameworks which facilitate software development, and every programmer has a goal to build a framework which will speed up software development. During the years of practical experience in the development of business desktop applications based on relational databases, we have noticed some basic rules which are proposed as key notes for the framework development of this kind. After some theoretical discussion we will give key notes of framework development through an insight into the Oz framework development. The Oz framework generates a three-tier application with incorporated CRUD database operations for the defined problem domain.*

Keywords: *software, software development, framework, software patterns, code generator*

1. INTRODUCTION

Constant growing needs for software products force software development companies to shorten software development process. Most common way to achieve this goal is to use already existing solutions or to build a new framework which will be used in later software development. The main idea is to build reusable software components which can be combined easily.

There are lots of definitions of framework. One of the main reasons for that is a fact that term framework is very wide. The most accepted definition for an object oriented framework is: „a framework is a set of classes that embodies an abstract design for solutions to a family of problems” (**Johnson, 1988**). Another good definition is “a framework is a reusable design of all or part of a system that is represented by a set of abstract classes and the way their instances interact” (M. Mattsson, 1995).

First object oriented framework was developed during 80's. Ever since this is the most common approach used to shorten software development lifecycle.

This paper will present key notes for framework development, using an example of **Oz framework** development. **Oz framework** is made to speed up development of business desktop applications based on **relational model**. In general Oz framework should be used to generate three tier application with incorporated CRUD (create, read, update, delete) operations on underlying relational database for defined domain model. Both, framework and generated applications are implemented using C# programming language.

Paper is organized as follows. Firstly we will give overview of definitions for framework development process. After that we will show development of Oz framework in brief. We will present domain analysis, and framework design phase of framework development. We will give a very short definition of **Framework use**. At the end of the paper we will give final conclusion.

2. FRAMEWORK DEVELOPMENT PROCESS

Lots of authors tried to give an overview of framework development process. For instance Markiewicz and Lucena propose classic framework development which is consisted of domain analysis, design, and framework use (**Markiewicz and Lucena, 2001**). Johnson considers this approach ideal in theory but in practice very inefficient and not payable. Therefore he suggests iterative way of framework development according to which one group of programmers develops framework while other group tries to use it to develop application for specific domain (**Johnson**). We found that Bosch gave proposition of framework development process which is most suitable for development of **Oz framework**. Bosch dismember two

different activities in framework development: development of **framework core** and development of **internal add-ins**. Core exists, unchanged, in every framework instance (every single use of framework) (Bosch et al , 1999). Core is consisted of **frozen spots**, in other words it is consisted of interfaces and classes which are already implemented in framework and as such are used in every framework instance. On the other hand, parts of code that are generated for every concrete application (specific domain model) are **internal add-ins**. In case of Oz framework these classes are generated from relational model. Parts of code which makes code flexible are called **hot spots**. These hot spots in most cases are some abstract classes or methods that must be overridden (Bosch et al , 1999). In order to generate executive code, e.g. concrete desktop application, one must implement application specific code for every **hot spot**. Final application, generated using framework, is consisted of **framework core**, **internal add-ins** and application specific code(implemented hot spots).

All authors have same opinion that use of design patterns is inevitable in framework development. Patterns that are identified as significant in framework development are: (Johnson),(Amatriain)

- Pattern of three examples
- white box
- component library
- Hot spots pattern
- Pluggable objects
- grained objects
- black box
- Visual builder
- Programming language tool

From **Oz framework** definition it is obvious that framework domain is very wide. Therefore, one of main tasks in development of Oz framework is to determine architecture of applications which the framework should generate. The architecture must be reusable and very flexible. Designing object-oriented software is hard, and designing *reusable* object-oriented software is even harder. Design should be specific to the problem at hand but also general enough to address future problems and requirements. You also want to avoid redesign, or at least minimize it “ (Gama, R. Johnson et al, 1995).

3. OZ FRAMEWORK DEVELOPMENT PROCESS

As said before, **Oz framework** should generate **three tier application** which will implement CRUD operations for specific domain. As we said we think that the Bosch's proposition of framework development is most suitable for developing this kind of a framework.

Modified Bosch's method will be used for development of Oz framework. It will have these phases (Bosch et al , 1999):

- **Framework development** which has following sub-phases:
 - **Domain analysis** – in domain analysis, as described in **pattern of three examples**, three applications will be analyzed to determine general architecture of applications that will be generated by Oz framework. Result, at the end of this phase of framework development, will be classes which will consist **framework core** and classes that will consist **internal add-ins**.
 - **Framework design** – Besides framework architecture design, one of most important things during this phase will be to determine all necessary transformations for generating components that are part of **internal add-ins**.
 - **Implementation** – framework will be implemented using C# programming language.
 - **Framework testing** – this phase of software won't be considered in this paper.
 - **Framework documenting** - this is the phase that Bosch didn't isolate, but lot of other researchers point out that this is also very important phase .
- **Framework use**– it will be conducted as case study in chapter 2.5
- **Evolution and maintenance of framework** – further evolution exceeds limits of this paper

Primary objective is to determine architecture of desktop application which will be generated using the framework. It is necessary to reveal which components do not depend on relational model, and as such will

be part of **framework core**. Besides that, it will be necessary to determine components that depend on relational model and to determine transformations which will be done in order to generate them (classes). These generated components will form an **internal add-ins of framework**. In this paper we will present only **domain analysis** and **framework design** phase.

3.1 Domain analysis

In most cases domain is presented by domain model, in particular via relation model, which is most common way for storing data for business applications. In case of **Oz framework** it will be input for code generation. First question relevant in this phase of framework development is **what is the best way to start domain analysis**? Solution that is presented in pattern of three examples, recommends that domain analysis should be based on three specific desktop applications. Because we want to develop framework which will generate business desktop applications based on relation database meta-information, following the pattern of three examples, three specific applications are analyzed to insight similarities and differences in order to do some abstractions.

Software systems that will be analyzed are:

- Application “**Shoe store**” for storehouse management, developed for Mastaco company
- Application “**Admission test**” for organizing admission test, developed as seminar paper for subject “Information system Design”
- Application “**Restaurant**”, for ordering

Objective of this phase is, as said earlier, to define general architecture of business applications which the framework should generate. As main tool for determining which components will be part of the architecture, we have used patterns in their general sense.

3.1.1 Architecture components analysis

In this phase all parts of three tier architecture are analyzed (figure 1). These components were built using generalization of classes from the three specific applications. Perceived concrete classes which were exactly same in every application, were added to **component library**.

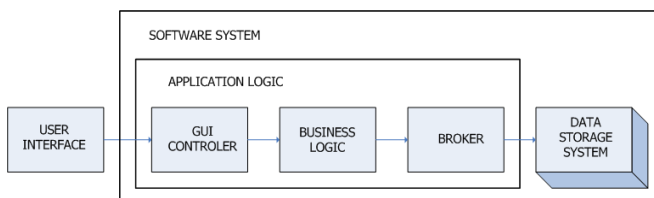


Figure 1. Three tier architecture – components

In case of Oz framework, we have firstly analzed **graphical user interface** (GUI), then **GUI controller**, **business logic** and **database broker** classes for three mentioned applications.

Goal of component analysis is to get interfaces, abstract or general concrete classes for all components in question.

Following the goal we have identified classes that will be part of **framework core** and ones that will be **internal add-ins**.

```

public partial class FGeneral : Form, InterfaceForm
{
    Fields

    Constructors

    #region Events
    public virtual void FGeneral_Load(object sender, EventArgs e) {...}
    public virtual void btnNew_Click(object sender, EventArgs e) {...}
    public virtual void btnSave_Click(object sender, EventArgs e) {...}
    public virtual void btnCancel_Click(object sender, EventArgs e) {...}
    #endregion

    #region Data grid view metode
    public virtual void gridOdo_DoubleClick(object sender, EventArgs e) {...}
    public virtual void gridOdo_KeyUp(object sender, KeyEventArgs e) {...}
    public virtual bool DeleteItem() {...}
    public virtual void ChooseItem(object sender, EventArgs e) {...}
    #endregion

    #region Fields Manipulation
    public virtual void EnableFields() {...}
    public virtual void DisableFields() {...}
    public virtual void text_EnterTab(object sender, System.Windows.Forms.KeyEventArgs e) {...}
    public virtual void SetFokusOnFirstField() {...}
    #endregion
}

```

Figure 2. Code for FGeneral class (method signature)

For instance After conducted analyses of GUI components these are conclusions. A graphic form will be created for every relation (table) from database. In case of dependant objects that form will be available only from parent form (form for “parent” table).

At the end of conducted analysis of GUI particular graphical components and methods that are often called are isolated. On this bases interface, which all forms must implement, and one general class **FGeneral** are created (figure2.).

In order to create concrete form which override abstract methods of **FGeneral**, relational meta data are required. On this findings we can conclude that concrete generated forms will be part of **internal add-ins** while general class **FGeneral** and interface are part of **framework core**. In design phase all necessary transformations should be determined.

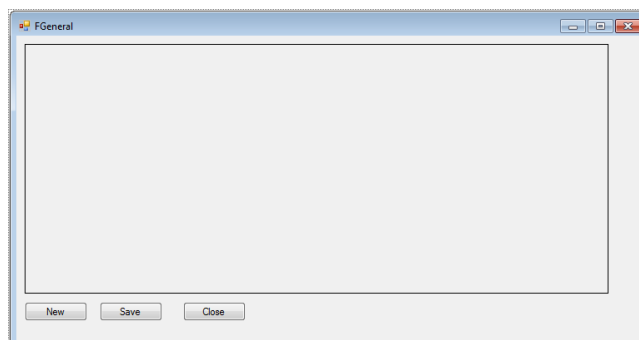


Figure 3. Look of FGeneral form

At the end of analysis one should have general architecture of framework and its instances. We can divide this architecture in two parts

- **framework core** – consisted of classes that will be built unchanged in every generated application
- **internal add-ins** – classes that depend on metadata of relations and as such will be generated by Oz framework

In case of the Oz framework, framework core is consisted of:

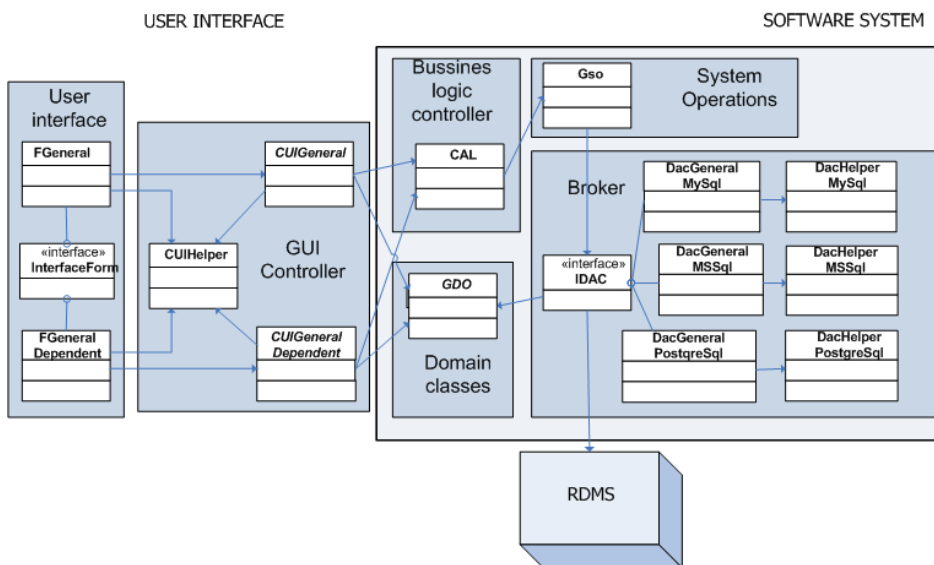


Figure 4. Framework core architecture

According to this, an instance of Oz framework (generated application) will have this architecture. Classes that are painted in orange are part of **framework core**, and those that are painted with green color are part of **internal add-ins**.

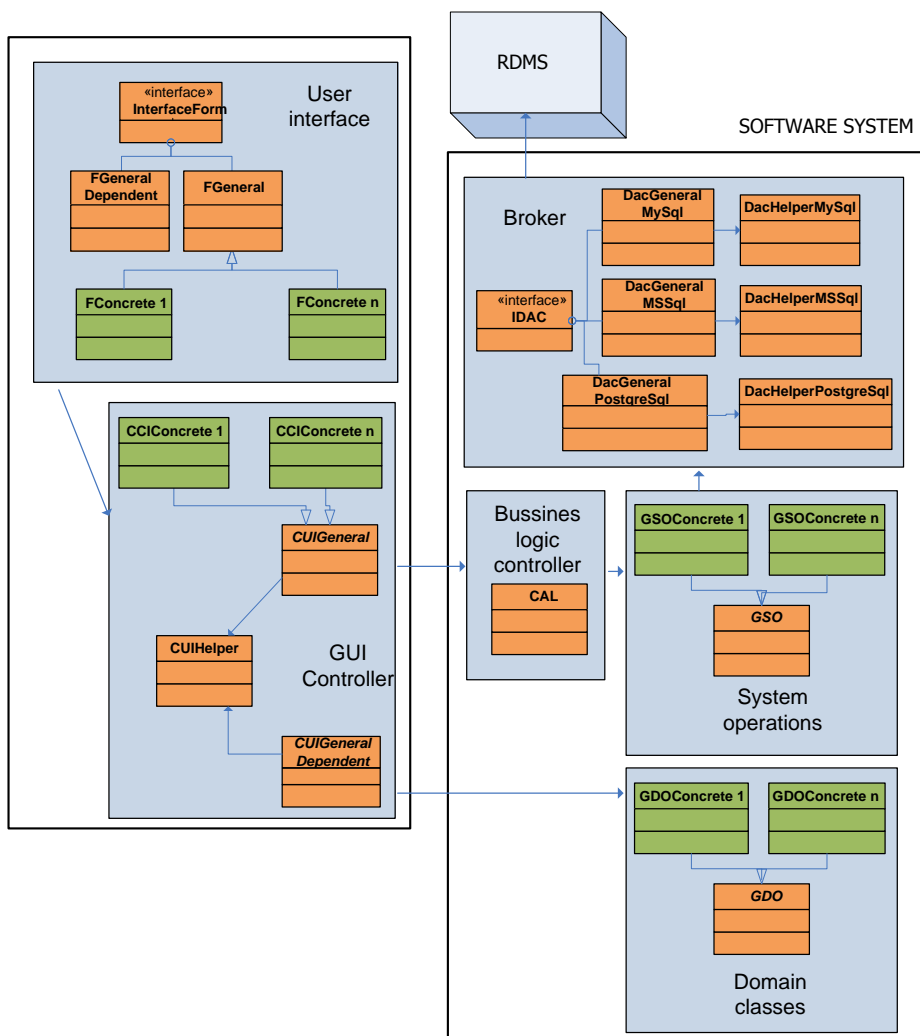


Figure 5. Relation between framework core and internal add-ins classes.

3.1.2 Framework design

The objective with this activity is to end up with a flexible framework. The activity is effort consuming since it is difficult to find the right abstractions and identify the stable and variable parts of the framework, which often results in a number of design iterations. To improve the extensibility and flexibility of the framework to meet the future instantiation needs, design patterns may be used. The resulting framework can be a white-box, black-box or visual builder framework depending on the domain, effort available and intended users of the framework.

One should base framework design on grounds of previous phase. The key contributions of previous phase is separation of classes that are part of **framework core** from those that make framework **internal add-ins**. Abstract classes and interfaces that makes framework core are usually organized as **component library**.

Next step in this stage of framework development is to determine whether there is a way to define a **code generator** for classes which will be part of **internal add-ins** in every framework instance, although this can be done manually in every framework instantiation. Thought this is in a way already done in previous stage of framework development here one should determine and design all necessary transformations which will be used during code generation. There are lots of tools, like FreeMarker, Apache Jakarta Velocity etc., which can be helpful for code generator development. Code generator can be observed as a kind of application, therefore it can be created using any of existing software development methods. One of key differences from classic software development is inputs e.g. domain. As mentioned before **database meta-data** will be inputs for this application. In a raw framework there will be just a few additional data that user of a framework have to provide. One can call this as framework fine tuning.

One of conclusion that can be made in this point is that there is no strict line between domain analysis and framework design phase. This is reason why some authors do not point out domain analysis as a phase of framework development.

One can use various techniques and method for framework design. For instance some of agile methods can be suitable for framework design.

3.2 Framework use

Framework development process is iterative and incremental. In every framework use user will see all good and bad sides of framework and this will be starting point for next increment. In most cases user will have to provide additional information during or after framework instantiation.

During the use e.g. test of generated application user should determine potential **hot spots** which can be made in next increment of framework development.

4. CONCLUSION

Objective of this paper was to show guidelines for development of framework which is used for generation of three tier desktop applications based on relational metadata. After brief introduction and presentation of various framework definitions, **patterns** that are widely used in framework development were identified. Most widely used patterns are **pattern of three examples, white box, component library, hot spots, pluggable objects**.

Proposed framework development process is based on Bosch's method for framework development, which is consisted of **Domain analysis, Framework design, Implementation, Framework testing** phases.

In **domain analysis** authors suggest that one should use **pattern of three examples**, especially for type of framework in question. Objective of this phase is to do abstractions in order to get classes that will be unchanged in every generated application and those which will differ depending on specific domain model. This should be done using **software patterns**. On the example Oz framework authors has given guidelines how the component of three tier application should be analyzed and all necessary abstractions are done. As a result of analysis components that are part of **framework core (application frame)** (they are same in every generated application) and those that depends on relational metadata and as such are part of **internal add-ins** should be identified.

Framework design, should be conducted on grounds of previous phase and there is not a clear line that divides this two phases of framework development. In this phase one should determine how to organise the framework and to design code generator transformations, if needed.

As we said Framework development is iterative. Therefore **framework use** is just an input for a new increment.

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IDENTITY MANAGEMENT – A SURVEY

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Abstract: *This paper presents our approach to the identity and access management system with respect to authentication method. After defining basic concepts of such system, like identity, digital identity, service provider, identity provider, paradigms of identity providers, multilateral security, the paper offers an analysis of identity and access management systems usage. Furthermore, an overview of different technologies and standards is given. We have also done a survey on brand name identity management solutions. Downsides of proprietary brand-name solutions are described, and an alternative, open-source based architectural approach is presented. Small to medium size organizations can especially benefit from this alternative approach.*

Keywords: *identity management, system architecture, open-source, privacy, authentication*

1. INTRODUCTION

The rise of network-based, automated services has brought some fundamental changes in every organization's activities. One of the most important changes that have occurred was the change in the way the business companies offered their products to customers. The business processes have become increasingly automated. As a result, the way in which customers create trust relationships with service providers has changed, because business transactions are conducted online. Traditional ways of establishing trust relationships between negotiating parties are no more applicable, when customers purchase or use services delivered to them electronically on their computer. Windley (2005) points out that the usual trust marks that customers have relied on in the past are either missing or easily forged. Moreover, in addition to changes in relationship between business companies and their customers, the whole business processes have become automated. The relationships with partners, suppliers, and employees have moved to electronic world. This leads to increased risk of attacks such as identity theft and identity disclosure. Therefore, digital identity management needs to be properly implemented in order to elevate overall business process security.

Digital identity as concept has application in many areas, not only in business. Al Khouri (2012) states that "the last few years have witnessed the evolution of the digital identities or so called e-Identities by various Governments across the world." According to United Nations E-Government Survey (2012), South Korea holds the first place in implementing digital IDs and national ID based commercial transactions. Second place is shared by Nederland, United Kingdom and Denmark, while the United States, Canada, France, Norway, Singapore and Sweden follow closely behind. Moreover, smart cards and biometrics are frequently used for border control and national IDs. For example, visitors to US have to pass through US-VISIT programme, have their fingerprints scanned, and photos taken. South Korea national IDs use smart card technology, and it is possible to conduct digital ID-based transactions, with identity validated and verified by the government. Identity management system with iris recognition as authentication method is used in UAE for border control.

Identity management is an asset of essential value for all of real-world activities and systems described above. There are many different requirements that described systems have to fulfil, such as single sign on capability, or strict confidentiality for personal data. Only one thing here is sure, it is very hard to find a business area or government activity, where identity management is not at least of some importance.

2. IDENTITY

One of the main concepts and terms in identity and access management systems is identity. Question is what is actually identity in the aspect of digital technology. Identification actually establishes unique digital identities. There is a lot of definitions, but we can say that identity is something what describes individual

person with set of attributes. Identity is the representation of user entity which should be provided to applications and services. There is the distinct character or personality of an individual. Identity can be used by applications and services to differ users from each other and provide different privileges to different users (V.Bertocci et al. ,2008).

The identity of a person include a lot of personal data with respect to individuals. The person includes all subsets of an identity. Some of these “partial identities” solely identify the person, who may be represented by different partial identities. An identity management system provides the tools for managing these partial identities in the digital world.

Authentication associates an individual with a unique identity. Providing evidence for the association is essential to this. Authorisation is enforcing what services the subject is entitled to access. Identity Provider is responsible for the processes associated with giving subject some role, establishing and maintaining the electronic identity (Senk, C. &Dotzler, F. ,2011).

3. IDENTITY MANAGEMENT

The only way to control identity is by identity management. That is the system and framework used in computer or communication systems and it is an integrated system of business processes, policies and technologies. That kind of system enables organizations to facilitate and control user access to online applications and resources while protecting confidential personal and business information from some types of attacks. These systems can be very vulnerable, so it is important to protect them with all level of security. Identity authentication, authorization management, access control, and operation audit are based on digital identity and there is set of policies, methods and rules for that (Elliot,J., Ford,M. &Birch,D. ,2011).

Basic concepts of identity management are user, service provider and identity provider. User must have a legal identity if he wants to use services. Service provider has to make available services to the user. Identity provider offers different trust level to different type of user. He has two functions. One of them is to implement services for users like user registration, verification reality of user identity and user identity storage. Service provider and user send requests for authentication to identity provider who must process those requests. User is the client of service provider and also identity provider.

According to all of this explanation identity provider types are:

- Credential Identity Service,
- Identifier Identity Service,
- Attribute Identity Service and
- Pattern Identity Service.

Paradigms of IdM (identity management)are:

- Network Centric,
- Service Centric and
- User Centric.

Network centric paradigm happens at the first stage of growth of IdM technology. Here is single entity for all community and user, and it is not user-related or service-related paradigm. Creation of identity and some other operations doesn't have connections with access. (McCusker,J.P., Lebo,T., Chang,C., Silva,P.P. & McGuinness,D. 2012). At service centric paradigm, there are different access control level of trust and security. It is made of services from different service provider, which are located across multiple domains. User is the center of everything at user centric paradigm. Actually, user is find his place between identity provider and service provider, as he can make decision whether or not to share identities with some trusted thirds parties. OpenID, Windows CardSpace, and Lightweight Identity (LID), Simple Extensible Identity Protocol (SXIP), Higgins are examples for this kind of paradigm.

Three models of IdM (comparision shown on Table 1.) which are most important and we must pay attention on them are:

- Isolated Model,
- Centralized Model and
- Federated Model.

At isolated model, there is single server at one level, which is at the same time service provider and identity provider. That single server play role of identity storage and user operations by himself. Service provider can do identity allocation, deletion, modification, authentication and authorization.

Functions of service provider and identity provider are divide at centralized model. User identity storage and user authentication here are implemented in the same servers-identity provider. PKI, Kerberos, and CAS are examples for this model.

Federated model make a global inimitable domain virtually. He actually connects different domains together. When a user is authenticated to one service provider, he is also identified and authenticated with all the other service providers (García,S.S., Gómez,O.A. & Pérez E.B. 2012). Federated Identity Management lets computer systems distribute identity information and tasks across security domains. Here is realized single sign on (SSO). It means that they can authenticate once and then get access to protected resources in many places, without need to re-authenticate.

Table 4. Comparison of these three models (Yuan Cao, 2010)

Model	SP Type	IdP Type	Service Composition	Cross Domain Access	Identity Storage	User Control over Identity	Privacy Protection
Isolated	Single SP and IdP, SP is IdP	Single IdP and SP, IdP is SP	Sole service	No support	On SP	No control	Few and very weak protection
Centralized	Multi SPs	Single IdP	Multi services but in the same domain	Limited support	On IdP	Few control	Much but weak protection
Federated	Multi SPs	Multi IdPs	Multi services form multi domains	Nearly fully support	On both SPs and IdPs	Much control	Much and strong protection

Also, an important concept connected to identity management is multilateral security. That means that is necessary to supply security mechanisms to all parties who are involved in communication, first of all, we mean on the basic concept of identity management. Pfitzman introduces a classification of technologies for multilateral security according to the number of cooperating parties at runtime. He make difference between unilateral (encryption of local storage media), bilateral (cryptography to achieve confidentiality-one of the main concept of security trial CIA, of communication content), trilateral (PKI-Public key infrastructure) and multilateral technologies (mechanisms which provide anonymity with regard to communication), (Pfitzman, A., 2001).

4. ANALYSIS OF IDENTITY AND ACCESS MANAGEMENT (IAM) SYSTEMS USAGE

Improving agreement, reducing risk and increasing business value are the main holders for identity and access management projects. The greatest use of this drivers are in the sector of Financial Services and the Information, Communication & Entertainment sector. The Infrastructure, Government and Healthcare sector is least concerned with improving compliance and reducing risk. This is the result of survey conducted by KPMG IT advisory with Everett Supported.

The best way to authenticate someone is using two factors authentications. Actually, authentication mechanisms can be classified in three way: someone knows something, someone has something and someone is something. According to that, survey of different authentication methods usage frequency is shown on Figure 1. Username and password is an authentication mechanism that was reported by all researches who were involved in this survey. Tokens are also popular with more than 50% of the researchers. Smartcards or other certificate-based mechanisms scored 35%. RFID and biometrics were both reported at around 12%, Hermans,J. & Valkenburg,P. (2009).

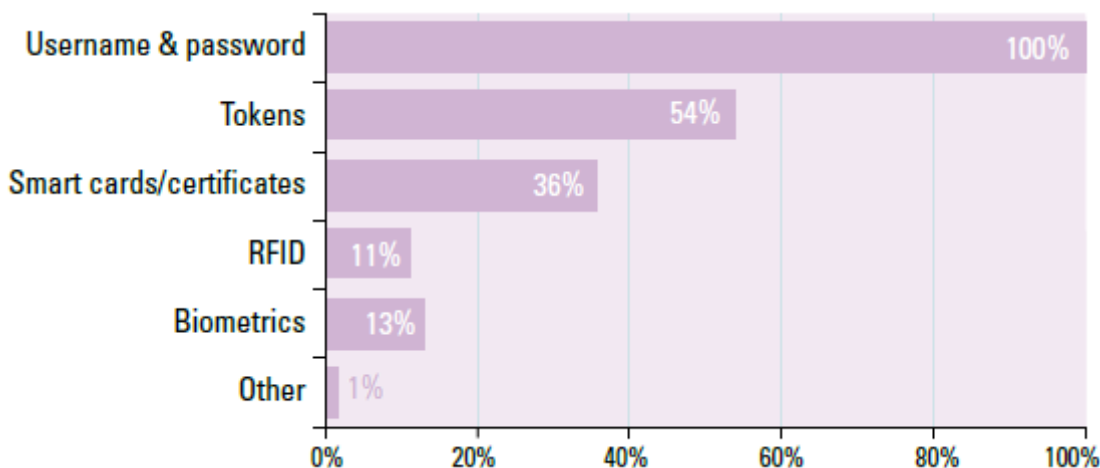


Figure 6. Authentication methods (Hermans,J. & Valkenburg,P., 2009)

Very important aspect in modeling system of identity management is their architecture and technology (Barisch,M. ,2011). On Figure 2, it is possible to see popularity of different architectural approaches. According to the respondents which were involved in this survey, central authorizations management is the most important principle for defining their organization's IAM need (39%). When organizations are selecting their required IAM solution, a large amount acquire the solution of their preferred supplier and only 18% perform a vendor selection in order to select a 'best of breed' solution.

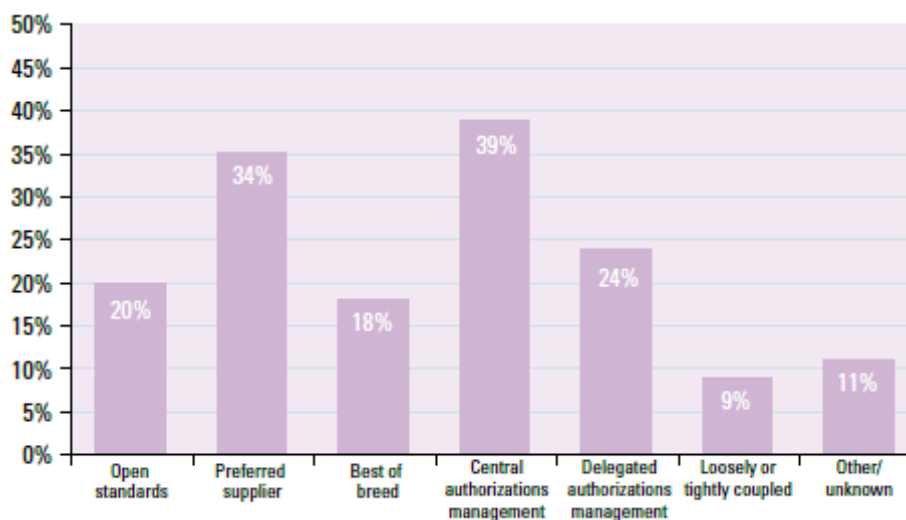


Figure 7. Architectural principles for IAM (Hermans,J. & Valkenburg,P., 2009)

5. BRAND NAME IDENTITY MANAGEMENT SOLUTIONS

Many brand name solutions are available in the market. Potential customers can choose between various vendors and solutions, such as Novell Identity Manager, IBM Tivoli Identity Manager, Microsoft Forefront Identify Manager, etc. At first glance, each of these solutions seems to satisfy every need an organization might have. All of them claim to provide automation of all organization's identity management tasks, such as enterprise-wide identity integration, user provisioning and deprovisioning, auditing and reporting capabilities, seamless integration, and many more.

However, brand name solutions seem to have some downsides. As first, they have many different features included. Although this could be seen as their advantage, in a lot of cases it is not. The reason is simple, the more complex the solution is, the higher is its price. Sometimes the functionality gap to the simplest system that meets requirements is quite bridgeable, and it is better for potential customers to role out their own implementation, using open source components and in-house development. Moreover, there is the issue of interoperability. Sometimes, there are proprietary hooks implemented into software, instead of using open protocols. Also, complex proprietary solutions can be hard to understand and maintain.

Still, many organizations prefer using off-the-shelf products. When organisations apply this typically “corporate” approach to sourcing an IAM solution, they usually overlook six 'C's, problems that are common to all brand name identity management solutions alternatives (Prasad&Rajbhandari 2011):

- **Conceptual Subtlety** - A suggestion that effective system integration can be achieved through appropriate data and protocol design is often unconvincing, and people are generally more impressed by solutions that take care of everything.
- **Centralised Model of Design** - A prestigious (and expensive) IAM product is expected to comprehensively manage user data by itself, because its purchase cannot otherwise be justified. This leads to numerous problems.
- **Commoditised Functionality** – Many open source solutions deliver same functionalities as the proprietary solution, and are equally robust and reliable.
- **Complexity of Features** - Some functions and data structures seem common to most organisations, but the generic implementations provided by major IAM products tend to be more complex than an average organizations requirements.
- **Custom Requirements** - Not all specialised requirements can be met by simple configuration settings on a generic product. Because of this, some customization is required, and this leads to additional expenses and difficulties.
- **Closed Interfaces** - The components of many brand-name products are often described as “tightly integrated”. Practically it means that they are designed to be used with components from the same vendor.

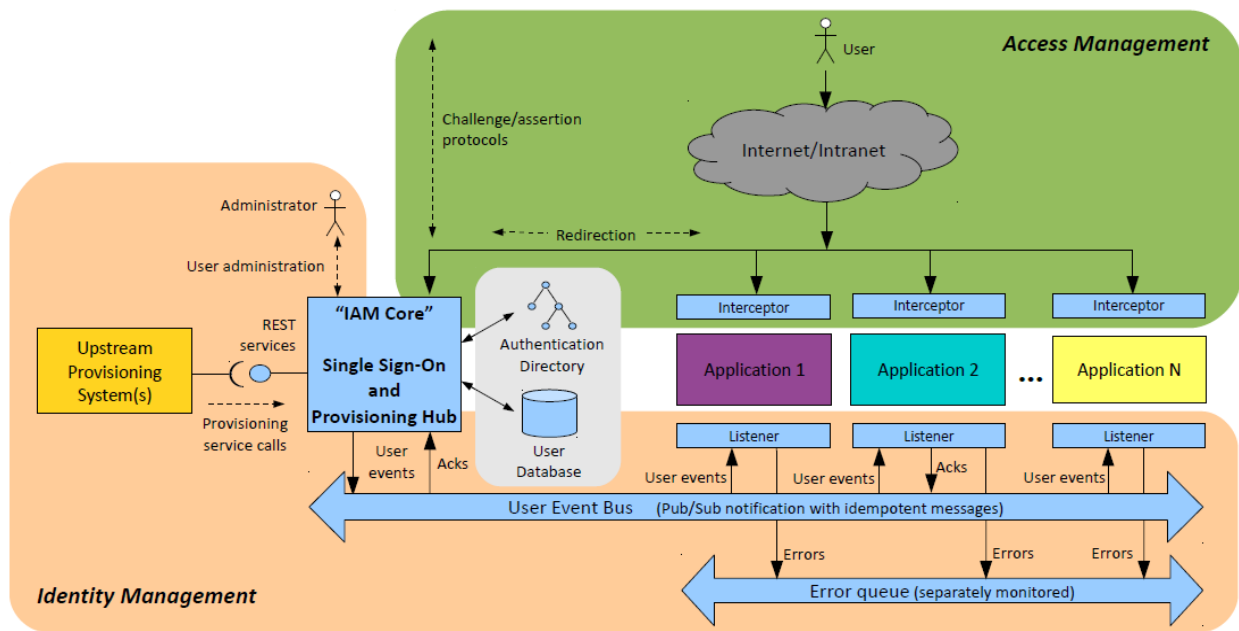
In order to implement a truly service oriented architecture, “loose coupling”, not “tight integration” should be the desired goal. It is possible to overcome these six 'C's by implementing a system based on “Loosely-coupled Identity Management Architecture” (Prasad&Rajbhandari 2011). This approach is different from brand-name vendor products because it imposes loose coupling instead of tight integration. Functions are decoupled, and only bare minimum of functional dependencies are retained. In other words, it is easy bind components together, and there are no limitations imposed. Also, appropriate data design also plays important part in such “loose coupling” scheme. Sometimes, if data is properly managed, there is no need for physical component to act as decoupling intermediary. Therefore, the system architecture is simpler, and it is easier to avoid unnecessary centralization. As a result, it is possible to develop a highly customized identity management system based on open-source components using this architectural approach.

6. IDENTITY MANAGEMENT SYSTEM ARCHITECTURE

Figure 3. illustrates logical components of “Loosely-Coupled Identity Management Architecture”. In order to preserve clarity, only a brief overview of various architecture components and principles is given.

The interceptor is a component that is placed in front of an application. It is used for redirecting access to the Single Sign On server. It may also perform the access control (authorisation) function based on the user identity and any other user attributes sent back by the SSO server. Such interceptor implementation allows application to be completely unaware of IAM authentication and authorization functions.. Prasad&Rajbhandari (2011) point out that “A specialised interceptor component not only relieves the application from having to implement these aspects of security, it can be treated as part of the enterprise security framework and is also a more easily auditable control point”. There are many possible choices for the interceptor implementation, for example a Java servlet, or an authenticating reverse proxy that is common to a group of applications.

This system architecture allows system to implement either centralized or federated identity management. There are several possible choices for Single Sign-On Access Management solution. Shibboleth is a good choice for a federated identity solution. JASIG's Central Authentication Service can be used for centralized systems. It is a ticket-based Single Sign-On system based on the Kerberos architecture but specially tuned for web applications. Both of these are Open Source, which means there are no licence fees, but more importantly, that there are no hidden hooks or dependencies.



All IAM components are in light blue:

Figure 8. Logical Components of an Identity Management System (Prasad&Rajbhandari, 2011)

IAM communication with upstream systems is based on standard synchronous request/response paradigm. However, the interaction between IAM and downstream systems needs to be asynchronous and loosely-coupled for maximum flexibility. These aspects are described below.

An observer pattern is used to propagate user events to systems “downstream” of IAM. Multiple systems that maintain local copies of user data need to be notified when there are changes to user data (adds, updates and deletes). To receive such notifications, they have to subscribe to IAM. Such a publish/subscribe model is easily implemented through a “bus” mechanism. IAM publishes user events on the “User Event Bus” and systems subscribing to these events receive such messages and make updates to their local data accordingly. After notification, downstream systems process the event. If the processing is successful, there should be no response, just like in Unix environment. Where notification is unavoidable, a simple acknowledgement event on the same bus is used. Error handling is logically separated from the user administration function. All errors are logged to a separately monitored “Error queue”.

User administration functions are exposed as simple REST services. There are two types of “upstream” applications that will invoke the REST services exposed by IAM, in addition to any business applications that may need direct access to user data. The first is a Human Resources type system, which is the authoritative source for adding new employees, and removing those who don’t work for company anymore. The second is a resource management system that is used to grant and revoke user access to various business applications. IAM’s own Access Management capability can be used to restrict control to these HTTP-based services

IAM performs only coarse-grained role-based access control. Fine-grained access control is applied by the business applications, while IAM supplies them only with necessary user attributes. Such delegation of duties enables IAM not to take care about requirements of every application in the system. In their work, Prasad&Rajbhandari (2011) have concluded that “Fine-grained access control by IAM is a largely infeasible task, and allowing it to be part of IAM is not a very wise solution”.

Both authentication directory (LDAP) and a relational database should be used. Authentication credentials are stored in LDAP directory using simplest possible tree structure. All other user attributes are stored in the relational database. The database design will be unique and specific for every organisation. User UUID (Universally Unique ID) is used for mapping between user record in the directory and corresponding record in the relational database. Universally Unique IDs (UUIDs) are extremely large numbers that are randomly generated, and virtually guaranteed never to collide, because their range of values is extremely large. A globally unique User UUID is used to associate multiple system accounts (application-specific user

IDs) across different systems, including the IAM directory and database. A single Person UUID is used to associate multiple user UUIDs.

7. CONCLUSION

In this paper, we have presented an overview of different basic concepts related to identity management. The definitions of identity and identity management were given and different existing models and paradigms of identity management have been explained. We have provided data from surveys that show identity management systems usage trends. In general, from different surveys, articles and commercial products it is possible to conclude that identity management is a very important issue for any type of organization.

Also, we have shown that an alternative to proprietary brand-name products exists. Using open source components, it is possible to develop a fully functional identity and access management system. It is very important to emphasize here that using “Loosely-Coupled Identity Management Architecture” does not implicate any security compromises. Although brand name companies solutions comply with various security principles and standards that need to be followed in such obviously risk-sensitive area, after deployment they also require auditing, in order to be sure that there are no security shortcomings. Therefore, there is no exemption from this procedure for organizations that implement an off-the-shelf product, as opposed to an in-house build.

Identity and access management solution based on open source can save organization a substantial amount of funds. This is especially significant for small to medium size organizations, because in most cases their needs are relatively simple but specific. It is difficult for big vendors to precisely predict needs of such companies, so their systems usually require additional customization. This paper can help different organizations to evaluate their needs for identity and access management, and consider opposing alternatives.

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REQUIRED RESOURCES FOR DOCUMENT MANAGEMENT SYSTEM REPOSITORIES

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Abstract: *This paper briefly presents resources that need to be allocated in the establishment of the document management system in business organization. The resources needed are planned based on real business environment parameters in which a document management system is to be established. The paper describes the way of planning software and hardware resources for establishing an enterprise document management system with the calculation of necessary communication resources for content replication between two repositories. Calculations are performed for two cases in which objects replication times are different. Based on well-defined parameters of a real business environment and projections on document management system usage it is possible to predict optimal software, hardware and communication resources required to establish the projected system.*

Keywords: *document management system, distributed repositories, replication, content replication, resources, resources calculating*

1. INTRODUCTION

Document management system provides a systematic solution for entering, organizing, managing and storing content within the business environment. Using such a system, unstructured information can be managed in accordance with predefined business rules, policies and procedures; connections between content areas are established giving possibility to use the same information in different contexts. (Milenkovic, 2006)

Content generated from document management system is stored in repositories¹. Repositories are connected in distributed systems within a computer network, while maintaining consistency of data between them is achieved by data replication.

During the design of business document management system necessary resources must be kept in mind. Resources are defined and calculated based on requirements that describe projected system. Basic requirements for document management system design are: the number of system users, the number of repositories, repository organization model, spatial repository distribution and number of repository objects that system will operate with.

Based on identified demands, use of appropriate software, hardware and communication resources is planned in order to establish a document management system, including data repositories and data replication.

2. MODELS OF DISTRIBUTED DOCUMENT MANAGEMENT SYSTEM REPOSITORIES WITH CONTENT REPLICATION

Usual content repositories organization model in large business systems is a system of two or more distributed repositories with replication (Figure 1). This model is based on objects replication between starting and destination repository. Document management system repository object includes documents stored in their original format and documents metadata (those data describe the documents such as keywords, owner, version, links, creation date, etc.) (Hodge, 2001). Additional document management system configuration defines which objects will be replicated and how often, furthermore, all replicated objects are clearly marked in order to identify them as replicas. Distribution is done by pre-defined business rules or in response to user requests.

¹Repository is a central place in which an aggregation of data is kept and maintained in an organized way, usually in computer storage. (ORACLE, 1998)

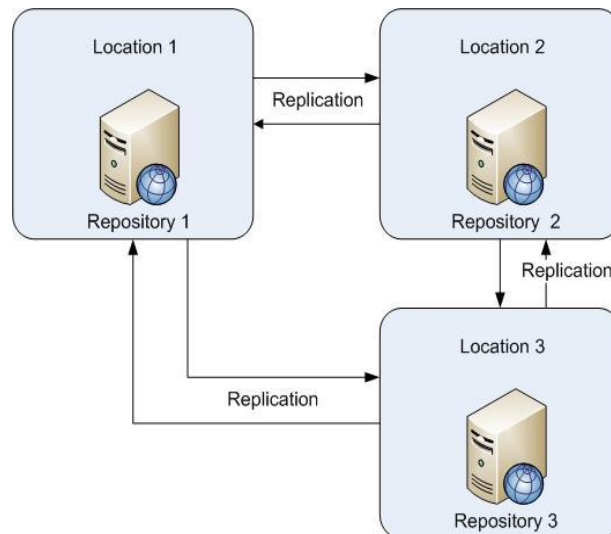


Figure 9: Conceptual model of distributed repositories with content replication (Milenkovic, Jovanovic Milenkovic & Pejanovic, 2012)

Another frequently used content repositories organization model is a system of distributed repositories with the content replication organized into a federation (Figure 2). This model is also based on objects replication, but it provides a higher level of automation in the content replication management.

This type of system declares one repository as the federation leader. Other repositories are considered members of the federation. After such a model configuration, every change on document management system users, access rights, or any other administrative changes may automatically reflect all member states of the federation, according to the system parameter settings.

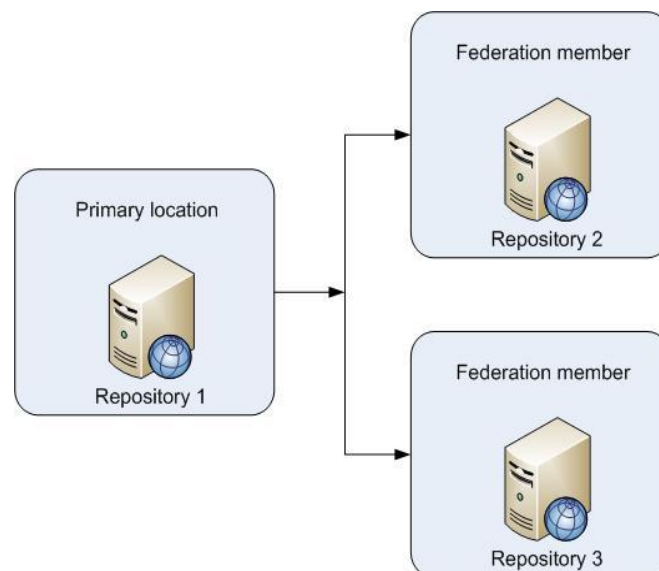


Figure 2: Conceptual model of distributed repositories with content replication – federation organization (Milenkovic, Jovanovic Milenkovic & Pejanovic, 2012)

3. REQUIRED RESOURCES FOR DOCUMENT MANAGEMENT SYSTEM

Resources needed for document management system establishment can be categorized into three groups:

- software resources,
- hardware resources and
- communication resources.

Software resources

Common document management system software resources are software licenses for:

- Content management server. Content management server is a software solution that provides a central repository storage, management and retrieval of all types of content (EMC, 2012) (text, graphics, hyperlinks, multimedia files).
- Database server. Database server provides a standard infrastructure for content management and all transactional operations in relational databases.
- Applications server. Applications server provides mechanisms for content organizing, controlling and delivering to and from repository.
- Client. Client licenses are kind of software that is installed on the client. Client may be thick or thin, depending on functional, system and infrastructure requirements.
- Input management services allow the incoming data translation into business-ready content and optimize the information flow across business organization, thus enabling faster access to the mission-critical information needed. (EMC, 2012)
- Other additional services. Licenses for other services providing advanced functionality of document management system solution (electronic signatures, security mechanisms, etc.).

Table 1 presents listing of measure units with specifications which determine the way of licensing for document management system (DMS).

Table 5: DMS licensing measure units specification (EMC, 2012)

Measure units	Sign	Explanation
Central Processing Unit (CPU)	Per CPU	Maximum number of CPUs that software can be installed on.
Concurrent connections/seats	CNC	Maximum number of users able to simultaneously use software.
Pages Per Year	PPY	Maximum number of pages that can be processed by a server within a year. This kind of licensing is used for sizing Input Management servers.
Seat/User	ST/USR	Maximum number of users who are authorized to use the software, regardless of whether those users are actively using the software at any point of time. This kind of licensing is most often used for client applications.
Server	SVR	Maximum number of physical servers on which user can install and use DMS.

Hardware resources

Hardware resources for document management system functioning are expressed by following elements: number of CPUs, RAM and HDD size for each server and storage² resources. Table 2 presents usual hardware resources for document management system server.

²Place where data are held in an electromagnetic form for access by a computer processor. (ORACLE, 2010)

Table 6: Display DMS servers hardware resources (EMC, 2012)

	Server	CPU	RAM	HDD
				System partition
1.	Content management server	1 x Core2Duo Intel Xeon	8GB	50GB
2.	Database server	1 x Core2Duo Intel Xeon	6GB	50GB
3.	Application server	1 x Core2Duo Intel Xeon	4GB	50GB
4.	Imaging server and Scan server	2 x Core2Duo Intel Xeon	4GB	100GB
5.	Index server	1 x Core2Duo Intel Xeon	4GB	50GB
6.	Content cash server	-	2GB	10GB

Reported values in Table 2 may vary depending on size of designed document management system. For items 1, 2 and 5 it is necessary to provide space on storage system to store content, database, and index data, respectively.

To determine required document management system storage space (S_s) following expressions are used (EMC, 2012):

For database server (DBs), for each document and each version saved 10 KB of additional memory space is required:

$$S_s(DBs) = 10KB \times verNum \times docNum \quad (1)$$

For content management server (CMs), for each document we need to plan resources for document versioning (V), rendition (R), Full text indexing (Ft) and additional 2.5 KB of memory space for each version saved in repository (Ad):

$$V = docSize \times verNum \quad (2.1)$$

$$R = rendSize \times verNum \quad (2.2)$$

$$Ft = 0.3 \times docSize \times verNum \quad (2.3)$$

$$Ad = 2.5KB \times verNum \quad (2.4)$$

$$S_s(CMs) = (V + R + Ft + Ad) \times docNum \quad (2)$$

For Index server (Is), for each document version we need to plan additional storage space sized as 20% of document size:

$$S_s(Is) = docSize \times verNum \times 0.2 \quad (3)$$

Variables used in expressions above are as follows:

- verNum – number of document versions,
- docNum – total number of documents,
- docSize – document size,
- rendSize – document rendition size

Important point to consider during storage system dimensioning is the content storage time because after that period of time storage space used will be cleared.

Communications resources

Document management system functioning is based on standard protocols, both in intranet and internet communication. To perform data transfer operations between document management system entities, minimum required bandwidth of communication channel is 56 Kbps (EMC, 2012). It is understood that the higher communication channel bandwidth provides better system performance.

For optimum document management system operation (execution of operations over content repository: management, storage, distribution, caching, replication) recommended communication links bandwidth are shown in Table 3.

Table 7: Possible communication links and recommended bandwidth overview (EMC, 2012)

Link	Bandwidth
Content management server<->Database server	1 Gbps
Content management server<-> Application server	
Content management server<-> Indexing server	
Imaging Server <->Content management server	>=100 Mbps
Client workstation <-> Application server	>=128 Kbps ³
Client workstation <-> Content cash server	
Administrator workstation <->Content management server	>=128 Kbps
Client workstation <-> Imaging server	>=10 Mbps ⁴

4. EXAMPLE OF COMMUNICATION RESOURCES CALCULATION FOR SYNCHRONIZED CONTENT REPLICATION BETWEEN REPOSITORIES

In document management system with distributed repositories and content replication, the most important replication parameters are:

- Amount of objects that are replicated (for example, 5 objects with 2 MB size replicate faster than 10 objects with 1 MB size; the second option is much more frequent in practice).
- Number of replicated objects renditions. Rendition is a term describing the electronic representation of documents in document management system in a different format than the original (Matthew, 2003). For example, one document in Word format can have its representation (rendition) in PDF format in accordance with document life cycle.
- Size of the metadata per object that is replicated. Metadata are "data about object", describing the contents and their characteristics (Hudec & Büchler, 2011). Average metadata size is 2 KB per object.
- Replication time is the time for which the document should be replicated in other repository.

In practice, other, hidden, parameters affecting the network bandwidth should also be predicted. Those parameters are (Matthew, 2003):

- Latency which, in computer networks context, represents synonym for delay. Latency represents the time required to transfer the data package from one network location to another. (Usual value of this delay is around 20% of total time).
- Ethernet protocol overhead. As throughput (bandwidth) is the actual amount of data that is transmitted through network per time, overhead covers conditions that must be met in the transfer. Network transfer protocol is an example of overhead. Message sent will be accompanied by additional protocol information (protocol overhead). This additional information will occupy part of the link capacity and thus affect overhead. In practice, a maximum of 55% of bandwidth is being used to transfer content.
- Communication overhead (average value is 8%)

Communication resources calculation for synchronized content replication between repositories is done using following document management system repository parameters:

- there are two document management system repositories with content replication system
- each repository is accessed by 500 system users
- in average each user creates a new document / version⁵ within working hours (working time is 8 hours), this means a total of 1000 new documents / versions for a period of 8 hours, 125 documents per hour or 2.08 documents / versions per minute

³Recommendations for network connections speed between client computers and application servers depend on the number of simultaneously active users. For 10 concurrent connections, bandwidth may be less than 2Mbps, but it is recommended to have more than 256 Kbps.

⁴Recommendations for network connections speed between client computers (scan stations) and Imaging Server depend on the number of scan stations and number of scanned pages.

⁵Versioning is automated process that creates a historical record of the document. (EMC, 2012).

- replication is done in both directions (full duplex), and each document has one rendition
- in average document size is 1 MB
- the most common case in practice is that documents do not create linearly in working time. Usually, the first 20% of documents are created in the beginning of working day, 30% at the middle and 50% at the end of working day.

Based on given parameters below are calculations of communication resources for two cases of synchronous content replication between two repositories, with replication periods of 60 seconds in first case and 6 hours in second case.

Case one: synchronization period is 60 seconds

Network bandwidth is calculated according to greatest overhead time (at the end of working day, when 50% of documents are created), so it is necessary to cover a peak of 500 documents / versions per hour or 8.33 per minute. Because of simplicity, we will replicate 10 documents in one minute.

In average, 10 documents (with size of 1 MB) are replicated per minute (full duplex, 5 in one direction and 5 in another direction) with one rendition (0.5 MB in size) for each document. Therefore, the network must transport 0.125 MB of data every second, and that is 1 Mbps of network capacity. However, this is "theoretical" maximum.

In this case, latency is 12 seconds (20% of 60 seconds), so, in order to compensate for it, 7.5 MB of data have to be transferred in 48 seconds. Hence, the capacity of communication link must be:

$$\frac{7.5MB}{48sec} = 0.15625MBps = 1.5Mbps \quad (4)$$

When expand calculation with Ethernet/packet overhead of 45%, required network capacity is increased to 2.175 Mbps:

$$1.5Mbps \times \frac{100 + 45}{100} = 2.175Mbps \quad (5)$$

Additional 8% should be added to the communication overhead, therefore link bandwidth required for content replication between the two repositories, where the objects replication period is 60 seconds, is 2.35 Mbps:

$$2.175Mbps \times \frac{100 + 8}{100} = 2.35Mbps \quad (6)$$

Case two: synchronization period is 6 hours

In total, by the end of the working day 1000 documents / versions are created and have to be replicated within 6 hours, but no later than next working day starts. That gives us a total of 150 MB of data (1000 documents / versions of 1 MB size and the 1000 renditions of 0.5 MB size).

Provided that replication line is Full duplex, 500 documents will be replicated in one direction, which means that 75 MB should be replicated within 21 600 seconds (6 hours). So, required communication bandwidth is:

$$\frac{75MB}{21600sec} = 0.0035MBps = 0.028Mbps = 28Kbps \quad (7)$$

Including latency of 20%, an additional 4320 seconds must be compensated. This means that 75 MB must be replicated within 17 280 seconds. This is the speed of

$$\frac{75MB}{17280sec} = 0.00435MBps \approx 56Kbps \quad (8)$$

At this value it is necessary to add Ethernet / packet overhead of 45%

$$56Kbps \times \frac{100 + 45}{100} = 81Kbps \quad (9)$$

and 8% of communications overhead

$$81Kbps \times \frac{100 + 8}{100} \approx 87.5Kbps \quad (10)$$

So, for the content replication between two repositories, where the objects replication period is 6 hours, required link bandwidth is approximately equal to ISDN connections with bandwidth of 128 Kbps.

In this case it is necessary to add metadata calculation (approximately 2 KB per document).

6. CONCLUSION

Before establishment of enterprise document management system, it is important to make proper sizing of the system. That includes sizing number of users, number of repositories, their organization model and approximate amount of content that the system will manage.

Only on basis of system predetermined dimensions, it is possible to calculate required software, hardware and communication resources. This allows optimal functioning of system and reduces waste of financial resources.

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USING IT TECHNOLOGIES FOR INTEGRATION BETWEEN PLANNING AND SHOP FLOOR LEVEL: A CASE OF THE OVERHAUL PROCESS FOR TRAIN BRAKING DEVICES

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Abstract: A brief overview of the development of systems for production planning and control is given in this paper, as well as an example of the development information system for the overhaul process of braking devices for train wagons. Modern market conditions are characterized by a very unstable, unpredictable and changing business environment. These requirements face companies with the fact that they must constantly improve their business practices and procedures in order to improve their business performance and remain competitive in the market. Likewise, companies must constantly share information with their suppliers, customers and partners and that information must be extremely safe. The integration and automation of the process of design, planning, scheduling and control are becoming increasingly important approaches that could lead the system into a state that imitates the human way of processing information and working in conditions of uncertainty. Since main problems are identified in communication between the level of business planning and the shop-floor level, management and operational decisions ought to ensure that the production process is in line with the dynamics of the product life cycle, processes and people in the company.

Keywords: material requirement planning, computer integrated manufacturing, enterprise resources planning, integration, shop-floor, production planning, production control

1. INTRODUCTION

Fast technological development, globalization, information technologies and competition are words which are very frequent in modern business. Companies have tasks to improve competitiveness, increase productivity, develop new products, reduce costs, improve relation with customers, etc. In order to perform these tasks, it's necessary to face the challenges of applying new technologies, methodologies, tools and knowledge that are in line with the time and progress of the market. Computer systems in general, and systems based on the network can be found even in the smallest activities.

In the past decades, management theorists believed that companies can and need strengthen relation along the whole supply chain, started from raw material to final customer (Norris, 2000). In 90s of last century, companies have began to use new technologies and accept Internet and other web based technologies in order to improve own business. Modern business environment and conditions don't allow companies to exist and develop as closed systems, but must be open to its environment, suppliers, customers and business partners. In order to provide information sharing between all relevant stakeholders, companies need developed and organized information system.

Modern trends in the application of new information and communication technologies in companies are focused on the integration of all activities in a unique, computer aided environment. The integration concept, which aims at providing the right information at the right time at the right place, concerns: business process integration, teamwork or computer work for concurrent design and engineering activities, increasing flexibility and interoperability of information, systems and people to force environment variability in the cost effective way. But, the main problem is caused by the heterogeneity of computer systems and applications that use the same data collected from business processes. The categories of functions have included planning functions, shop floor execution functions and machine/process control functions (Boucher & Yalcin, 2006). These functions are hierarchically linked because the upper level planning functions typically constrain the activities that are allowed at the lower levels. In companies with advanced enterprise integration, these levels are coupled through the network architecture and a set of common databases that hold the most current information and make it available to all functions requiring it.

2. DEVELOPMENT OF SYSTEMS FOR PRODUCTION PLANNING AND CONTROL

2.1 MRP - Material Requirement Planning

In the period from 1960 to 1980, most efforts have focused on the research and design of material flow within the company (Norris, 2000). In the sense of information, tasks such as receiving and realization of the orders were not optimized, because the information within the company has not transmitted on time and properly. First steps in systematization and editing of this process began in the 60th of the 20th century and the first result was material requirement system which is also considered as the antecedent of a system for integrated control of resources.

In the 60's, the focus was on achieving competitive advantage through cost, using the strategy of a large volume of production, minimize costs and keep stable conditions (Jacobs & Weston, 2007). Introducing of computerized system for determining the Re-order point, including the determination of economic orders satisfy the needs of companies in terms of planning and production management. Systems for material requirements planning are a key step forward to the process of material planning.

The first versions of these systems for MRP were expensive and large. First of all, they require more technical staff to operate with computers. The development of higher speed drives and larger capacity for data storage has enabled the further development of the integrated business process management. Over time, the approach is extended to the procedures of preparing operational plans, control of production activities, specifying the inputs / outputs for orders and communications in an integrated support system.

MRP systems have been characterized as an analytical procedure in which the individual requirements are created from independent requirements (Tescic, Gracanin & Mitrovic, 2008) based on data obtained from sales service or distribution. Based on individual requirements for components, MRP system determinates the gross requirements by surmising of requirements for components and their quantities. After that, the net requirements are calculated by subtracting the amount of parts already in stock and amounts that are already in the procurement process. The system consists of the following processes or steps (Figure 1):

- Material plans check in order to exclude those which are not currently required
- Net requirements calculation
- Calculation of the material amount needed to purchase with the aim to join in existing orders or requisitions
- Scheduling or deployment
- Define the sources of supply in order to make acquisition
- Define the requirements for the additional material based on bill of material

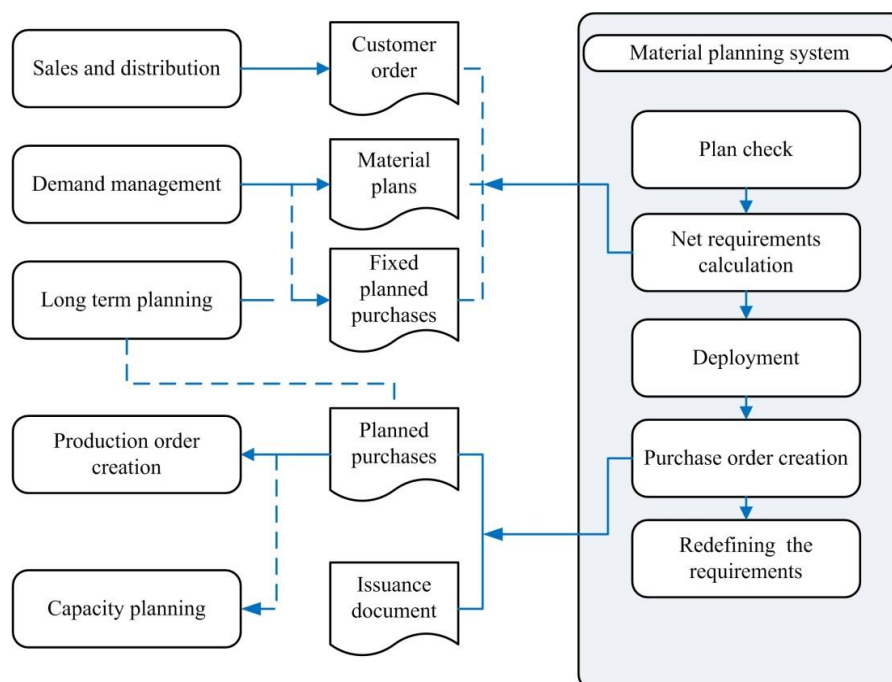


Figure 10: MRP processes

2.2 MRP II - Manufacturing Resource Planning

Manufacturing Resource Planning systems (MRP II) includes capacity planning and shop floor workers as well as the production needs. In the case of disability, this system allowed the planner to make changes to the plan implementation process within the existing capacity (Jacobs & Weston, 2007). This system allows the analysis of the consequences of different versions deployed enterprise resource plan and delivery of products, which was quite a lack of closed MRP systems. MRP II has expanded their usage to other areas such as marketing, production and finance. The most important, this was not only software system, but a combination of computer resources, human skills and the database. The emphasis was on the optimization of manufacturing processes with synchronization of material flows with production requirements.

One definition comes from the APICS Dictionary-a, (American Production and Inventory Control Society), which set standards of terminology over the years, and it follows that the resource planning for the production method of effective planning of all resources, the production company that uses units of measures for operational planning, the monetary unit for the financial planning and simulation supports the ability to answer "what-if" questions. It consists of various functions, which are linked together: business planning, sales and operations planning, production planning, material requirements planning, capacity requirements planning, and execution support systems for capacity planning and materials.

2.3. Computer Integrated Manufacturing - CIM

During the 80's, the performance of computer systems were significantly increased and cost reduced. This contributed to the intensive development of applicative systems in the field of product design and manufacturing technology (CAD-CAM systems). Computers have become an integral part of technological systems (machines), with the ability to manage work and machine movements, which is contributed to the development of computer numeric control machines, the robots and automatic guided vehicles.

The potential of computer systems, as an integral part of machines is contributed to the development of related and automated systems such as automated warehouses, flexible manufacturing cells, flexible manufacturing systems, as well as factory without people. These systems are set up as independent entities, often referred as islands of automation (Tescic, Gracanin and Mitrovic, 2008).

One of the main goals of computer integrated manufacturing approach is the automation and integration of entire business and production processes in an industrial company. The base of the approach is a Manufacturing Execution System - MES and its key component is a system for planning, scheduling and process control in production units of the company. This concept has created from practice and integrated processing of information about business and technical tasks in industrial processes (Dickerbach, Keller and Weihrauch, 2007). Research in this field started Harrington in the early seventies of 20th century. In his book, "Computer integrated manufacturing" (1973), Harrington has defined the following elements of this approach:

- Computer aided design
- Computer aided manufacturing
- Computer aided quality control
- Production Planning

Computer integrated manufacturing set up unique database by applying by applying a variety of applications, methods and techniques of product design and manufacturing flows, as well as connection with a business system functions (marketing, finance, human resources management) (Browne and all, 1988). According to Dorf and Kusiak (Dorf & Kusiak, 1994), the computer has an important role in integration of following functional areas of CIM systems: product design, tool design, process planning, numeric control machines programming, production planning and quality control.

2.4. Enterprise Resource Planning - ERP

The aim of the Enterprise resource planning is to integrate all the parts and functions into a single computer system, which will be able to service all of the specific needs and requirements of all parts of the company (APICS). It consists of software modules which are fully integrated into the system with a common database and there is no duplication of data. These modules cover a huge number of different functions of a company such as: marketing, finance, sales, customer support, human resources management and manufacturing. Disintegration is the sign of illness and integration is sign of health. All problems primarily come from one cause: the disintegration. Something isn't together, something doesn't work related. Therapy is - how to consolidate (Adizes, 2009). If the disintegration is cause of all problems, then the solution is integration. One of the main indicators of successful company is its full integration, which includes both, external and internal integration. Just as a unified entity, the company can develop products and implement services that meet customer needs. Effective and efficient management of production processes of the

industrial systems can be achieved by integration of the all functions and processes from top-level management to the shop - floor level (Zelenović, 1981).

Visibility in real-time and capabilities that provide integrated solutions has significant impact on improving of agility, quality and efficiency based on the collected data and execution of manufacturing operations through the exchange of information in the feedback to the ERP system. Total exploitation of ERP possibilities depends on its association with manufacturing units through the software applications that make the structure of the system for manufacturing activities control, as shown on figure 2 (Tescic, Gracanin and Mitrovic, 2008)

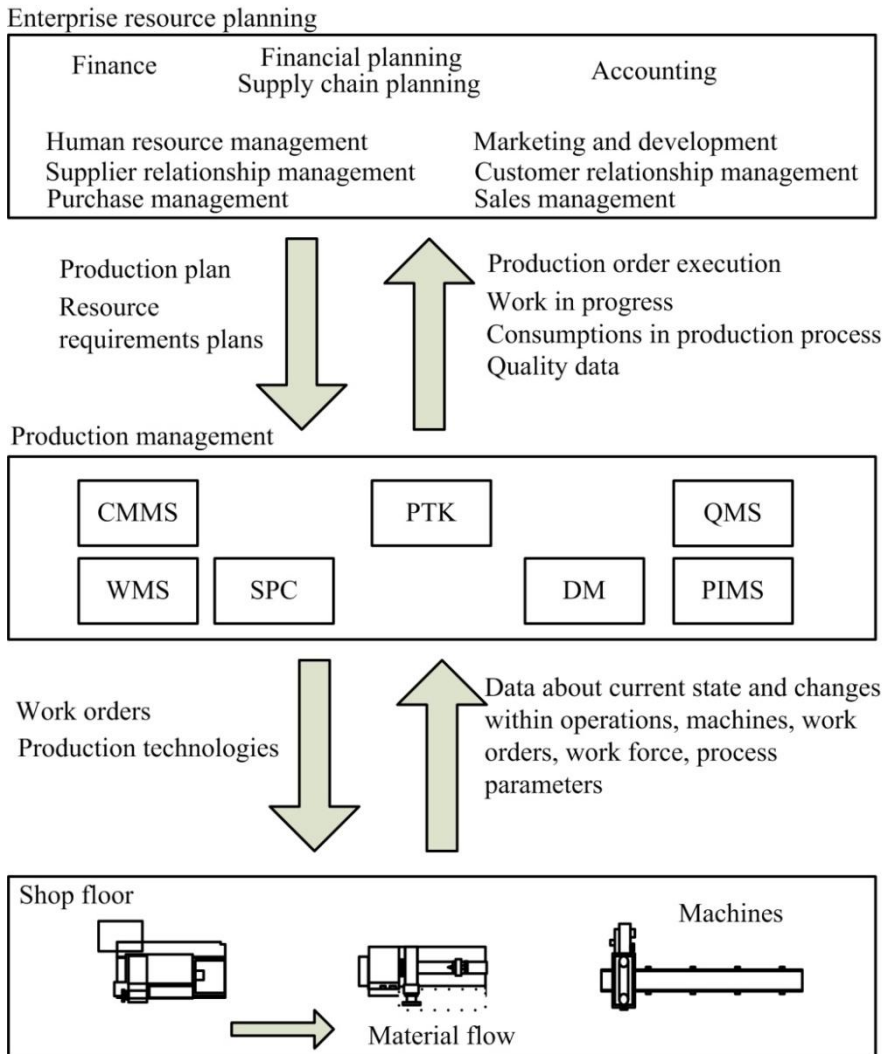


Figure 2: Shop floor, production management and general management

The characteristics of ERP system related to the business area are process-oriented, customizing to the company, modularity, independence and simulation. Briefly, the functionality of the ERP system is reflected in transactional processes (integrated data management), work flow management and decision support (Akkermans & Helden).

2.5. Enterprise Resource Planning- II generation

After several iterations of development and improvement, appearance of new generation of these systems was completely logical continuation, especially with the Internet as a business medium. With these systems, the information platform is extended to customers, suppliers and other business partners. While the first generation is adaptive technology, second generation can be categorized as a revolutionary technology (Norris, 2000). The adaptive technology are just a new generation of already existing technologies, while the revolutionary technology can be seen as those that change the way of life or way of doing business. With this

new generation of systems, companies are open to the environment and have a completely new way to communicate with clients. Web-based technologies give life and breath to the system for enterprise resource planning, which is a large and technologically complex and it is not always easy to discover its true value. ERP system is focused on improving the effectiveness and efficiency within the company, while the task of the second generation of the system is oriented to the environment and relations with customers and suppliers, as well as the promotion of products / services.

One of disadvantages of first generation is introduction of new function or activity which is not covered by the existing system. This constraint has seemed like a handicap of system, particularly with the rapid transformations in the organizational structure and functions. The second generation system was able to overcome this problem and provide greater coverage of functions and processes in the enterprise. The special significance of next-generation system is given due to the fact that they cover a number of industries, while the previous generation was more focused on manufacturing companies.

3. CASE STUDY

In this paper case study represents the overhaul process of train braking devices in company “Inter-Mehanika” from Serbia. “Inter-Mehanika” manufactures and gives services for both large government systems (EPS, Railways) and private companies (USS Serbia, Vagonka MINNiš, NIS installation, Inter-Gas.), and for all other smaller companies. Company consists of three parts positioned on three locations:

- company headquarters which include marketing, R&D, sales, purchase, and financial departments along with the specialised shop floor for repairing braking devices (K03),
- shop floor for repairs and maintenance of railway vehicles,
- manufacturing facilities for machining, locksmith-welding and plumbing works.

Hierarchical process structure is shown on figure 3.

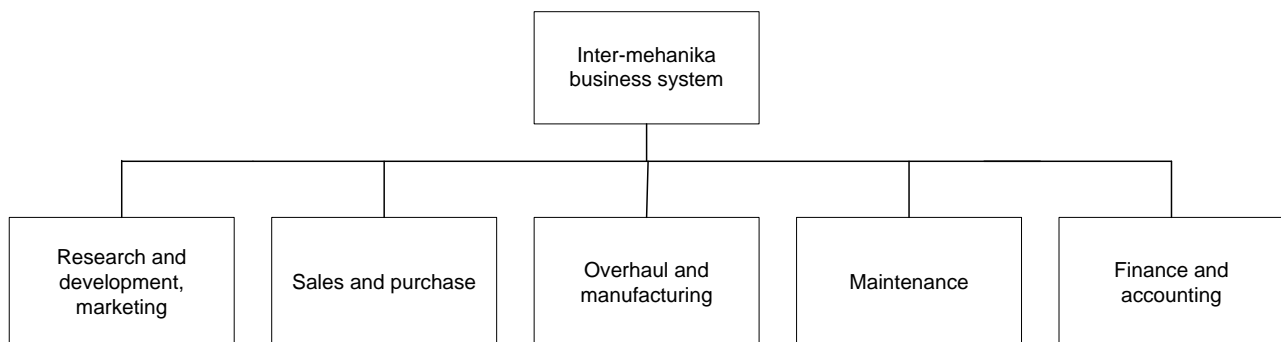


Figure 3: Hierarchical process structure

Train braking devices are overhauled in the specialized shop floor K03. The shop floor is fully equipped with technical and personnel for the repair, maintenance and reconstruction of all types of train brakes, distributors, metering valves, cylinders, regulators, cylinder-regulators and block cylinder regulators. The overhaul process begins with the reception and visual inspection of braking device which is then disassembled. Using the technical documentation for the overhaul process, device defects are noted and the parts that need to be changed are specified. There are two types of parts which can be replaced:

- parts which must be replaced every time the device comes to overhaul (rubber parts) and they are purchased from the supplier
- parts that must be replaced only if the inspection process shows defects of them (metal parts), and they can be purchased or more often they are manufactured in the manufacturing facilities of the company.

After the parts are prepared and changed the assembly process begins and after that the braking device goes to inspection and functional testing. The amount of documents and information regarding overhaul process is complex. Technical and technological overhaul documentation represents a manual for process of performing overhaul of braking device. The documentation contains detailed instructions for repairing brake device, a list of parts brake device, technical drawings of equipment, overviews of membranes and springs, time standards, normative for the materials and a document which serves for parameter input during braking device testing (Protocol). The instruction manual for the repairing of the devices defines in detail the procedure for disassembly, inspection and assembly of each device, with the necessary tools and measuring devices. Part lists give an overview of all parts of the device. Parts that are necessary to change during

repairs are separately labelled, as well as those that need to be replaced only when needed. The drawings give cross-section views of each part of the braking device, with labels for all positions. Overview of springs in the tabular view provides specifications for all the springs in the braking device (labels, wire diameters, spring diameters - inner diameter, the forces acting on the springs and spring length - free length and under pressure).

Overview of the membranes provides the technical characteristics of the membranes in a tabular view (labels of the membranes and their hardness). Also the parameters that the braking device must meet are defined. The parameters are presented in tables, and also there is a drawing that defines how to connect the braking device to the testing table. The protocol of the braking device testing includes results of the braking device. The time for repairs is defined by the time required for each operation (rough cleaning, disassembly, cleaning of the parts, control of the parts, defects inspection and finishing, assembly, testing and painting), and the total time is shown. Time standards exist for each device. Standards for required material contain defined amounts of paint, detergent, grease and other materials as needed for each part of the braking device. IDEF0 diagram of overhaul process is shown on figure 4.

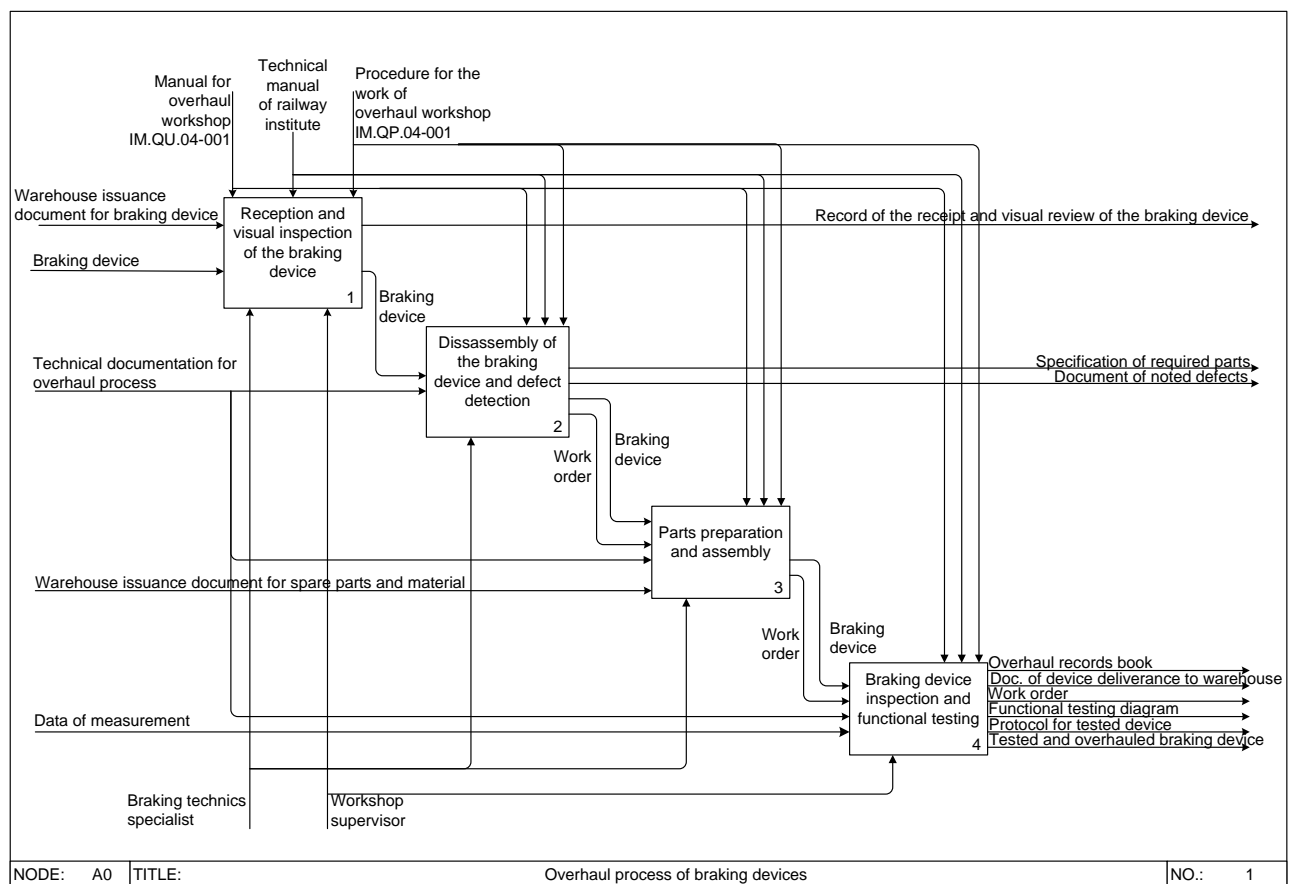


Figure 4: Overhaul process diagram

Testing of overhauled braking devices is made on testing station shown on figure 5.

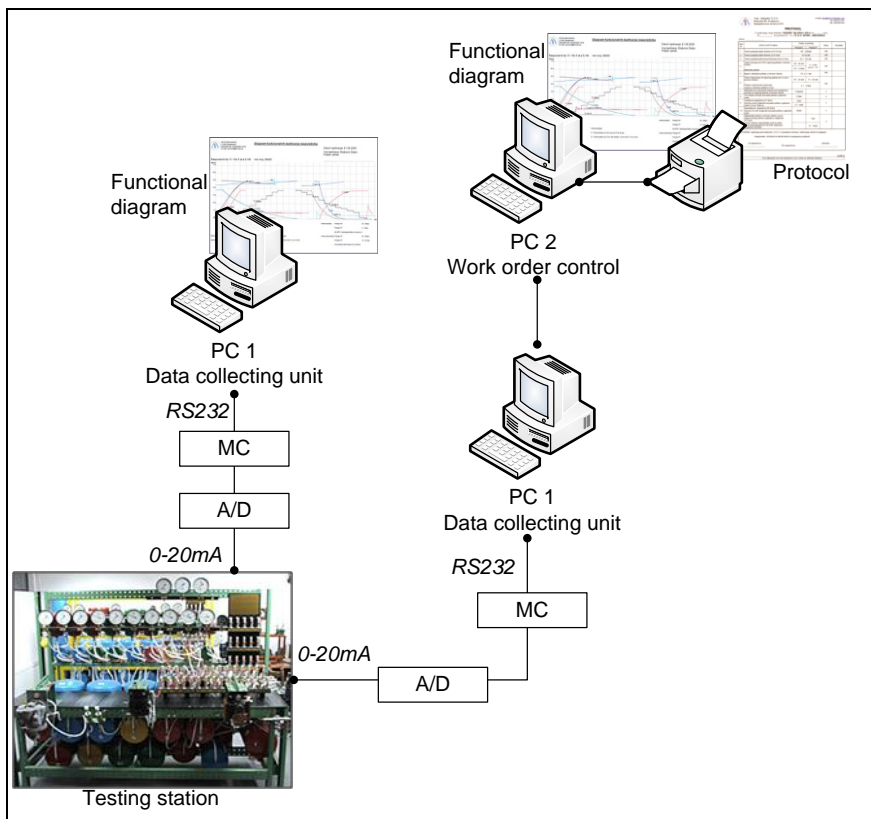


Figure 5: Testing of braking devices

During the test, the real system working conditions are simulated. Relevant parameters are examined (nominal pressure in the system, time of braking etc.) and the braking device is adjusted. Number of repeat tests depends on the number of settings that are needed to make the device and of the detection of possible defects that could not be noticed in the visual inspection of the braking device. Empirically, the number of tests carried out is not less than 15. Electric signal (0-20 mA) from the analog meter, which is a part of the testing station, is sent to 10bit A/D converter. A converter then turns continuous analog input signals into digital output signals. There are various procedures for this including successive approximation, counters, R-network comparators, dual-slope converters, parallel converters and multi-ramp techniques. Depending on the pressure, signal is converted to a number (0-1024) and through serial communication send on PC1. This process is also known as digitization. Program on PC1 then use a linear equation $Y=ax+b$ (a can have different values, b is constant and has value -1 which is atmospheric pressure), create a value of relative pressure and form a diagram.

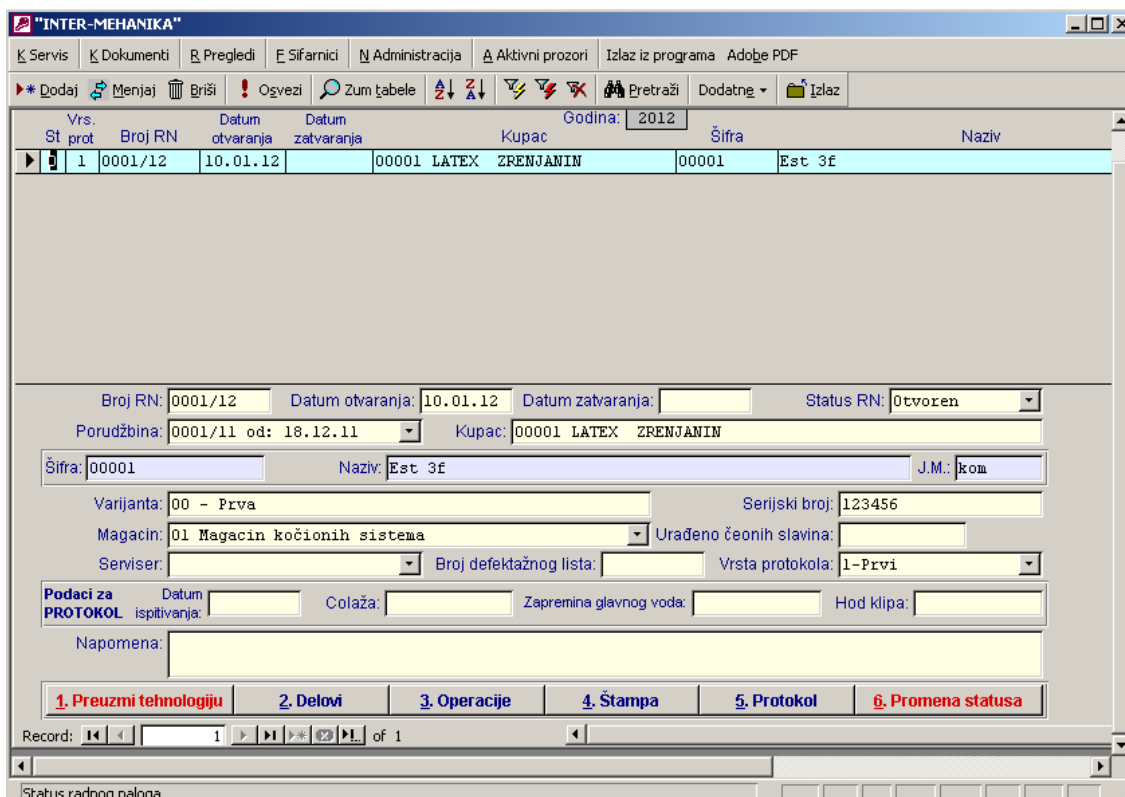
As a result of testing, the diagram captures the functional examinations from test equipment, and the data from the chart are enrolled in the testing protocol, which has a character of a certificate.

Shop floor K03 is poorly integrated with the other parts of the company. The conducted analysis of business process showed the following basic deficiencies in the performance of functions and processes:

- low level of integration between the processes and functions in the working system especially between incoming customer orders, K03 shop floor and warehouses (there is no tracking connection between work orders and customer orders, it is hard to track material, parts and tools consumption, there is no data acquisition and analysis from the shop floor etc.)
- process planning is missing,
- all documents are in paper form which is lowering the process efficiency,
- the lack of process analysis as a basis for decision-making procedures and settings.

The analysis showed the need for information system development. Application that integrates customer orders with work order control, shop floor activities and the final testing of the braking devices is developed using Microsoft Access and Microsoft SQL Server. The figure 6 shows input in the planning, execution and control of work orders in the overhaul process of the braking devices with the built-in connection with testing

station. The <Protocol> command enables downloading the results of measurements and the formation of the protocol document, which shows the final results of the overhaul process and can be sent to the customers.



The screenshot shows the 'INTER-MECHANIKA' software window. It features a menu bar with options like 'Servis', 'Dokumenti', 'Pregledi', 'Sifarnici', 'Administracija', 'Aktivni prozori', 'Izlaz iz programa', and 'Adobe PDF'. Below the menu is a toolbar with icons for various functions. The main area contains a data entry form with fields for 'Vrs. St. prot.', 'Broj RN', 'Datum otvaranja', 'Datum zatvaranja', 'Kupac', 'Godina', 'Sifra', and 'Naziv'. A table below these fields shows a single record with values: 1, 0001/12, 10.01.12, 00001 LATEX ZRENJANIN, 00001, Est 3f. Below the table are more form fields for 'Broj RN', 'Datum otvaranja', 'Datum zatvaranja', 'Status RN', 'Porudzbina', 'Kupac', 'Sifra', 'Naziv', 'J.M.', 'Varijanta', 'Serijski broj', 'Magacin', 'Urađeno čeonih slavin', 'Serviser', 'Broj defektažnog lista', 'Vrsta protokola', 'Podaci za PROTOKOL', 'Datum ispitivanja', 'Colaža', 'Zapremina glavnog voda', 'Hod klipa', and 'Napomena'. At the bottom, there are buttons for '1. Preuzmi tehnologiju', '2. Delovi', '3. Operacije', '4. Štampa', '5. Protokol', and '6. Promena statusa'. The status bar at the very bottom indicates 'Status radnog naloga'.

Figure 6: Integration through software

4. CONCLUSION

It could be concluded that these systems are not only the trend of information technology, but a necessity of modern business and a new vision of the modern company. Manufacturing is a very dynamic environment, and change and disturbances handling are high on list of research challenges. The cooperation between high-level planners and schedulers and the manufacturing execution system is virtually unexplored.

Case study presented in this paper is model of integrated processes in the industrial company with a focus on controlling the processes of repair and maintenance. The development process is required analysis and research of different approaches in the field of the industrial system characteristics and process identification. The integral information system that includes both business and part of production management and in the modern programming environment is designed. Future research activities will be focused on the further integration within "Inter-Mehanika" in the sense of connection this system with financial, commercial and R&D functions. For successful implementation of these systems is very important to select appropriate strategy and methodology for implementation and ensure the full involvement of all organizational levels and open communication among participants.

Acknowledgement

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INTEGRATION OF APPLICATIONS FOR MOBILE PLATFORMS WITH SYSTEMS OF KNOWLEDGE MANAGEMENT

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Abstract: *This paper describes the process of integration of mobile web applications with the Learning Contents Management System (LCMS). We present a way of developing web applications for mobile devices in the NetBiscuit platform which is implemented at the University of Novi Pazar. The process of implementation is based on the project management of e-learning, more precisely on the application of project management (through four phases: definition, planning, management and evaluation). It is designed as a combination of the project management phase which enables more efficient planning and performing online education with the procedure of design courses for e-learning.*

Keywords: *mobile applications, e-learning, NetBiscuit platform, LCMS, project management*

1. INTRODUCTION

In today's modern society, emphasis is placed on the availability of information which should be provided on all devices that users use to search for information. Therefore it is necessary to optimize web pages for mobile devices, and this trend is increasing fast. Using the mobile internet, customers receive the highest possible comfort in finding quick information that interests them. Some of the statistics that speak in favor of the development of this area are:

- 4 billion mobile devices in the world and out of that 1.08 billion are Smartphone's,
- by 2014. mobile Internet will overtake the use of the Internet through computers,
- 1/2 of all local searches are performed on mobile devices,
- 86% users of mobile Internet are using their mobile devices during watching TV,
- 2.7 hours per day - during which the average user spends on social networks (Facebook, Twitter...).

In response to modern trends of distance learning at the University of Novi Pazar is established combination of traditional education and distance learning. This type of learning represents a form of student support and supplements to the classical method of education using information and communication technologies (ICT). Values indicator of this system is to help students and teachers with ICT technology to easier overcome the teaching material. Apart from the implementation of e-learning at the University (Međedović, 2011) in classic web environment through a system of e-learning (Moodle and Google Aps) on this institution of higher education are formed and the shape of e-learning in the form of web applications for mobile devices. In the future, our web application will be developed to monitor the trends of modern education. One of the following steps in the development is the ability of electronic exam registration as well as filling the various types of forms, which will among the other things, reduce travel costs of students who do not live near the University.

This paper consists of three parts. In the first part we describe the method and platform development of University Web applications. In the second part, we specify the basic phases of project management and development of the application. In the third part is given a concrete integration process of mobile applications with the courses that are implemented in systems for e-learning.

2. DEVELOPMENT PLATFORM FOR MOBILE WEB APPLICATION

To develop applications for mobile devices, we chose Netbiscuits platform which provides fast and efficiently publishing web content through all available mobile platforms in the form of a Web site or the native application. This platform supports the publishing of web content to many types of mobile devices including smart phones, media tablet (mini-computers and phones at the same time) musical devices, game consoles, e-readers and even TV set-top boxes.

Netbiscuits retains its independence from any mobile operating system installed on the devices and provides optimization of Web content for each browser on the phone. This platform actually translates the code and adapts it to the browsers in order to present web contents.

Netbiscuits has integrated world classes of mobile devices in its platform which is connected to one rendering machine that deliver you optimized mobile Web applications on any mobile device. This platform uses the latest mobile technologies such as HTML 5, CSS and Java script, in order to create Web sites that users will experience as application (Petković, 2011). This platform provides the use of PHP and MySQL technologies to communicate with the database. In order to improve the user experience Netbiscuits provides optimization tools that enable the optimization of labels, CSS, images, audio and video content and provides their introduction on the basis the characteristics of each mobile device.

Netbiscuits content is optimized to reduce the load time for users who have access over the limited permeable scope. Netbiscuits has created a database that contains more than 6000 tested mobile device profiles from over 50 countries worldwide. In order to guarantee maximum coverage, reliability and quality of mobile sites and applications Netbiscuits does not use of any information or open source database. Database of this platform not only check the basic properties of each device such as the size of the screen but already have detailed information about the search capabilities media support, processing power or memory capacity of the device. Although mobile phones use different platforms and operating systems this web application adapts to any phone independent of who runs the startup (Schreiner, 2011). During development, we considered what is it that in relation to the primary web site of the information should be placed on the mobile web site which will certainly facilitate the University students.

While creating the application we were guided by the following rules:

- application should contain the most needed information for moving users
- navigation should be easy, fast and intuitive,
- rejection of the functionality, content and information that are not very necessary to the mobile web site reduces the time required to access the site
- speed access is also determined how the information and content is formatted and displayed to the end user.

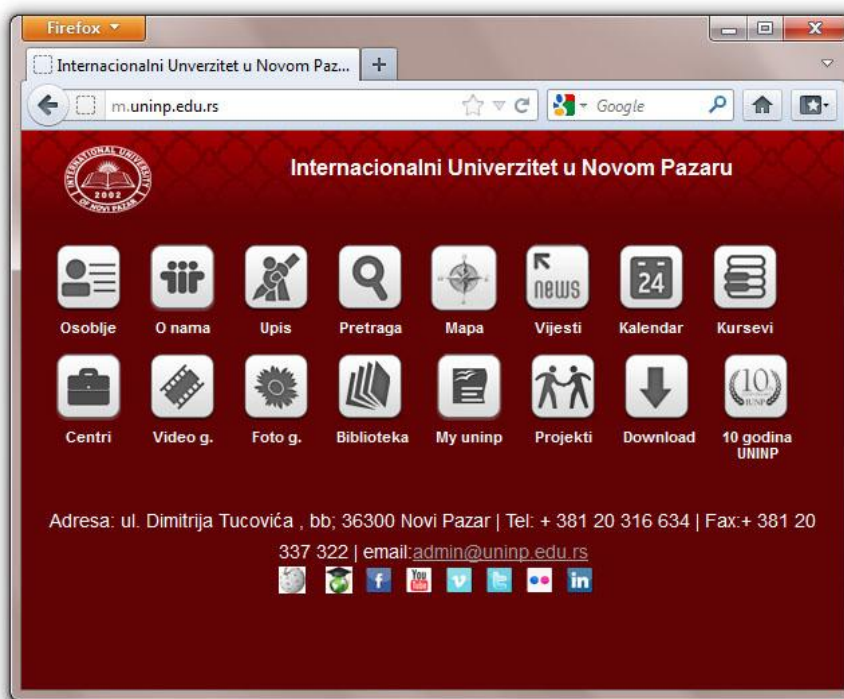


Figure 11: Home page of applications for mobile devices

As mentioned above, during development of web application PHP and MySQL technology is used under which the printed BiscuitML source code which is only understandable for the Netbiscuits platform. When it

comes to speed of navigation the use of mobile applications offer many benefits to students. All information that applications carries are already in local phone memory, thereby the speed is much higher than in the case where looking for any new information on the web site which requires additional time needed for data transmission over the Internet when you load and display the desired content.

A detailed functionality description of the University applications for mobile devices is described in our paper (Selimović, Saračević, 2012). In this paper we focus on system integration for e-learning with a mobile web application. In the following we describe the process of managing the project through its development phases.

3. PROJECT MANAGEMENT FOR DEVELOPMENT OF MOBILE WEB APPLICATIONS

Project management is a concept with the help of appropriate methods of organization, information technology, planning, management and control, performs a rational alignment of needed resources and coordination of necessary activities to realize a project in the best manner. The process of project management learning is a much broader concept of project management, instructional design, program leadership, team management and information technology.

The concept of project management of development of our applications for mobile devices is based on establishing efficient organization of data, that allows the best use of available methods of planning and control for effective project implementation with the emphasis on the better navigation, content, and easier communication.

3.1 Development phases of the concept of project management applications for mobile platforms

In this part of the paper we will present the basic phases of the e-learning. Firstly it is necessary to make a difference between the following concepts: processes, products and projects of e-learning. The process of e-learning involves the whole strategy of providing the knowledge using technology and networking. The product of e-learning is a package that comes with the completion of the project of e-learning.

A project of e-learning is an initiative to deliver or improve a separate package of the content of e-learning or to create, establish and maintain software or infrastructure to support e-learning process (Saračević, Mašović, Šemsović, 2011).

Figure 2 presents a model that is implemented through three phases in the design of the project: planning, design and development. Phase of design and development have their sub-phases which are in mutual interaction. During the design a prototype of application is created that can be reviewed and re-designed in the future iterations. In the development phase the implementation of received applications is being carried out as well as and its evaluation. There is also iteration between the phases of design and development.

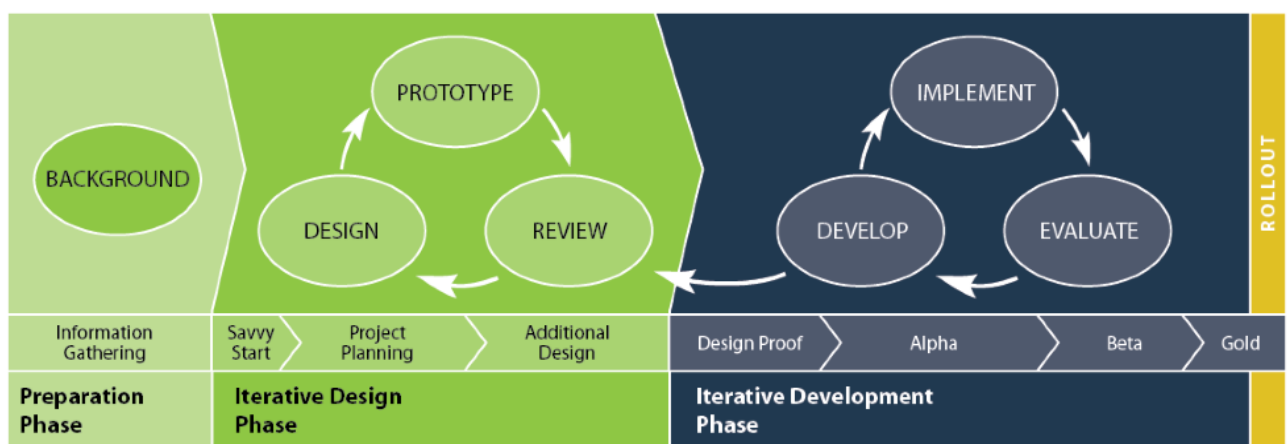


Figure 2: The development of applications based on the model 3-Phase (P-ID-ID)

The concept of project management and development of the application for mobile platforms based on the previously presented model can be defined through the following main steps (E-Lab, 2011):

1. PROJECT DEFINING is a phase that includes development of the project plan, its implementation and control changes, which is very important for the subsequent maintenance applications. In this phase the types of risks are defined for each phase of the project.
2. PLANNING is the phase of determining the scope and duration of the project. It performs the evaluation of individual activities, developing the project plan and control changes.
3. MANAGEMENT is a phase in which defined tasks are determined. It manages the risks, project scope, quality, cost, communication and resources.



- **management of project implementation** is actual monitoring of the implementation, recording and updating of actual data on the realisation (completed work, cost, duration) as well as monitoring of possible changes
 - **management of communications** is an important segment that includes communications planning, distribution of information, reporting about the project and its administrative closure.
 - **resource management** is the process of defining the resources needed for the project and their scheduling. It primarily refers to the selection of data that are used and imported from the traditional web site of the University.
 - **quality management** refers to planning and definition of measures for its implementation and control that is necessary in order to achieve desired quality of the results of the project.
 - **risk management** is the process of identification, analysis, planning responses to the risk and its control.
4. EVALUATION is the phase during which it conducts a formal evaluation of the actual value of the project, reports and documentation for the project are published to ensure the quality of the e-learning.

The project ends with a final report, which will serve in the realization of future similar projects.

4. SYSTEMS INTEGRATION FOR E-LEARNING WITH MOBILE WEB APPLICATIONS

Systems for support learning have experienced significant changes and passed many development phases and approaches and to the early learning system based on large computers with multiuser operating systems through the software system based on microcomputers developed for various computer platforms. Learning Management System (LMS) are the key applications in the model of electronic education or e-learning (Saračević, Međedović, Mašović, 2011). This kind of the system includes a set of functionalities that are designed to deliver, monitoring, reporting and administration of the learning content. One of these systems for e-learning is Moodle.

Despite the fact that the concept of Moodle architecture respects the principle of minimal consumption of resources and computer communication networks, there is a need to further simplify and optimize it. The reason for this is that mobile platforms used today, do not have available computer power or speed and bandwidth of modern internet connections. The result of attempting to respond to these requests was implemented as additional modules for Moodle environment (Saračević, Mašović, Selimović, 2011).

MLE – Moodle is a module that adds a Moodle installation the ability to access with mobile platform (mLearning). This module allows you to access on the system besides the usual, using the computer, and using mobile phones, smart phones, tablet computers etc. Mobile access is possible by using of a customized web pages or specially created applications for mobile devices. To integrate our web application with the LMS system – Moodle we used described supplement for open - source system (LMS) Moodle.

Supplement is copied into the installation file system of Moodle and then when you access to the system via mobile device browsers or with some special mobile phone application designed for learning on mobile phones (called the MLE phone client), MLE – Moodle recognizes the device and adjusts according to its performance. To log on the educational course you need to login on the mobile application.



Figure 3: Login form and students portal

M-Learning use the mobile phones as a medium for learning. Therefore the use of mobile phones as a medium it can be used anywhere. One possibility is to connect mobile web applications with Moodle, a system for e-learning which is customised to run on mobile devices. With MLE-Moodle you can implement some mobile learning scenarios. The mobile web applications are especially good for terrain trips where students need to complete quizzes or upload images / video / audio or written reports. creating locations based on the learning scenario for mobile tagging or integrated GPS. make a quick research and submit the results immediately in the classroom with mobile devices and see results immediately.

We will present an example of source code that uses the link to access the MLE-Moodle applications within the University. The main issue in this code is linking with the MLE-Moodle.

```
<container>
<column>
<?php
print ('<LIST class="mylinklistclass">
<items>
<item
href="http://d.uninp.edu.rs/blocks/mle/browser.php?xml=courses,c9-2">
</items>
</LIST> ');
?>
</column>
</container>
```

To demonstrate the functionality of MLE modules, we have listed Moodle course which was developed for the needs of University teaching. This course will be used to configure the module and it is necessary that the identical roles should be assigned at both courses. One such example is illustrated in the following figures.

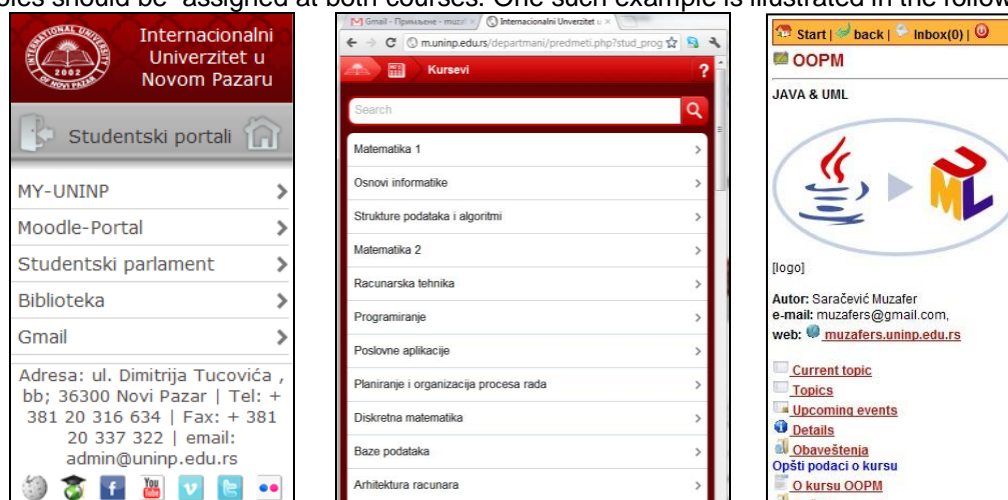


Figure 4: Loading procedure for Moodle course to applications for mobile platforms

Moodle has provided that, instead of solely classroom training is done it could also be done in our working rooms, MLE adds a new dimension to learning from any location, at any time, regardless of whether you have a computer with yourself (Mašović, 2011).

5. CONCLUSION

Without a doubt, the future of the internet lies in mobile platforms. With the appearance of Smartphone mobile devices internet has become more attractive to a wider audience. This mini Smartphone revolution cannot ignore changes in the habits of Internet users. This paper is a proposal of how to raise teaching in higher education institutions at a higher level and to allow students faster and easier access to the information.

This paper outlines some of the advantages of one model of the implementation of e-learning in higher education. We give proposals for application of project management in teaching improvement with emphasis on rapid development and high quality projects of e-learning. Product of e-learning which is implemented in this way requires a flexible content and simple interface customized to learning. The advantage of this way of implementation is that the method of creating courses for e-learning relies on the concept of a person's mobility. This process promotes the teaching approach in which the student is at the center of attention in any place at any time and thus achieves better study. The combination of traditional learning with the support of e-learning and m-learning is the best combination for the study. It is very important to apply described procedure of implementation at all educational institutions, because in this way the teaching will be raised to a higher level but also the level of student achievement.

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CAN SERVICE FAULTS IN PASSENGER FLIGHTS BE PREVENTED? A PROPOSED FRAMEWORK

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Abstract: The paper devises a new framework for implementing preventive service systems that aim at preventing service failures and complaints in air transport services. By proactively monitoring the provision of services to passengers and averting service failures, preventive service management decreases the volume of customer complaints and assists in enhancing service quality and airline reputation. The presented framework is based on extensive use of IT systems that continuously monitor the service infrastructure in a cycle of activities that includes detection and prevention of service failures, notification of service malfunctions and follow-up operations. The implementation and the value of the framework are exemplified in various scenarios that arise in the operation of commercial flights and often facilitate passenger complaints and discomfort.

Keywords: preventive service management, service faults, customer complaints, customer satisfaction.

1. INTRODUCTION

The eminent growth of the airline industry and air transport worldwide highlights the major economic and commercial importance of provision of qualitative and punctual flight services (Kim and Lee, 2009). The operation of services is challenging and complex, particularly in the airline industry, where large numbers of passengers continuously travel to multitude destinations worldwide and air transport services incorporate a broad set of resources, safety and work procedures.

Recent studies emphasize the importance of complaint management as a key factor for ensuring customer satisfaction and, in the longer term, customer loyalty (Homburg et al., 2010). At the same time, studies conducted on the subject of service recovery argue that most of the customers that confront service failures avoid complaining, especially before deciding to leave their service providers, and thereby do not provide service companies the opportunity to correct their negative experiences or compensate them for their damages (Chebat, Davidow, and Codjovi 2005; Sharma et al. 2010). Further, similar service failures often repeat themselves (either in same or different contexts) and more customers are exposed to service malfunctions that could have been prevented had companies enforced earlier service control mechanisms.

The recent and common practice applied by service providers that seek to improve their operations is complaint management. Complaint management includes scope of activities that encourage dissatisfied customers to complain, rather than remaining dissatisfied and spread negative opinions, correct their negative experiences and "convert" dissatisfied customers to satisfied and loyal clients (Fornell and Wernerfelt, 1987; Paul et al., 2009). However, the major drawbacks of complaint management is the exposure of customers to service faults and the requirement that customers contact their service providers and complain as a pre-condition for initiating complaint management procedures.

Preventive service management is a new and innovative framework that aims at improving customer satisfaction without exposing customers to negative experiences, by preventing service faults and the consequent customer complaints. The methodology is based on ongoing monitoring of the service infrastructure and processes and on discovery of conditions that may lead to potential service failures. Since continuous monitoring activities require intensive labor and may be very costly, we advocate the application of automated systems to carry out monitoring activities.

Preventive service management aims at guaranteeing consumer satisfaction as well as proactive elimination of events that may lead to potential service malfunctions by using human-based procedures and automated

systems. Indeed, prevention of failures was explored in the airline industry, considering, in particular, airline maintenance and safety policies (see for example Liou et al., 2008; Netjasov and Janic, 2008). However, little research has been dedicated to preventive practices that can enhance the quality of the service provided to passengers. Preventive service management suggests that by identifying, monitoring and preventing different factors and occurrences that result in service malfunctions, airlines can improve the level of delivered services and customer satisfaction, while sparing inconvenience and recovery costs.

2. PREVENTIVE SERVICE MANAGEMENT: A CONCEPTUAL FRAMEWORK AND METHODOLOGY

Preventive service management can be applied in a wide range of organizations, including airline companies. However, its application requires a coherent and constructed framework that addresses a broad variety of services and processes that support them. The methodology and the framework presented in this paper were constructed to accomplish the major aim of reducing the likelihood of service failures. This aim is addressed and met at large by establishing a model that addresses a broad spectrum of service related processes and organizational units on the basis of four major stages: detection, prevention, notification and follow-up (see Fig. 1).

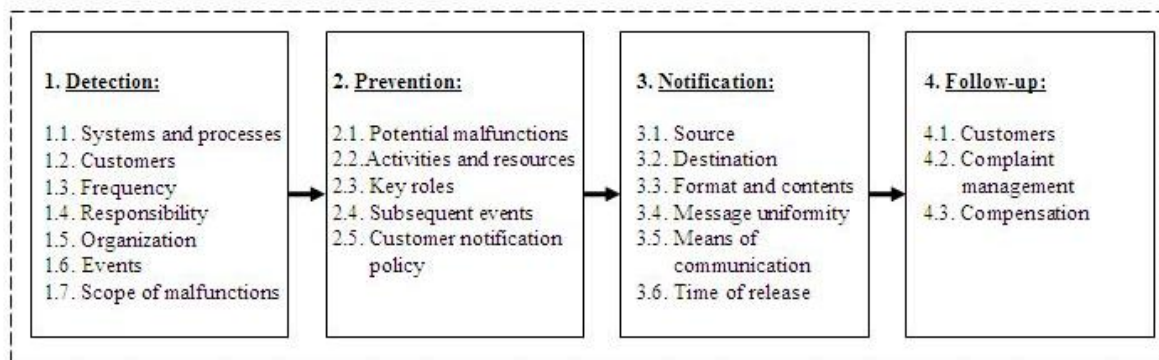


Figure 1: Stages of the Preventive Service Management process

Detection represents the stage of continuous monitoring of services to eliminate possible occurrence of dissatisfactory events. For example, airline companies may continuously monitor the state of major and minor aircraft maintenance problems to allocate replacement aircraft and team within a short period. Automation of the monitoring processes via real-time information systems provides broad coverage of the services in multiple destinations worldwide, while enabling the airline to economize on labor costs.

Service activities and information systems that carry out detection processes should address the following aspects:

- 1) The service operations, processes and related systems that should be monitored by the airline.
- 2) The population of customers for which detection is carried out (for example, business passengers, frequent flyers or all the passengers in a particular flight).
- 3) The frequency of operating detection activities (for example, hourly, daily or weekly monitoring of service processes).
- 4) Who is responsible for different detection operations.
- 5) The ways in which detection operations are organized and carried out, the information systems and the airline resources that they use.
- 6) Which events are defined by the airline as service malfunctions.

Prevention represents the activities that the airline implements to eliminate potential risk factors that affect the proper provision of services and their quality. In this stage, the airline carries out activities that proactively prevent the occurrences of service failures, such as emergency and contingency operations. In case planned service outages and maintenance operations are carried out, prevention includes the organization of activities and resources that can shorten the duration of service malfunctions and minimize financial losses.

Our framework consists of the following aspects of prevention processes:

- 1) Identifying potential service failures that may occur and articulating plans to resolve them in advance.

- 2) Allocation of resources and prioritizing necessary means to prevent service failures from occurring - The allocation of resources can also be decided on an economic basis: service providers can decide to invest in preventing only the failures that cause damages that surpass the costs of the resources, without taking into account downgraded service quality and reputation.
- 3) Key roles in the firm that should be informed about service failures that are prevented (major stakeholders within the airline, such as the CEO, technical experts and customer service managers).
- 4) Subsequent events that follow particular service failures and should be prevented.

Notification provides information about service failures to customers who are likely to be affected by it or to customers that the airline finds it important to alert about the problems and the major steps that are taken to solve them. Notifications may be delivered to customers in conjunction with the preventive operations that are carried out or may be activated after the prevention stage is completed. The proposed framework suggests that by applying notification in an automated way, the firm can address a large volume of customer calls in cases of widespread service failures. It is further suggested that firms should implement additional *active* notification systems that pro-actively contact customers and deliver notifications about expected service failures or failures that are discovered and can affect the operations of customers.

3. APPLYING THE PREVENTIVE SERVICE FRAMEWORK: PREVENTION OF POTENTIAL SERVICE FAILURES IN PASSENGER FLIGHTS

The most common passengers' complaints refer to the following categories (Weber and Sparks, 2004; Kim and Lee, 2009):

- Airline punctuality and convenient flight scheduling.
- Food quality and fulfillment of special meal requests (such as a vegetarian, Kosher or a children's meal).
- Proper and complete delivery and receipt of baggage at the flight destination.
- Cabin and check-in services.

Airlines can comply with a broad spectrum of service failures and malfunctions and prevent them by implementing proactive steps for monitoring and correcting service failures. The range of service processes and the failures associated with them begins when customers are ordering their tickets and ends when they leave the flight and collect their luggage. In general, the sources of service failures can be divided into three major groups: First, data on passengers or on airplanes are not streamlined between various information systems of the firm, resulting in maltreating customers despite the available information on their bookings and preferences. For example, a malfunctioning seat that is reported in the aircraft maintenance information system and is not removed from the ticketing system until it is fixed can create a problem to the passenger that purchased it and to the crew that should remove him to another seat shortly before take-off.

Second, passengers provide information via their bookings, but further know-how about their flight habits and needs that could ensure their convenience and satisfaction was not derived from their booking. For example, passengers that purchase children's tickets should not be allowed to choose seats near the exits, since children are not strong enough to open the exit doors in case of emergency. Hence, the ticketing system should prohibit choosing these seats when bookings that include a child are made so as to prevent the inconvenience of allocating different seats before the flight.

Third, due to lack of attention or mistakes of passengers or service providers, passengers are provided with inferior services than could have been supplied to them had these mistakes been automatically tracked and prevented. For example, if the passenger or the travel agent forgets to request special meals, the frequent flyer system can ensure via the purchasing history that the passenger usually consumes standard meals or otherwise contact the passenger before the flight to validate his choice.

Table 1 summarizes the various potential service failure events that can occur throughout the process of service provision in commercial passenger flights. As the various types of service failures do not depend on each other, airlines can choose to implement some or all of the proposed solutions to prevent them.

	Service failure description	Proposed solution
1	Unplanned flight delay - Delay of arrival to the destination and possibility of missing connection	Notification of passengers upon the event, the expected delay and instructions what actions should be taken. Preparation of dining and sleeping arrangement, if needed,

	flights	including passenger transportation.
2	Planned flight delay - Delay of arrival to the destination and possibility of missing connection flights	Notification to passengers about planned flight change (via SMS or phone). Rental of aircraft and crew, if needed. Frequent update of passengers.
3	Ticketing and seat allocation - Improper allocation of seats for babies, children and disabled persons by the ticketing system	Allocation of baby and parent seats by the ticketing system upon completion of a booking. Child seats would not be permitted next to emergency exits. Disabled persons ordering wheelchairs would not be seated next to emergency exits. Unavailability of seats due to technical problems requires notification of maintenance, temporarily removal from the ticketing system for upcoming flights and automatic allocation of alternative seats if purchased.
4	Flight manifest inaccuracies - Passengers do not appear in the manifest despite purchasing and receiving their flight tickets	Before flights automatically examining that the manifest and the passenger ticket purchases are identical. If mismatches were revealed, passengers would be provided with alternative seats.
5	Arrival of passenger luggage to a wrong destination	Receipt of contact details and address from passengers reporting luggage claims. Update of passengers via SMS or phone upon finding the luggage and coordinating its delivery. Installation of additional barcode readers in baggage compartments of airplanes to prevent wrong loading.
6	Flight time brought forward – Inconvenience and loss of Duty Free shopping time	Passengers are notified via SMS or by phone
7	Meals do not fit preferences of passengers (vegetarian, Kosher, etc.) due to travel agents' mistakes or passengers forgetting to specially order them	Automatic review of Frequent Flyer history can reveal mismatch between passengers' meal orders in the presence and in the past. Then, a company representative will call the passengers to ensure the accuracy of their present meal order.
8	Reduction of pre-flight waiting time	Luggage collection from the passenger's house (as a premium/standard service).
9	Animal transport – Lack of passenger's knowledge can impede the check-in process or would not allow transporting the animal.	Delivery of an email few days before the flight stating the procedures and requests in detail, including contact details of the airline's advisory veterinarian.
10	Confusion about the flight time due to mistakes and lack of attention	Redesign of the electronic ticket to highlight the flight date and time. Delivery of SMS with the flight details the day before.
11	General or specific seat malfunctions in the media system	Reporting the malfunctions to maintenance. Distribution of media players to passengers.

Table 1: Potential service failures in passenger flights and activities to monitor and prevent them

Among the various service failures that can be prevented by airlines, mismatch between passenger's meal preferences and the meal ordered for her (seventh category in Table 1) can occur due to mistakes in online booking or due to a travel agent's fault. This service failure can cause major inconvenience to passengers who cannot consume non-standard meals (due to medical or religious reasons), as most airlines offer them only if they were ordered before the flight. Fig. 2 exemplifies how this failure can be prevented by linking the various information systems and data sources of the airline. This process aims at ensuring that ordered meals match the preferences of passengers, indicated by data on their previous and recent flights. If no mismatch is found, the passenger receives by SMS his flight and meal details. Otherwise, an airline representative contacts the passenger to verify that the meal order matches her preferences and, if necessary, corrects it.

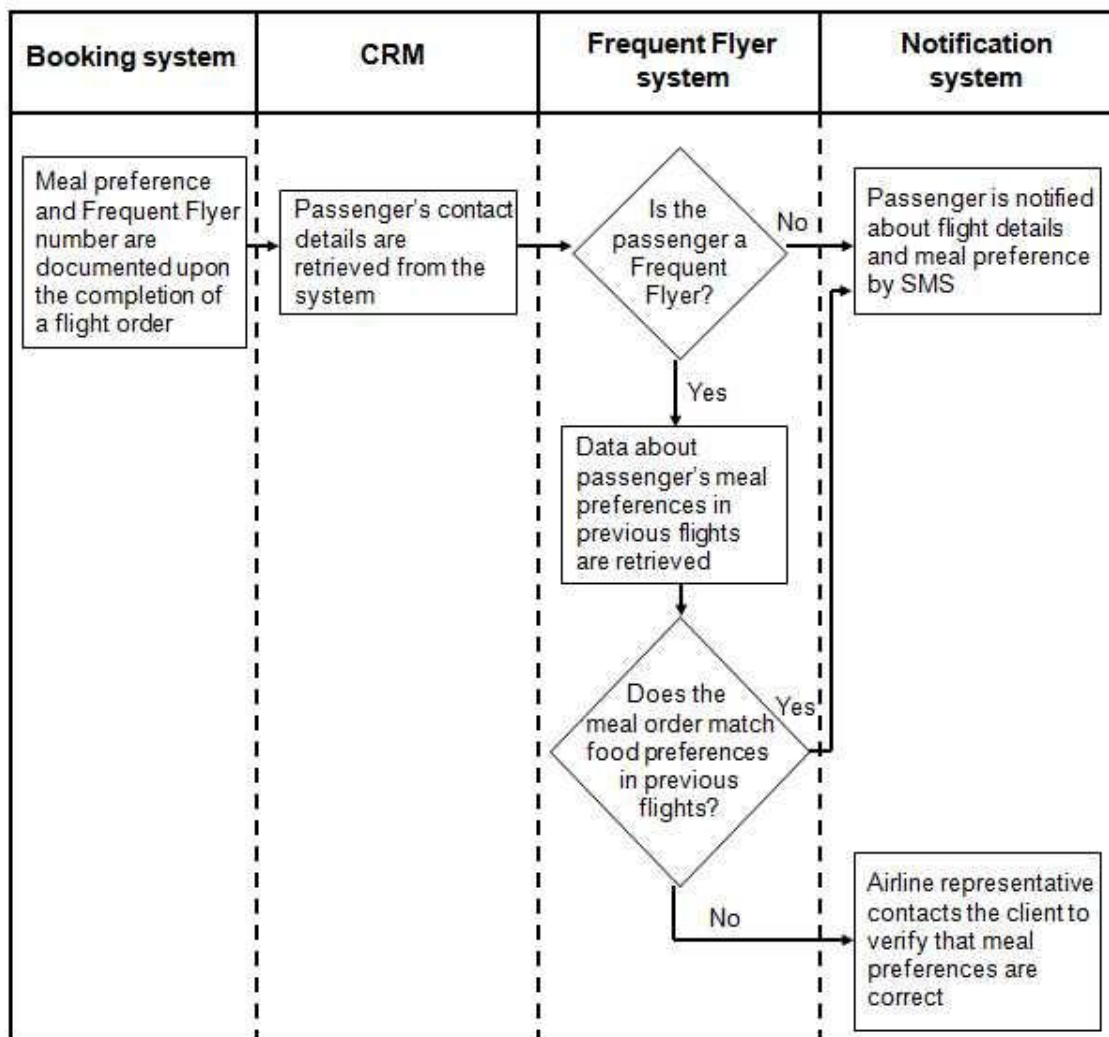


Figure 2: Preventing mismatch between meal orders and passenger preferences

4. CONCLUSION

The recent research literature on service and customer relationship management has largely focused on preserving customer satisfaction and addressing customer complaints as means for improving service quality. This paper takes a different approach towards the possibilities of improving the quality of services by proposing the preventive service management framework, which is based on monitoring the provision of services and eliminating potential service failures.

The airline industry was chosen to illustrate the application of preventive service management and its benefits as the operation of airlines and their revenues are largely based on the quality of services. Additionally, airline operations are sensitive to the emergence of service failures in multitude operations and contexts, for example as a result of technical malfunctions in aircraft cabin systems.

The presented methodology suggests that while the majority of services providing organizations, including airline companies, react to service malfunctions in an attempt to preserve satisfaction and loyalty of customers, service quality can be preserved in advance, hence sparing airlines the negative consequences of service failures. The methodology also advocates extensive use of information and communications systems. On the one hand, the use of information technologies enables airlines to enhance the degree and the quality of communication between them and their customers (e.g. by notifying them about their orders or any changes in the flight schedule). On the other hand, airline companies can produce larger value from data on aircraft procedures or about their customers' habits (e.g. by preventing ticketing of a broken seat or by identifying mismatch between an ordered meal and the customer's special food habits from past purchases).

Moreover, by using information and communications systems for automatic processing of information and for handling of potential service failure factors, airlines do not only enhance service quality but also substantially economize on labor and service recovery costs.

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URBAN TRAFFIC MANAGEMENT BASED ON MEASURING AIR POLLUTION LEVEL

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Abstract: *The subject of this work is exploring ways of traffic management by measuring the concentration of air pollution in urban areas. The goal of this research is to develop models of traffic management and air pollution. The method is based on air pollution 24-hour measurement and connecting monitoring stations with the Automatic Traffic Control System Centre. Based on the measuring results, signalling cycles are being activated in order to make city traffic diversion. In this way it is possible to manage air pollution in critical zones of the city and make traffic diversion to other city areas, which allows the improvement of air quality and pollution control within prescribed limits. Research results show that in the Case of Banja Luka City the air quality has improved 60 minutes after the suspension of traffic in endangered areas (city center). In order to maximize the effects of this method used for traffic management and air pollution control, it is necessary to define alternative city itineraries and implement a program of population education in due time. Results of this research can be useful for companies engaged in the manufacturing of specialized traffic management software and also help them create new specialized software for air pollution control and forecast.*

Key words: air pollution, traffic management, air quality, pollutant measurements, SAUS, APVJGP

1. INTRODUCTION

Economy, technology and car industry development caused the increased number of vehicles in urban areas. Environmental problems in urban areas of today are numerous, causing very serious health problems and influencing the psychology of urban living. In urban areas, such as Banja LukaCity, one of the main problems is undeveloped infrastructure. The Banja LukaCity has no roundabout. Two transit roads pass through the city causing the increase of the pollution. Technological aspect such as the structure of the city, taxi and vehicle traffic, type of vehicles, not implemented SAUS (System of Automated Traffic Management) and APVJGP (Automated Public Transport Surveillance) systems, partial air pollution measurement, bad traffic infrastructure (no separate lines for taxi and public transport) and finally climate and meteorological factors, have direct influence on air pollution.

Small traffic infrastructure and fairly old vehicles are just some of the elements causing the increased air pollution in the city. Air pollution is also caused by certain type of vehicles, in our case vehicles that are 15.7 years old (Euro 2 Standard), ([3]). The end result is ecology problems caused by increased pollution due to stop/go traffic waves and increased traffic during morning and afternoon rush hours. In order to solve the problem two possible solutions can be applied. The first is to set a traffic restriction which is not very popular solution for decreasing the air pollution in urban areas and traffic jams. The second is the method of traffic and air pollution control.

2. MANAGEMENT METHODOLOGY

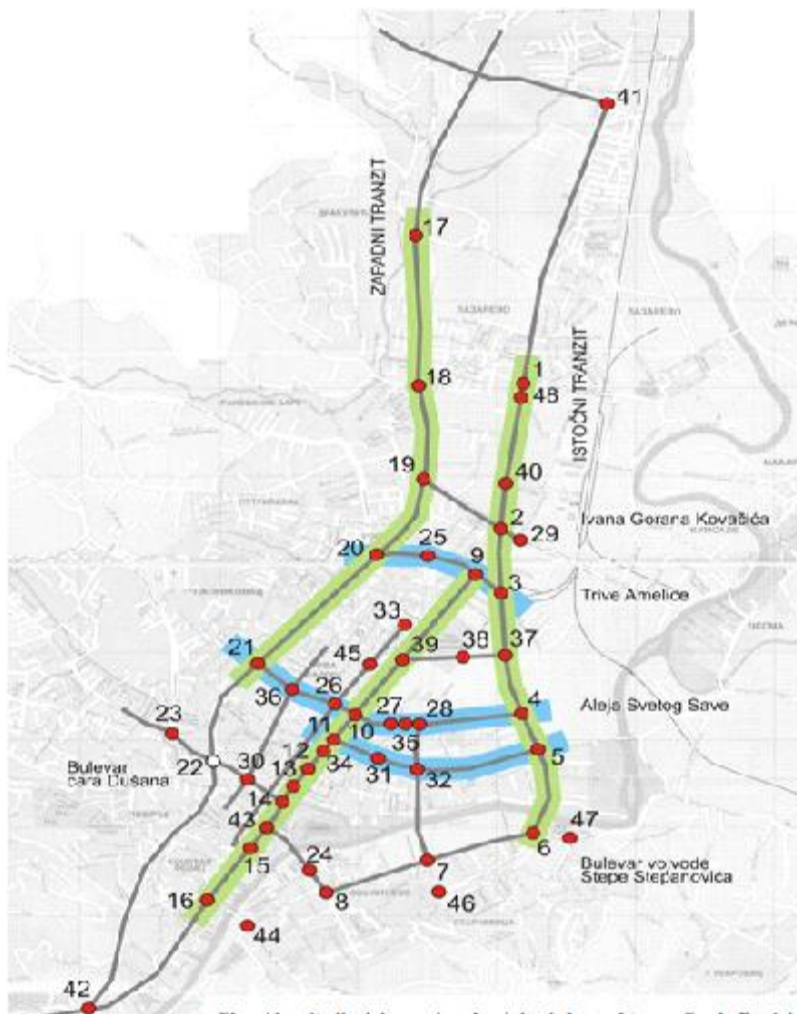
Air quality level in urban areas is determined by different geographical, climate, meteorological and other factors ([2]). Currently, the level of air quality in Banja LukaCity does not match health requirements, i.e. pollution has negative impact on its population. In general, measuring results of air quality in past 3 years indicate Second Class of air quality in Banja LukaCity area. Monitoring took place in 4 spots. Measuring results relating to pollution in the city centre (5th measuring spot) and measuring results relating to the pollution on no traffic day ([4], [6], [7]), show that the air quality keeps in range from Class I to Class IV., depending from the type of pollutant.

In order to apply the suggested methodology of traffic and pollution control, following actions are to be made:

- To install cable distribution system (DKR) throughout the city
- To integrate SAUS and APVJGP system
- To make a laboratory network for measuring the presence of each pollutant
- To install ArcGIS™ ESRI (Win/), Gis software-SelmaGIS
- To make professional teams for implementation of suggested actions
- To provide population education

3. THE ELEMENTS MODEL

DKR - Cable Distribution System represents an infrastructure system for data transfer and system management. This is very important issue because it also allows other elements of the system such as air pollution measuring units, air pollution street display etc., to be connected to data transfer system. For optical cable net (DKR), it is necessary to foresee a huge system which includes safety connections i.e. allows the system to function without the interruption.



Scheme 1: DKR - Cable Distribution System

The idea is to make the system work 24 per 7 and 365 days a year on online basis. Operating system must support audio or video data transfer i.e. alfa numeric information or services. It is of crucial importance to have this kind of system because it will allow the connection to the pollution monitoring network and sending information on current air pollution to street displays. In order to have emediate acces to all relevant dat,

SAUS system also must provide complete database of traffic and air pollution information as well as information on the other services.

SAUS system provides both location and graphic network preview i.e. georeference vector map of urban area including georeference chart of crossroads controlled by traffic light, parking and public garage area, street cabinets with active and passive equipment, street displays, pollution measuring units on video wall. A very important element of SAUS system is video surveillance of crossroads controlled by traffic lights and the detection. On specific locations it is necessary to install video cameras in order to achieve the following:

- Traffic and crossroad surveillance
- Driving direction of the vehicle detection (in case of driving wrong direction)
- Approaching of the vehicle detection
- Traffic jams detection
- Vehicle numbering
- Classification of numbered vehicles (it is the key element for pollution preview and the classification of pollutants is being done by Selma^{GIS} software)
- Lost cargo on the road detection
- Cross road and pedestrian surveillance

Video detection system provides detailed statistics for all required functions of detection cameras. It provides daily, weekly, monthly, quartal, 6-month and annual reports. All of this applies to air pollution statistics by pollutants). SAUS system architecture preview is given on Scheme 2.

SAUS system is advanced architectural information system for automatic traffic management (Scheme 2), that supports the following:

- reception, digitalisation and video formatting of the signal including the storage of all data related to video system and other peripheral elements such as temperature, air humidity and pollution level
- Broadcasting
- Data storage
- Client applications for video surveillance and system for independent diagnosis and maintenance

Monitoring and pollution measurement network consists of mobile EcoLabs that should be set on specific locations. Locations are determined based on traffic frequency i.e. spots with crowded streets and dense traffic during rush hours, when people are going to or coming back from work.

Monitoring and pollution measurement network is second phase in technical and organisational realisation of the model. Immediately after the realisation of SAUS system it is necessary to provide traffic counts on all crossroads and in a few iterations in order to get the exact figures of number of vehicles per hour or number of vehicles per crossroad. This will help define EcoLab locations for measuring of the pollution. [5]

Measuring Lab - APNA 370E, ([1]) has been used for continuous monitoring of atmospheric NO, NO₂ and NO_x. APNA-370 was selected because it uses an independent, internal dry-method to achieve the highest levels of sensitivity and accuracy. The dry method has been a preferred method for monitoring the atmospheric pollution, due to its minimal maintenance requirements and capability of continuous monitoring and instantaneous analysis of gas in its unaltered state. The APNA-370 uses a combination of the dual cross flow modulation type chemiluminescence principle and the referential calculation method. This gives it the advantages of the single-detector method plus the ability of continuous measurements of NO_x, NO, and NO₂. The design gives great stability and extremely high sensitivity (0.1 ppm F.S.)

APNA 370E is single rack-sized unit. For measuring of other pollutants such as CO, SO₂, O₃, LČ, ULČ, smoke and dust it is possible to connect mobile labs with the system.

LED panels are to be installed on city entrance and other city locations displaying different information but with its main purpose to inform the population about the level of the pollution (especially NO_x). LED panels are set on city entrances in order to give the information related to city traffic such as traffic jams, car accidents, directions, speed limit warnings, temperature (T °C), air humidity (rH %), air pressure (mb), etc. LED panels are matrix colour displays with 20 mm pixel distance which are resistant to moisture and other weather and climate factors.[5]

ArcGIS™ ESRI (Win/), GIS software-Selma^{GIS}

One of the most important elements of the model is the implementation of Selma^{GIS} software for graphic preview of pollutant emission on defined locations with mobile EcoLabs. Selma^{GIS} software is modular software supported by ArcMap™ as a part of ArcGIS™ ESRI information system Windows based [8]. User interface is Windows compatible and consists of:

- Emission Factory/Emission Database
- Digitizing Tool
- Meteorology Factory
- Terrain Factory
- AUSTAL2000

Figures for pollution emissions for each pollutant (NO₂, NO_x, PM10 etc.) in selected street can be obtained from Emission Factory SelmaGIS model. The system is used to determine pollutant dispersion in different seasons, vehicle structure which causes air pollution and meteorological conditions, type of source of air pollution (point sources: industries, energy production and heating industry), line sources (streets), diffuse sources (private heating, industries / energy production etc.). *AUSTAL2000* allows up to 300 x 300 grid points in the horizontal direction, i.e. the grid solution for simulation of region 25km x 25km.

Additionally AUSTAL2000 needs as physiographic parameters

- the topography height
- the aerodynamic roughness of the surrounding
- building information (building contours and building height)

AUSTAL2000 can treat the dispersion of the following gases: SO₂, NO, NO₂, NO_x (given as NO₂), Benzene, Chloroethane, Hydrogen Fluoride (given as F), NH₃, Hg

Meteorological conditions in defined area – When defining the model it is necessary to take into the account following meteorological conditions:

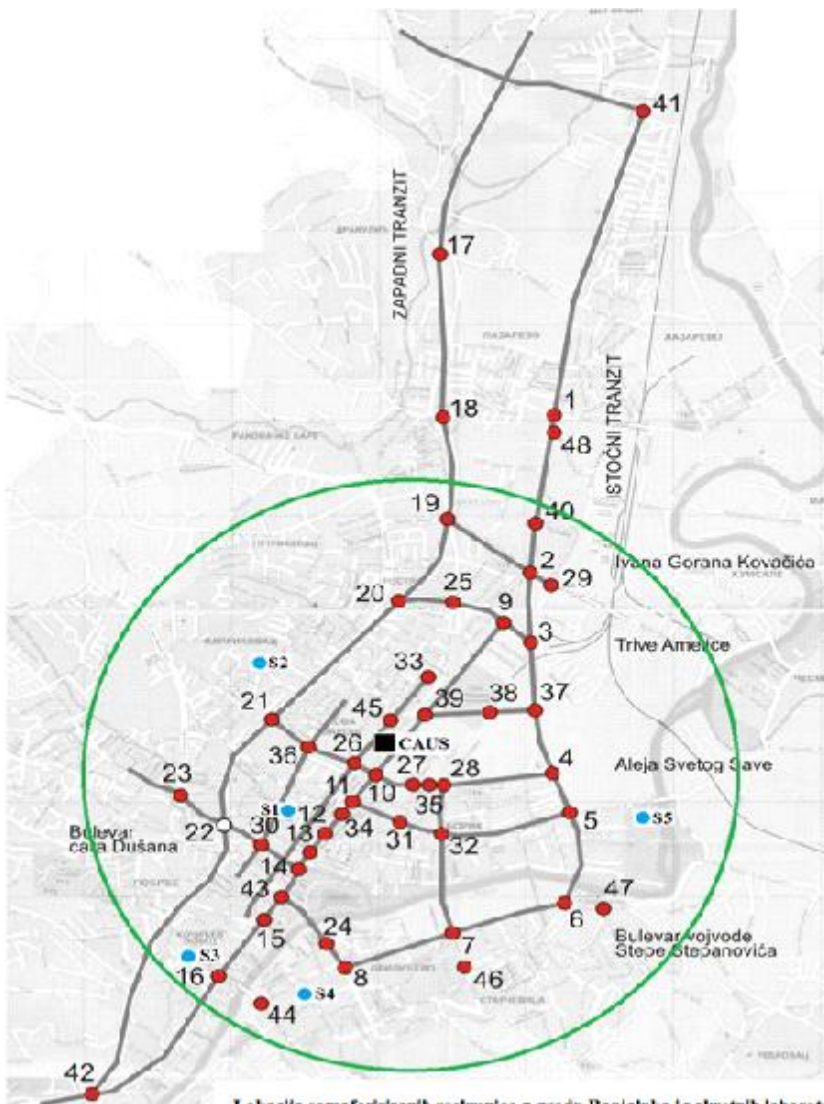
- Relative air humidity, (rH %);
- Air pressure, (mb);
- Wind roses, (direction, wind speed);
- Temperature, (C⁰)

Above given parameters are being taken from Hydrometeorological Institute of Republic of Srpska and have a great impact to pollutant emissions ([4], [6], [7]).

New public transport schedule, parking policy and raising the level of conscience of public transport users are of crucial importance for decreasing the air pollution up to 20%, in case of respecting public transport schedules. Constant reminding and education of the population allows rising of the level of their conscience and reducing the health problems caused by the pollution and increasing the percentage of using bicycle as a mean of transportation. New public transport schedule supported by SAUS has advantages such as pollution decrease, creating the pedestrian zones in the city centre and displacing parking areas out of the city centre to other urban areas. In order to finalize new public transport schedule it is necessary to change the old vehicles that are using liquid oil gas with new ones and, if possible, implement subway, tram or trolleybus transport system. The right means of transport should be implemented depending on the configuration of urban area and the financial resources and it is to be decided by the traffic performance study.

4. URBAN TRAFFIC MANAGEMENT BASED ON MEASURING AIR POLLUTION LEVEL

The method is based on air pollution 24-hour measurement and connecting monitoring stations with SAUS. (Scheme 2). Based on measuring results, signaling cycles are being activated in order to make city traffic diversion. This way it is possible to manage air pollution in critical zones of the city and make traffic diversion to other city areas, which allows the air quality to be improved and within prescribed limits. This method allows the implementation of automatic zero-zone i.e. no traffic zone in specific period of time.



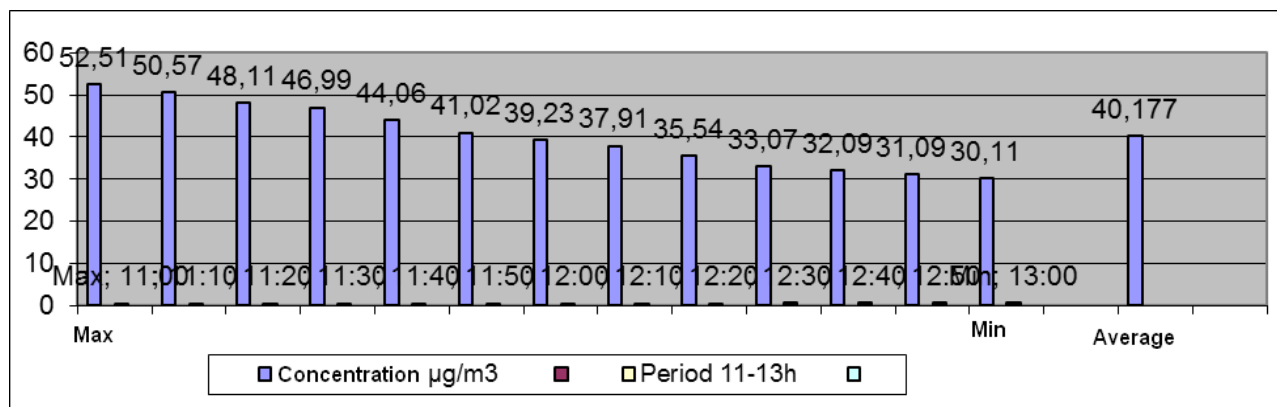
Scheme 2: Traffic Management Model

The level of air quality in urban areas is determined by different geographical, climate, meteorological and other factors ([2]). Currently, the level of air quality in Banja LukaCity does not match health requirements, i.e. pollution has negative impact on its population. In general, measuring results of air quality in past 3 years indicate Second Air Quality Class in Banja LukaCity. Monitoring took place in 4 spots. Measuring results for city centre (5th measuring spot) and measuring results in during no traffic day ([4], [6], [7]), show that the air quality keeps in range from Class I to Class IV., depending from the type of pollutant.

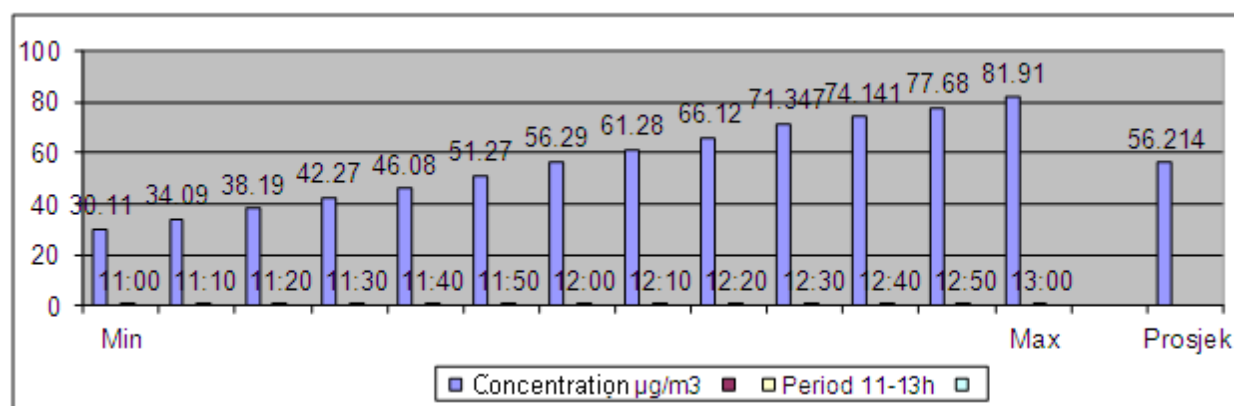
Example: Bus line 14-9. This bus line covers the city center. As soon as pollution reaches its critical level with nitrogen dioxide concentration in the air, the SAUS system is to suspend bus lines 14-9 relocating the traffic to bus lines 14, 30, 22, 21, 20, 19 and 2. The measuring station (S3) that covers this line and city center is within SAUS system. Bus lines 21, 36, 26, 10, 27, 35, 28, 11, 31, 32 i 20, 25, 9, 3 would be suspended automatically and the traffic would be reallocated to bus lines 19, 2, 9 and to transit road lines , 2, 3, 37, 4, 5, 6, 7, 8, 24, 43, 15, 16, 42. City center would be covered only with city and taxi transport.

This was just a sample of city traffic organized based on pollution measurement results given by S1 station. Combining other measuring stations S2-S5 it is possible to make even more alternative itineraries depending on pollution level results. The most important element of traffic management is the infrastructure adjustment of city network necessary for alternative itineraries and pictogram plan for traffic allocation. Before the system is put into the function it is planned to conduct education campaigns in cooperation with the Ministry of Internal Affairs.

Measuring results on No Traffic Day (Scheme 3) and the day after (Scheme 4) during the period from September 22 to September 23, 2010



Scheme3:Results of measurements of nitrogen oxides in the day without traffic



Scheme4:Results of measurements of nitrogen oxides in the day with active transport

Years are determining second class of the air (Table 1). Taking into the consideration air pollution measuring hypothesis, measurements were done on the most frequent street in the Banja Luka City Center. Constant measurements are being done even during days with no traffic and in a specific period of time.

Table 1:Air Quality Classification

Pollutant Concentration in $\mu\text{g}/\text{m}^3$	Air Quality Class			
	Air Class 1 (low air pollution, relatively clear air)	Air Class 2 (risk zone)	Air Class 3 (high level risk zone)	Air Class 4 (critical zone)
SO ₂ (Sulfur Dioxide)	Up to 30	30 - 50	50 - 100	> 100
NO ₂ (Nitrogen Dioxide)	Up to 30	30 - 40	40 - 80	> 80
CO (Carbon Monoxid)	Up to 1000	1000 - 2000	2000 - 4000	> 4000
Black smoke or soot	Up to 20	20 - 40	40 - 60	> 60

Measurements being done on the day with no traffic and the day after with active traffic during the period from September 22 to September 23, 2010 ([4]) gave results as given in Table 1). Decrease of pollutants has been noticed during 2 hour period (10-minute measurements in 2010), especially nitrogen oxides. The values are double during the period with regular traffic. Scheme 4 and 5.

First Measuring Day took place on 22/09/2010 and it was the day with no traffic. An average NO₂ concentration during the measuring period was 28.232 $\mu\text{g}/\text{m}^3$. When comparing an active traffic and no traffic period the decrease of an average NO₂ concentration in the air was evident.

During 2-hour measuring period (no traffic period on 22/09/2010, 1100-1300) First Air Class was reached (zone of pollution border value with an average of $28.2325 \mu\text{g}/\text{m}^3$) with low polluted air, i.e. clean air. NO₂ concentration during a no traffic period was within both target and border value according to the Regulations of Border Air Quality Value ([5]).

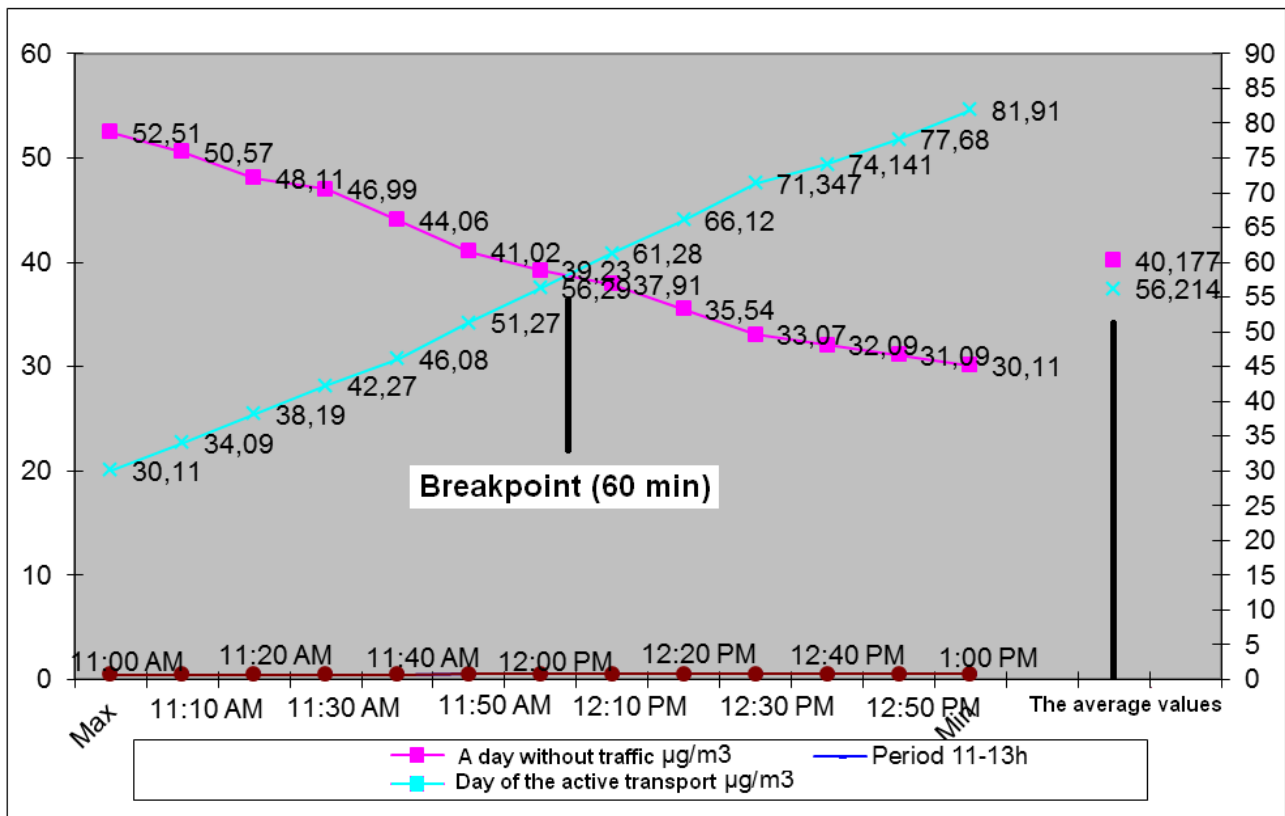
Second Measuring Day took place on 23/09/2010 and it was the day of active traffic. An average NO₂ concentration during the measuring period was $45.282 \mu\text{g}/\text{m}^3$, maximum NO₂ concentration value $63.878 \mu\text{g}/\text{m}^3$. Based on the Decision of Pollution Air Protection in Banja Luka City ([2]), the air quality can be classified according to the following criteria:

During 2-hour measuring period (period of active traffic on 23/09/2010, 1100-1300)

3rd Class - High risk zone ([4]).

It is obvious that dense traffic in Banja Luka City Centre influences the air quality, which confirms NO₂ pollutant concentration during no traffic day measuring period. If we take a look at the graph with active traffic period results we can see that there is a significant increase of pollution with NO₂. The significant increase of pollutants is noticed even with other air pollutants.

If we make data crossing of time periods (with and without traffic, scheme 5) we can see that just after 60 minutes the air quality increases i.e.



Scheme 5: Crossed data measurements with and without traffic

This 60 minute period is a turning point when the air quality i.e. Nitrogen oxide NO₂ concentration level increases or decreases. Just after 60 minutes the air quality decreases to 2nd class. If we take into the consideration the fact that rush hours in Banja Luka City are between 07:00 and 08:00 and between 15:30 and 17:00, we can be safe to say that it is possible to manage air pollution efficiently both in the City Centre and other city locations, because the traffic infrastructure makes it possible. The highest level of air pollution was spotted in rush hour period between 15:30 and 17:00, when in short period of time large number of vehicles were on the streets. From the transportation aspect, it is necessary to coordinate alternative routes for vehicles. However standard itineraries for public and taxi transport would have stayed unchanged. In the AutomaticTrafficControlSystemCenter special itineraries would activate after the critical point, i.e. alternative lines for traffic redirection from the critical zone.

6. CONCLUSION

It is not completely possible to eliminate the air pollution in urban areas. However, it is possible to control it using air pollution measuring stations i.e. allocate polluted air throughout the city. With a support of networked measuring stations it is possible to make pedestrian zones (automatic pedestrian zone) between 1700 and 2400. This way the air quality could be improved to 1st class.

The air quality is determined by measuring results and its comparison to the standard, which helps define certain aims and take necessary steps such as:

1. Protection rate activation in critical situations (total traffic suspension using CAUS System, defining of pedestrian zone and Ecopass zone)
2. Population health risk estimation (traffic suspension)
3. Procurement of basic data for town planning (traffic infrastructure and itinerary planning)
4. Audit of citizen complaints on air pollution

Basically, air quality results taken on 5 different locations in past 3 years show that the air in Banja Luka City is of 2nd class. If we take into the consideration measuring results in S3 centre and the results on no traffic day (22/09/2010), the air quality vary from 1st to 4th class ([4]) depending on the type of pollutant. Finally, the results of the study show that it is possible to manage and control air pollution in urban areas.

Actions that can be taken in order to support these activities and help manage air pollution are closure of parking facilities in the city centre and supporting public and taxi transportation using price policies. Currently, the parking fee in the city centre is at least 5 to 6 times higher than in other city zones and restrictions on buses to remain in city centre other except on bus stations). Quality town management enables lower fuel consumption which decreases the pollution. The reason for that is that less time would be spent in searching for available parking space. Updated information on available parking spaces on public parking lots and public garages would be presented on crossroad displays and the data would be sent by Automatic Traffic Control System Centre.

Based on measuring station network it is possible to make pedestrian zone between 17:00 and 24:00 (implementation of automatic pedestrian zone) and this way improve the air quality to the 1st level. Decreasing the traffic frequency in the city centre would help bus and taxi drivers to drive on schedule, which would also decrease air pollution.

A study allows surveillance and present reading of air quality with immediate traffic dispersion in urban area. Also, the study shows that diagnostic analyses and air quality measurement depends on meteorological conditions. In this case, wind rose has a big influence as well.

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USING GOOGLE MAPS FOR THE PLANNING AND REALIZATION OF A MOUNTAINEERING SPECIAL EVENT

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Abstract: *The goal of this paper is to show possibilities of using Google Maps technology for the planning and realization of special events like mountaineering actions. Google Maps is a powerful, user-friendly managing tool which offers geographic information and gives possibility of choosing between various views such as Traffic, Map, Terrain and many others. The presented software features specification is divided into two packages. The first one consists of features which are important in the mountaineering actions planning phase, and the second one contains functionalities that can help in performing the action itself. Some of the presented features represent addition to the existing outdoor navigation software. While proposed functionalities are not supposed to support complex mountaineering expeditions which demand very serious pre-trip logistics and planning, they can be used as an auxiliary tool in some logistic segments.*

Keywords: *GoogleMaps, special event, mountaineering, planning, mountain hut, mountain peak, tracks*

1. INTRODUCTION

For performing all special events, especially hiking actions, the most important thing is good preparation and organization. In cruel conditions, like they are on mountain, you can never be sure that everything will go according to plan, but there is a way to largely control this situation. Using information and communication technologies you can speed up preparation itself and ensure quality plan execution. In that way you can predict and prevent many potential dangers which can occur in action performing. In this, we must note that, no matter how we planned all undertaking in detail, mountains still hide certain danger that can, more or less, violate the plan. Our plan can be great and worked out in detail, but there are things we can not affect in surroundings like these, primarily weather conditions but also other natural factors. The goal is not to eliminate situations like these, but to reduce its influence on minimum.

The reminder of the paper is structured as follows. Section 2 presents Google Maps technology through its main characteristics, additional technologies and different case studies. In section 3 we will define our problem for which we will use presented technologies and try to recognize all user requirements. In section 4 related work is discussed. Finally, Section 5 provides the conclusion and gives outlook of further research directions.

2. BRIEF OVERVIEW OF GOOGLE MAPS

Google Maps is a web mapping service application and technology provided by Google. This program is a virtual globe with a map and geographic information. You can view close up maps of any place in the world. This service is offering powerful, user-friendly mapping technology and local business information -- including business locations, contact information, and driving directions. Google Maps are flat maps that function within a web browser, and it offers several different views of the landscape, including Street, Traffic, Map, Satellite, and Terrain.

It was launched on February 8, 2005. Interesting thing is that Google Maps satellite images are not updated in real time; they are several months or years old. Google Maps uses a close variant of the Mercator projection, which is a cylindrical map projection that became the standard map projection for nautical purposes because of its ability to represent lines of constant course, known as rhumb lines or loxodromes, as straight segments. While the linear scale is equal in all directions around any point, thus preserving the angles and the shapes of small objects, which makes the projection conformal, the Mercator projection

distorts the size and shape of large objects, as the scale increases from the Equator to the poles, where it becomes infinite. If the earth were perfectly spherical, the projection would be the same as the Mercator. Google Maps uses the formula for the spherical Mercator, but the coordinates of features on Google Maps are the GPS coordinates based on the WGS 84 datum. The difference between a sphere and the WGS 84 ellipsoid causes the resultant projection not to be precisely conformal. The discrepancy is meaningless at the global scale but causes maps of local areas to deviate slightly from true ellipsoidal Mercator maps at the same scale. This difference maybe is not significant but consequence is not that meaningless. Because the Mercator projects the poles at infinity, Google Maps cannot show the poles. Instead it cuts off coverage at 85° north and south. This is not considered a limitation, given the purpose of the service because there are no roads at those latitudes.

Like many other Google web applications, Google Maps uses JavaScript extensively. As the user drags the map, the grid squares are downloaded from the server and inserted into the page. When a user searches for a business, the results are downloaded in the background for insertion into the side panel and map; the page is not reloaded. Locations are drawn dynamically by positioning a red pin (composed of several partially-transparent PNGs) on top of the map images. A hidden IFrame with form submission is used because it preserves browser history. The site also uses JSON for data transfer rather than XML, for performance reasons. These listed techniques actually represent Ajax techniques.

Google TECHNOLOGIES

There are many technologies based on Google Maps. In this paper we will mention just some of them.

Google Ditu - Chinese localized version of Google Maps and Google Local services. In order to be compliant with the requirements of Chinese law, Google had to remove or modify some Google Maps features in Google Ditu. Google Ditu does not allow overlay of user-generated content from Panoramio, YouTube, Wikipedia and webcams. Google Ditu shows the disputed border areas between China and India as being part of China, while on Google Maps those disputed areas are shown inside dotted lines.

Google Moon - displays the points of landing of all Apollo spacecraft to land on the Moon Google Mars.

Google Sky - an online space mapping tool that allows users to pan through a map of the visible universe, using photographs taken by the Hubble Space Telescope.

Google Rider Finder - displays the current location of all supported vehicles of the participating services in major U.S. cities, including Chicago and San Francisco, on a Google Maps street map.

Google Transit - public transport route planner, or we can say the service that calculates route, transit time and cost, and can compare the trip to one using a car.

Google Biking Directions - possibility to search for biking directions on Google Maps. Optimal routes are calculated from traffic, elevation change, bike paths, bike lanes, and preferred roads for biking. An optional layer also shows different types of biking paths, from bike-only trails to preferred roads. This service is available in the US and Canada.

Google Street view - provides 360° panoramic street-level views of various U.S. cities.

Google Aerial view - consists of angled aerial imagery, offering a "bird's eye view" of cities. This feature was available only to developers via the Google Maps API. In February 2010 it was introduced as an experimental feature in Google Maps Labs.

Google Latitude - feature from Google that lets users share their physical locations with other people. This service is based on Google Maps, specifically on mobile devices. Some concerns have been expressed about the privacy issues raised by the use of the service.

Google Flu Shot Finder - allows users in the United States to identify locations where both the pandemic H1N1/09 virus and seasonal flu vaccines are available near a given address or ZIP code.

MonopolyCity Streets - live worldwide version of the game Monopoly using Google Maps as the game board.

Google My Maps - lets users and businesses create their own map by positioning markers, polylines and polygons onto a map. The interface is a straightforward overlay on the map. A set of ninety-one pre-designed markers is available, ranging from bars and restaurants to webcam and earthquake symbols. Despite these, there is possibility to add your own markers. Polyline and Polygon color, width and opacity are selectable. Each element added to My Map has an editable tag which can contain text, rich text or HTML. Embeddable video and other content can be also included within the HTML tag. Created map you can embed into your Web site by copying and pasting map link into your HTML Page.

TECHNOLOGIES THAT CAN BE USED IN COMBINATION WITH GOOGLE MAPS

Google Maps has a great possibility and represents an astonishing discovery of 21st century. Even though, by combining it with other technologies, we cannot harm it, we can just improve it. In this section we will list only a few of many other technologies that can be used in combination with Google Maps. These can help us in export and import all important data from and into database, respectively.

Google Fusion Tables (or just Fusion Tables) is a Web service provided by Google for data management. Data is stored in multiple tables that Internet users can view and download. Google Fusion Tables lets you store, share, query and visualize data tables with pie charts, bar charts, lineplots, scatterplots, timelines as well as geographical maps. Data is exported in a comma-separated values file format. It offers a REST API to run SQL-like queries to manage tables (create, delete), manage data rows (insert/update/delete), and query the table for all rows that match spatial or data conditions. The results of queries can be a .CSV or used in the Google Maps API or Google Chart Tools.

Oracle Spatial forms a separately-licensed option component of the Oracle Database. Oracle Spatial aids users in managing geographic and location-data in a native type within an Oracle database, potentially supporting a wide range of applications — from automated mapping/facilities-management and geographic information systems (GIS), to wireless location services and location-enabled e-business. The spatial component of a spatial feature consists of the geometric representation of its shape in some coordinate space — referred to as its "geometry".

NEW SIGNIFICANT FEATURES

In 2011, Maps and Earth cataloged the massive earthquake in Japan, local businesses and museums joined Street View, and Maps went inside buildings to help you get your bearings in airports, shopping malls, and big box stores across the United States. The most significant features of Google Maps in 2011 are:

- Google Maps kicked off 2011 with some new 45-degree imagery for 10 U.S. cities, including Albuquerque, New Orleans, San Antonio, and Tucson. The 45-degree images in Maps are aerial photographs taken from a 45-degree angle that offer better views of a location than the grainy satellite imagery.
- After the devastating and subsequent tsunami that struck Japan, Google sprung into action to provide fresh satellite imagery of areas that had been heavily impacted.
- Google included a Person Finder to help locate displaced persons, as well as a collection of Google Maps with information about electricity black-outs, road conditions, and emergency shelter locations.
- After tornadoes ripped through the southern United States, Google added new satellite imagery to Google Earth and created a collection of tornado touchdown reports in Google Maps.

- New Place Pages feature that lets you take a 360-degree photographic tour of store interiors such as Nashville's Gruhn Guitars and Comics Toons N Toys in Tustin, California.
- Partnering with transit agencies in Boston, Portland, San Diego, and San Francisco, Google Maps in June launched a feature that let you find out if your bus or train was running on time in real time. Live transit updates let you see live departure times for your bus or train, as well as service alerts. Transit updates are accessible on your PC or on a mobile phone running Android 1.6 or higher.
- Google also added an extremely handy feature to Google Maps that let you download a specific map area to your Android mobile phone for times when coverage is spotty and you can't get online to access Maps.

CASE STUDIES

In order to improve their business, many companies have adopted Google Maps and other listed technologies. In this section we will mention just some of the most famous companies that became even better thanks to these technologies. Those companies are:

- **Tracker Fleet tracking** – leading provider of vehicle tracking with over one million security fleet telematics systems fitted in the UK enables customers to monitor and manage their fleets quickly and effectively Google Maps API was an effective way to make it easier for customers to view information about its vehicle fleets and wanted to investigate displaying historical data on maps that would traditionally appear in a written report or spreadsheet.
- **UniCredit** – one of Europe's largest banking institutions, wanted to add geolocation features to its website including a service to help customers find nearby branches, as well as a tool for linking users to information on the bank's products and services. In addition, they wanted to connect customers with consultant agents in different offices.
- **DHL** - as part of the world's leading logistics group, DHL implemented a mobile-computing system to fully utilize courier routes, reduce the carbon footprint of deliveries, and to improve its Express Same Day Service in UK. DHL used GPS technology to give dispatchers accurate, real-time visibility of courier locations. DHL Same Day chose Google Maps API Premier that lets corporate users build and integrate fully interactive Google Maps on public and internal websites. The couriers' GPS coordinates are now integrated into Google Maps and displayed on plasma screens in the service centers.
- **Toyota** – decided to create a pilot website which would be entirely optimized for mobile devices. The goal was to create a full mobile version of website instead of a scaled down, simplified version of the current website. Location-based services are one of the great advantages of the mobile internet, so they decided to use Google Maps on both main and mobile sites.
- **Apple** – this famous IT Company also added possibilities of Google Maps on their Web site. They use it for adding more useful information for every their store, such as: opening hours, exact address, description how to get to their store, driving directions.
- **Zipcar** –deals in renting cars in Boston and on their site you can find Zipcars near you with all types of cars that are available by entering your address, work address, best friend's address or neighborhood. You can also learn more about the cars, like how many groceries or friends you can fit safely inside.

There are many other companies that are using possibilities of Google Maps for various purposes. Such as fire break, determining how many of acres are affected, when evacuation has started and so on. Other companies are using it for trip planning. There you can see all viable transportations with evaluation of time arrival and cost for each elected type of transportation. You can also enter parameters that are important to you, for choosing adequate medium. Some of them are: minimum time, minimum transfers or minimum walking, acceptable walking distance, are you a person with special needs and so on.

3. PROBLEM DESCRIPTION

In this chapter we will see what is necessary for planning some special event, like mountaineering. We must note that as mountain climb is harder and more serious, that more logistics is needed.

Before departure itself, you should determine all information that is necessary for surviving in cruel conditions. Primarily you need detailed description of location. This is related to existential questions that concerns mountain hut, its structure, capacity, existence of drinking water and so on. The most important thing is to determine not only the distance between every point of interest (in further text POI) and place in which you are situated, but also all routes that lead you to the desired place. The point is not to choose any of existing routes, but to determine, depending on position, the best and the closest route that will take you to the final destination, whether it's mountain hut, water, parking place, mountain service, mountain peak itself or something else. Before departure you also need to know what the length of the route is and how many hours of walking is expected. Needed time primarily depends on age and physical predispositions of mountaineer, but also there are many other influential factors like weather conditions, season, group size, gender, etc. Considering all key influential factors you can predict needed time to conquer some mountain massif. The key element in situations like this is good communication. For navigation on those places, of great importance, is possibility of using GPS gadgets. Before departure itself you should examine ability to access GPS, signal quality, network coverage and availability of various services.

Considering previous exposure, we will state all identified user requirements:

- Defining POI (hut, peak, parking, mountain service, medical help, restaurant) and all important information
- Defining tracks
- Description of tracks that lead to mountain peak
- Evaluation of hiking time
- Length of route between two points of the segment

4. FEATURES DESCRIPTION

In this chapter we will present software features specification according to problem description given in previous chapter. We must emphasize that suggested solution is based on using Google Maps technology. Realization of features that we will give in this paper will provide quality planning and realization of mountaineering actions. These features represent addition to existing outdoor navigation software and not their surrogate. Proposed functionalities are not supposed to support complex mountaineering expeditions which demand very serious logistics and planning, but can be used as auxiliary tool in some segments of logistics.

Functionalities of this software can be divided into two packages. In the first package are features that cover mountaineering actions planning phase and the second consists of functionalities that can be helpful in performing action itself. In further text we will present all identified features.

Planning phase features (first package) consists of following:

- Defining POI types
- Defining POI (hut, peak, parking, mountain service, medical help, restaurant)
- Maintaining data about hut facilities
- Defining and maintaining information about peak approaches
- Maintaining approaches grade values
- Attaching GPS tracks to defined approaches
- Maintaining hiking time for approach route

Second package consists of following functionalities:

- Searching and displaying all tracks to the mountain peak that have intersection in defined diameter from actual GPS position
- Ranking of obtained tracks depending on given criterion which can be: minimal distance to the track switching point, the lightest weight track, the shortest hiking time remaining, etc.
- Getting information about time left from actual position to the peak. For this purpose embedded average hiking time table and weighting coefficients that depend on approaching grade value are used
- Getting information about number of left track segments, their grade value and estimated time left for their overcoming

Logical data model of presented solution is given in Figure 1. In data modeling process, extended entity-relationship technique is used.



950

For realization of defined features Google Maps will be used. All Geocoding and other information is stored in database with Oracle Multimedia (if we are using Oracle Spatial). Data can be displayed by reverse engineering addresses into Geospatial Co-ordinates using the Google Maps API. Hereinafter, are figures that describe how Google Maps can be used for displaying information about hut, peak and track.

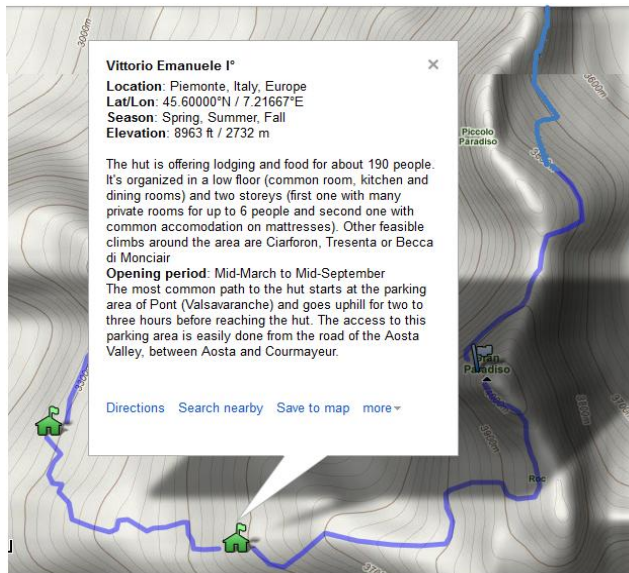


Figure 2: Info about mountain hut

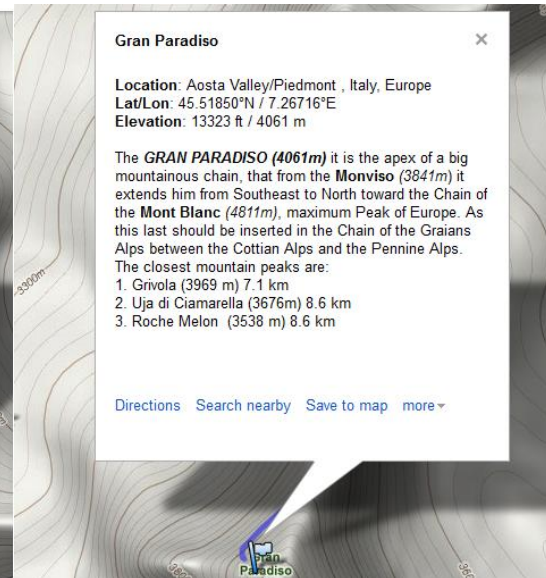


Figure 3: Info about mountain peak

On figure 2 are a couple of huts and defined peak. This figure presents all information that is important for the hut. Hut has its name, location (latitude and longitude), seasons in which it is available, elevation, short description and opening period. Figure 3 presents mountain peak. It has its name, location, elevation, brief description, and list of closest peaks. Blue colour is for tracks. On figure 4 is information about standard NW face route that leads from hut on figure 2 to peak shown on figure 3. Each route has total distance between two defined points, level of difficulty, track description and site for further information.

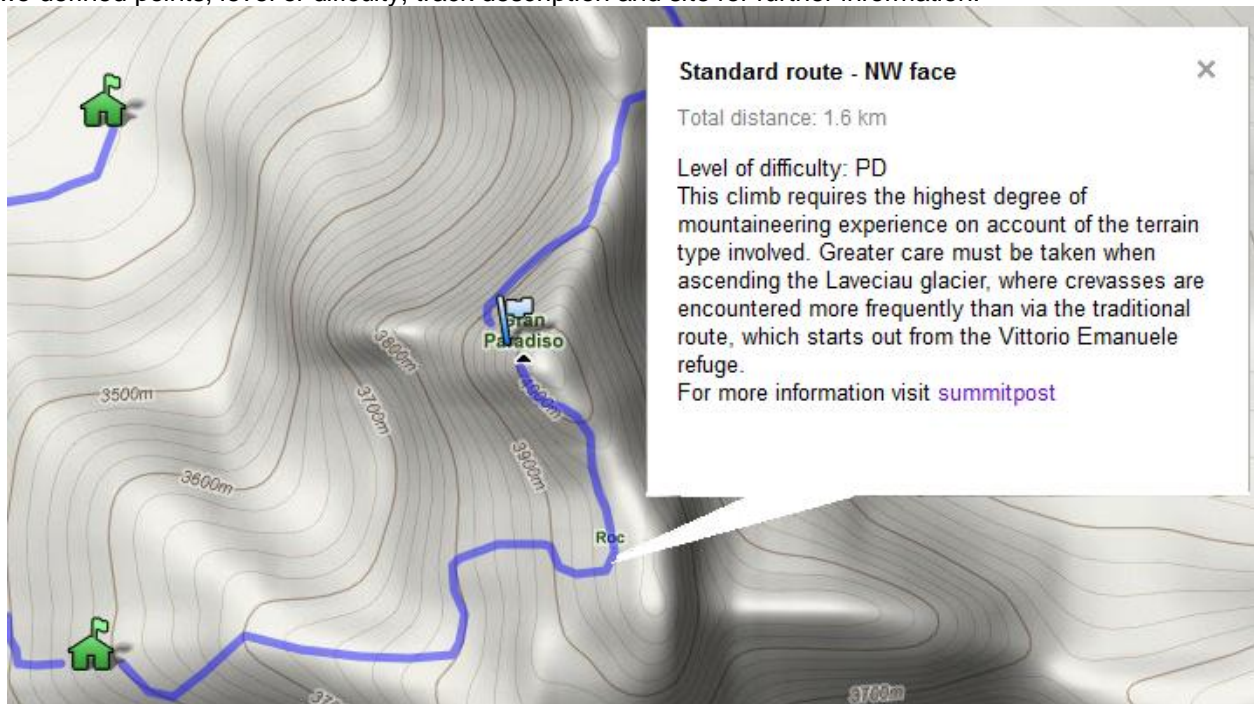


Figure 4: Info about NW face route from mountain hut to peak

5. CONCLUSION

The goal of this paper was to show possibilities of using Google Maps technology for planning and realization of special events like mountaineering actions. For defined problem and identified user requirements we have given software features specification and data model of presented solution. Our goal for the future is to improve suggested solution and to work on its realization. We do not want to replace existing outdoor navigation software, but to use its possibilities and add some new features that are important in planning and realization special events, in this particular case, mountaineering actions.

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INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE FUNCTION OF CREATING A GLOBAL MARKET AND THE INTERNATIONALIZATION OF TRADE

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Abstract: *Information and communication technologies (ICT) in contemporary business are becoming an important means of creating and maintaining a long-term competitive advantage. On the other hand, multinational companies, being drivers of globalization and internationalization, implement ICT in their business strategies. This mode of operation leads to the creation of global markets and the internationalization of trade. The aim of this paper is to highlight the role that ICT play in the creation of global markets and the internationalization of trade. For this reason, the focus is on the innovations that are brought with the information and communication technologies, global market and trade conditions in the "new-to-digital" economy, as well as on the positioning of Serbia in terms of "digital" economy and information society. By using relevant statistical data, the goal is to determine where Serbia is in the implementation of ICT for business purposes.*

Key words: *information and communication technologies, global market, internationalization of trade, innovations, "new" economy*

1. INTRODUCTION

Market globalization and internationalization of trade marks the end of the 20th and early 21st century. Multinational companies (MNCs) as drivers of globalization recognize information and communication technology (ICT) as a resource for competitive advantage and increase business performance. Hence the effort MNC leader in the global ICT market to implement in business strategy, while recognizing them as agents of globalization. Internet adoption in MNCs leads to reengineering the entire supply chain, developing new business formats to trade in goods, services and capital. It is produced and traded to a business partner does not see. It affirms the concept of a virtual (electronic) transactions, electronic commerce, virtual supply chain, marketing and Internet marketing information systems on the Internet. Electronic commerce and electronic sales channels that were in the eighties mentioned in MNC visions "have brought" a new concept of business economics known as the "digital economy". "Old Economy" driven resource gives way to "new economy" (knowledge economy), whose main resource of knowledge - innovations and info. Furthermore, MNCs, former leaders of the "old economy", accept the challenges of the "digital economy" and develop electronic business. The degree of acceptance of ICT reveals the level of information (lack of) literacy and transnational cooperation "of national-international" stakeholders: owners, managers, employees, suppliers and society as a whole. Furthermore, the globalization of markets and internationalization of trade reveal (in) ability of local managers to implement ICT in marketing-management strategy. In terms of "new economy" open questions: how to position the national economy into regional and global economic integration? how to master the secrets of the Digital Agenda "information society" by the EU as a "pre-accession commitment," the candidate countries for entry into its market? And how to master the secrets of "network economy" as a polygon in which MNCs "measured" force "global player"? The European Union is still in the framework of the Stabilization and Association Agreement (SAA), recognized the insufficient development of ICT in Serbia, as a limiting factor for the development of "information society", on the one hand, and Web-digital economy, on the other. To this end the EU's economic policy makers in Serbia set up a digital "tasks" including pride of place belongs to the development of the concept of electronic commerce, "the digital-Internet (Web) economy" and "information society". As the Serbian, the first of March 2012, granted candidate status for EU membership, and the Digital Agenda Project "informational society" becomes priority number "one".

2. INFORMATION AND COMMUNICATION TECHNOLOGIES – A PREREQUISITE FOR INCREASING THE COMPETITIVE ADVANTAGE OF COMPANIES IN CONDITIONS OF GLOBALIZATION

Modern information and communication technology (ICT) and their use in operations of multinational companies (MNCs) and other operating system feature of the globalization in the 21st century. The

development of microelectronics, production and use of computers enabled the transition of industrial society to information society. With the development of ICT leads to convergence of traditional forms of international business operations carrier, on the one hand, and computer science, on the other hand. Multinational companies seeking the possibility of diversification of business has been recognized ICT as factor in raising the competitive advantage. Hence the efforts of companies in the global market leader that implements ICT in business strategy while recognizing them as agents of globalization. Government and management of MNCs countries try to encourage the development of innovative activities in electronics and communications.

2.1. INNOVATIONS WERE BRING BY INFORMATION AND COMMUNICATION TECHNOLOGY

Scientific and technical progress in the field of micro-electronics and applications of information and communication systems, such as: EAN system (European Article Numbering), scanning (bar codes), and a computerized collection of the so-called point of sale. POS (Point of Sale System), electronic transfer of funds so. EFTPOS system, electronic payment cards, electronic transfer and exchange of business data so. EDI (Electronic Data Interchange), electronic transfer and standardization of business documents so. EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport) and the SWIFT system (Society for Interbank Financial telecommunication), leading to the re-engineering of the international carrier business, affirming the concept of global information and communication strategy.(Chaffey, Mayer, Jolnoston, Ellis-Chandwick, 2000)

With the development and implementation of Internet, multinational companies recognize the information-communication innovation as a resource to increase competitive advantage and business performance in the global market. Internet adoption in MNCs leads to reengineering the entire supply chain, developing new business formats to trade in goods, services and capital. It is produced and traded to a business partner does not see. It affirms the concept of a virtual (electronic) transactions, electronic commerce, virtual supply chain, marketing and Internet marketing information systems on the Internet.(Turban, Mc Lean, E., Wetherbe, 2003)

Electronic commerce and electronic sales channels that were in the eighties mentioned in the visions of MNCs "spawned" a new concept of business economics known as the "digital economy". "Old Economy" driven resource gives way to "new economy" (knowledge economy), whose main resource of knowledge - innovations and information. Furthermore, MNCs, former leaders of the "old economy", accept the challenges of the "digital economy" and develop electronic business (e-business Eng.). It is the "displacement" (transfer) of the traditional business functions: purchasing, sales, logistics, physical distribution, marketing, finance, customer services, and cooperation with business partners on the Internet. Electronic procurement and sales overcome spatial and temporal barriers; MNCs and management with emphasis on marketing information system (MIS) to inform consumers about the properties of the "package deals" that can satisfy their needs, desires and expectations. Through large and expensive projects, such as: a) Business-to, business (B2B commerce between business systems), which includes not only business between parent companies and subsidiaries, but also other companies and supporting entities such as banks, insurance companies, customs, shipping organizations, financial institutions, etc.), b) Business-to-consumer B2C. This model of e-business is focused, mainly, on the sale marketing products and services. The best-known company of its kind in the world is Dell, Amazon-com, e Bay, c) Business-to-Administration B2A, d) Consumer-to-Administration C2A. This, the model is increasingly promoted by the European Union to reduce the complicated administrative procedures between administration-citizens. He served makers "global society" as a platform for the development of "information society", e) Consumer-to-Consumer C2C f) Consumer-to-Business C2B. Example of e-business model was developed by Price.Line.com where the customer says the price at which to buy the product, and the seller is trying to deliver the product in accordance with the request, g) Government-to-Consumer G2C (government to citizens and others). In this model, e-business recognizes the desire by the Government (Administration) of the developed countries to a global society and make the information developed "in hand" approach to all.(Clinton, Gore, 2000)

This does not exhaust the list of innovations that bring with them information and communication technology. Along with information and communication reengineering of production and transfer of the global market sphere there is a kind of electronic revolution in the financial market. Based on EDI and the Internet promotes the concept of electronic financial markets, and in the forefront of electronic exchanges. Trading on the stock exchange is carried out based on a software-hardware package. Formed a sort of reversal of spreading primarily personal computers and then connect them to the Internet as a global communication

medium. Information and communication technologies broke the physical, linguistic and administrative barriers in the movement of goods, services, capital and labor in the global market.

3. THE GLOBAL MARKET IN CONDITIONS "NEW-DIGITAL ECONOMY"

Chronologically speaking, the process of globalization of markets and the internationalization of trade carried out in phases. Leaving aside this time in an exhaustive listing of the most important carrier (driver) globalization-internationalization, the different stages of development we intend to look at the final stage of which is the "seal" the "new economy".

Are there new managers for the "new economy"? With the development and application of ICT and novelty that brings scientific and technical progress and changing the nature of conducting global business. Computers and electronics modify the current traditional business and marketing-management skills. Development and application of the Internet in the late 20th century affirms the concept of electronic (virtual) business and the new managers for the Internet "digital economy" parallel changes in the nature of global competition on the market. Besides price and quality of goods and services comes to the fore and the implementation of marketing innovations that bring with them information and communication technology. Multinational companies are becoming promoters of modern information and communication systems and the "masters" of the global market. Electronic data interchange and business documents based on EDI and the Internet has enabled multinational companies to connect with their affiliates, on the one hand, and business partners and subcontractors across the globe, on the other. It creates a model of "network economy".

The term "network economy", "digital economy", "knowledge economy", is used to refer to "postindustrial society". These are concepts ("landmark"), which separate the "old economy" (resource-driven economy), and "new economy" (knowledge-driven economy and information). Furthermore, in theory a few years ago started using the term "new economy". (Milovanović & Veselinović, 2009) It is a young (tentatively named) new scientific paradigm to explain the whole range of economic, social and cultural changes brought with them the information and communication technologies, where pride of place belongs to the Internet. Rarely characterized in textbooks, technical papers, in scientific meetings, the term "new economy" there are different interpretations of this phase of globalization. The literature has not yet crystallized attitude, whether the "new economy" or is it just a new phase of development of the current economy.

Leaving aside other aspects of the "new economy" (socio-cultural, environmental and ethical), as a permanent current topic, we can say that the innovation that brings scientific and technological progress of the most recognizable determinant of economic phenomena. Seen from this perspective the "new economy" is a qualitatively higher level (benchmark) "old economy". It served Pjatkovskom (2009) to the question of whether there is a "new economy" answer "if we agree with the fact that economic growth is still largely based on the traditional economy, then we can say that the" new economy "in the true sense of the word does not exist ". (p. 396) However, if the other "new economy" look like a set of economic phenomena and mutually conditioned processes based on IT technology, which means new ways of doing business and further economic development, then we can say that there is a qualitatively different pattern of economic development. This definition links the "old" and "new economy" in the sense that the "new economy" is still just a form of expression of technological and economic development. Another group of theorists led by Gordon (2009) believes that the term "new economy" will always be written in quotation marks because it does not exist as such. (p. 397) There are only new production technology and distribution that each time a qualitatively different impacts on the way this business. According to them faster economic growth in the U.S. in late nineties of the 20th century is the result of "new economy" has increased productivity in the sector of information and communication technologies, supplemented by cyclical effects of higher levels of investment.

It can be finally concluded that the ICT architect of the "new economy". The challenges of ICT are accepted by multinationals companies, the leaders in the global market. Due to the different pace of implementation of ICT in business strategy leads to technological and economic gap between the companies. The differences are more noticeable if the development and application of technological innovations seen at the global level. The digital divide that already exists between the developed North and the underdeveloped South, will lead to further technological and economic divide between these countries. Generators "new economy" and lead to the division of the company globally recognized companies and parochial type. Through this prism, and in terms of further penetration of ICT should consider the future trends of globalization.

4. TRADE IN THE ERA OF "NEW-DIGITAL ECONOMY"

With reference to contemporary theory and practice, we see that the progressive development of the ICT is coming closer to the international carrier business, on the one hand, and ICT, on the other. Multinational companies recognize ICT as a factor in raising the competitive advantage and improve business performance. Hence the effort MNCs, global market leader is in implementation of the (ICT) in business strategy and promoting themselves as the creators of the "new economy". (Daning, 1998)

Development and application of the Internet leads to a kind of global business reengineering. Multinational companies internationalize their operations affirming the concept of electronic (virtual) business. There is a virtual transfer of business of MNCs. Parent companies open their branches (daughter companies) around the world, where the spatial distance business partner is no longer a limiting factor in business.

4.1. "MOVING" RETAIL NETWORK TO THE INTERNET

Modern ICT abolishes the last geographic barrier between the participants in the global business. Information and communication technologies and their services, such as the Internet becomes a platform on which the traffic of goods and services. Retail chains leaders "traditional economy" such as Wal-Mart, Marks & Spencer recognize ICT as an important determinant of internationalization of trade in the era of "digital economy". (Turban, McLean, Wetherbe, 2003) It comes to the "migration" of the retail network in the traditional trade institutions to the Internet. These retail chains develop the retail network "brick and mortar" and open Internet e-store, known as retail sales on a "click and mortar". Commodity exchanges are digitalized. Information and communication technology and standardized trading rules internationalize the stock market trading. (Dugalić, Štimac, 2005) Thanks to ICT London Metal Exchange has become a global stock market. Internet-Web economy has made the London Metal Exchange to trade on her "accredited" electronic brokers from around the world. On this basis, trade moves from mechanical to electronic Internet-stage development. This does not exhaust the list of innovations that ICT brings. It develops and occurs: e-money, e-payment card, e-check, e-payment and e-business documents (purchase orders, invoices, records of quality and quantity of goods receipt, goods and documentary letter of credit, customs declaration, etc.), which increasing the competitive advantage of companies in the global market.

Digital Economy (the "new economy") requires change-management and marketing skills. It affirms the concept of electronic (Internet-virtual) virtual marketing and management. (Kolaković, 2011) Network Economy becomes a global range within which MNCs "weigh" their forces. The national competition's authenticity "tests" the global test site. In other words, the global market is becoming a national evaluator of business strategy. In the global market is checked and implementation of ICT strategies in the marketing strategy of the business system. In doing so, we must not forget the fact that ICT reversed model "parochial" production and trade. New ICT reveal the level of information (lack of) literacy of local stakeholders: owners, managers, employees, suppliers and society as a whole. Therefore, the appearance (exit) of local managers in the global market easily reveals their (un) preparedness for the implementation of ICT in national business strategy. Examples of this abound. One of the key is the digital divide between the developed North and the underdeveloped South.

Financial markets, financial institutions and financial conditions of the participants in the "digital economy" given the epithet of "virtual". Stock Exchange becomes a virtual financial "conglomerates" in which electronic trading brokers from different web sites. Distances financial student is no longer a limiting factor in the business, came to the fore of the global strategy of the financial markets.

5. SERBIAN SECRET TO MASTERING THE "NEW ECONOMY" AND THE INFORMATION SOCIETY

Digital processes re-engineering of all areas of business are present in the world and the EU more than half a century. Innovation that brings scientific and technical progress has changed the traditional way of conducting all business activities have. Pride of place in the digital re-engineering of the national and global socio-economic scene was given to ICT. With the development of the Internet as the latest phase of information-communication restructuring "traditional model" of life and work, changes and socio-cultural view of society. It promotes the concept of information society on the one hand, and the world becomes a "global village", on the other.

Depending on the level of ICT in business, is the differentiation of national economies in the following directions:(Porter, 2000) a) Globally oriented economy, b) regionally oriented economy, and c) Locally

oriented economies. The global decentralization of socio-economic activities will be digitally literate privilege which would exclude from the regional and global socio-economic information and unprepared scene of the national economy, in this case, the national economy from the group c.

Through this prism should be considered and the development of information society in Serbia. It is a national project to harmonize our information and communication infrastructure with the "Digital Agenda". The development of ICT, electronic communications and their implementation in the socio-economic development strategy of the Serbian society is one of the EU requirements.

The European Union has recognized the insufficient development of ICT in Serbia as a limiting factor for the development of "information society", on the one hand, and Web-digital economy, on the other. The development of digital communications and information society is an important factor to increase national competitiveness and improving the business climate and quality of life of citizens. To this end, EU economic policy makers in Serbia following sets of digital "tasks" as follows: (Izveštaj Svetske banke, 2009) 1) digitization of telecommunications infrastructure, 2) that the Internet is widely available, 3) fast, cheap and secure Internet, 4) development of broadband Internet, 5) Web development economics, 6) the introduction of digital television, 7) development of the industrial sector of electronic communications equipment, 8) development of mobile services, 9) the introduction of number portability, and 10) effective access to information and knowledge.

This does not exhaust the list of EU demands Serbia on the path to mastering the secrets of the "information society" and the "digital economy". It is necessary to market liberalization of fixed telecommunications network and the elimination of "double" as a bottleneck of information and communication environment. Emphasizes the development of broadband Internet access, because the current data, only 6.36% of users using this approach, which is below the EU average (23.9%). The development of "information society" and the "digital economy" requires change of public, utility and real sectors. It involves the use of ICT in the following areas: a) Public administration (e-government), b) Health (e-health) c) Judiciary (e-programs sponsored), d) Education, science and culture (e-science and e-culture), e) Distance learning (e-learning).

A special segment of "information society" and the "digital economy" is a national concept development of electronic commerce. Feeling is the best person for the development of the concept of electronic commerce Ministry of Commerce of Serbia within the project "Strategy and Trade Policy of Serbia," (Grupa autora, 2009) a special emphasis placed on the development of this new segment-digital economy. Emphasis is placed randomly on the development of e-commerce. Reasons for this are more. Primarily, the internationalization of trade and globalization of markets is impossible to imagine without the instrumentality of ICT in the marketing strategy of retail chains. Electronic trade models, such as (Ćuzović & Ivanović, 2010) B2B (Business-to-Business), B2C (Business-to-Consumer), B2A (Business-to-Administration), C2A (Consumer-to-Administration), C2C (Consumer-to-Consumer), C2B (Consumer-to-Business), G2C (Government-to-Consumer), P2P, make the platform on which the traffic of goods-services-capital-information in international business. Computers and electronics are becoming the architects of the "new digital-trade."

Bringing the end of the discussion on this topic should be said that in Serbia, created institutional conditions for the development of "information society" and the "digital economy". When you speak, especially bearing in mind that Serbia has adopted the Digital Agenda: (Grupa autora, 2010) 1) Development Strategy of electronic communications in 2010. Until 2020, 2) Strategy for Information Society by 2020, 3) development of e-government strategy for the period 2009-2013., 4) Law on Electronic Commerce, 5) Law on Electronic Signature, 6) Law on Electronic Documents, 7) Law on secrecy, 8) data Protection Act and the personality and 9) Act on Organization and Jurisdiction of the fight against high-tech crime.

It is the harmonization of our socio-economic environment with the requirements of the Digital Agenda of the EU "Information Society" and "digital-Internet economy." For the implementation of the Digital Agenda Serbia estimated the amount of five billion Euros.(Grupa autora, 2010) Funds for implementation of these projects will be provided by international organizations, donations, and through public-private partnership.

5.1. POSITIONING OF SERBIA IN CONDITIONS OF "NEW ECONOMY" AND INFORMATION SOCIETY

Speaking of the "Information Society" and "digital economy-Web economy" in Serbia is not possible without the answers to these questions, like: what is the level of development and application of the Internet? Where Serbia is today in terms of implementation of the Internet for business purposes? After the answers to these

questions, we will try to look at digital-Internet positioning Serbia to the EU, on the one hand, and Global positioning on the other hand.

Starting from the research objectives in the following presentation we will try to rely on the available empirical-statistical data look "digital-Internet" positioning of Serbia in the EU and the global environment.

Table 1: Overview of the population of Internet users by region in the world

Region	Population (2011)	Users of Internet (31.12.2000.)	Users of Internet (2011.)	Users of Internet (in %)	Increasing of users of Internet (2000-2011)	Users of Internet by regions
Africa	1,037,524,058	4,514,400	118,609,620	11.4 %	2,527.4 %	5.7 %
Asia	3,879,740,877	114,304,000	922,329,554	23.8 %	706.9 %	44.0 %
Europe	816,426,346	105,096,093	476,213,935	58.3 %	353.1 %	22.7 %
Middle East	216,258,843	3,284,800	68,553,666	31.7 %	1,987.0 %	3.3 %
North America	347,394,870	108,096,800	272,066,000	78.3 %	151.7 %	13.0 %
Latin America	597,283,165	18,068,919	215,939,400	36.2 %	1,037.4 %	10.3 %
Australia	35,426,995	7,620,480	21,293,830	60.1 %	179.4 %	1.0 %
Total	6,930,055,154	360,985,492	2,095,006,005	30.2 %	480.4 %	100.0 %

Source: <http://www.internetworldstats.com>

According to estimates, about 30% of the world uses the Internet population. This number is significantly higher if the watch-developed regions of the world, such as North America, where 78.3% of the population uses the Internet, Oceania (Australia), where 60.1% of the population uses the Internet, and Europe where 58.3% uses Internet population. In less developed countries, the percentage of Internet users rarely exceeds 20% of the total population. However, most Internet users today are located in Asia, about 44% of the total number of users worldwide. This is partly explained by the fact that Asia is a continent with the most population, but it is the percentage share of Internet users in relation to the total population far behind North America, Oceania and Europe. Also, many underdeveloped regions have high rates of growth of the Internet, which can be partially explained by the statistical phenomenon of a low base. It speaks to their importance to use the Internet to grow in the future. (Bjelić, 2008)

The most important limitation of the number of Internet users worldwide continues to represent the costs to invest in equipment to connect to the Internet infrastructure. In addition to computers and need to find appropriate software to enable Internet access, as the very poor strata and remains an obstacle. However, widespread use of cell phones, even in the poorest regions of the world, and allows the use of Internet services. This is one of the reasons for the increase of Internet users, even in underdeveloped parts of the world. (Bjelić, 2008)

Table 2: Users of Internet in EU

Region	Population (2011)	% of world population	Users of Internet (2011.)	Users of Internet (in %)	Increasing of users of Internet (2000-2011)	Users of Internet by regions
European Union	502,748,071	7.3 %	338,420,555	67.3 %	258.5 %	16.2 %
World without EU	6,427,307,083	92.7 %	1,756,585,450	27.3 %	558.9 %	83.8 %

Total	6,930,055,154	100.0 %	2,095,006,005	30.2 %	480.4 %	100.0 %
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Source: <http://www.internetworldstats.com>

Table 3: Users of Internet (by countries)

European Union	Population (2011)	Users of Internet (2011.)	Users of Internet (in %)	Increasing of users of Internet (2000-2011)	Users of Internet by countries
Austria	8,217,280	6,143,600	74.8 %	192.6 %	1.8 %
Belgian	10,431,477	8,113,200	77.8 %	305.7 %	2.4 %
Bulgaria	7,093,635	3,395,000	47.9 %	689.5 %	1.0 %
Cyprus	1,120,489	433,900	38.7 %	261.6 %	0.1 %
Czech Republic	10,190,213	6,680,800	65.6 %	568.1 %	2.0 %
Denmark	5,529,888	4,750,500	85.9 %	143.6 %	1.4 %
Estonia	1,282,963	971,700	75.7 %	165.1 %	0.3 %
Finland	5,259,250	4,480,900	85.2 %	132.5 %	1.3 %
France	62,102,719	45,262,000	69.5 %	432.5 %	13.4 %
Germany	81,471,834	65,125,000	79.9 %	171.4 %	19.2 %
Greece	10,760,136	4,970,700	46.2 %	397.1 %	1.5 %
Hungary	9,973,062	6,176,400	61.9 %	763.8 %	1.8 %
Ireland	4,670,976	3,042,600	65.1 %	288.1 %	0.9 %
Italy	61,016,804	30,026,400	49.2 %	127.5 %	8.9 %
Latonia	2,204,708	1,503,400	68.2 %	902.3 %	0.4 %
Latvia	3,535,547	2,103,471	59.5 %	834.9 %	0.6 %
Luxemburg	503,302	424,500	84.3 %	324.5 %	0.1 %
Malta	408,333	240,600	58.9 %	501.5 %	0.1 %
Netherlands	16,847,007	14,872,200	88.3 %	281.3 %	4.4 %
Poland	38,441,588	22,452,100	58.4 %	701.9 %	6.6 %
Portugal	10,760,305	5,168,800	48.0 %	106.8 %	1.5 %
Romania	21,904,551	7,786,700	35.5 %	873.3 %	2.3 %
Slovakia	5,477,038	4,063,600	74.2 %	525.2 %	1.2 %
Slovenia	2,000,092	1,298,500	64.9 %	332.8 %	0.4 %
Spain	46,754,784	29,093,984	62.2 %	440.0 %	8.6 %
Sweden	9,088,728	8,397,900	92.4 %	107.5 %	2.5 %
US	62,698,362	51,442,100	82.0 %	234.0 %	15.2 %
European Union (total)	502,748,071	338,420,555	67.3 %	258.5 %	100.0 %

Source: <http://www.internetworldstats.com>

Table 4: Users of Internet in the candidate countries for EU accession

The candidate countries for EU accession	Population (2011)	Users of Internet (2011.)	Users of Internet (in %)	Increasing of users of Internet (2000-2011)	Users of Internet in Europe
Croatia	4,483,804	2,244,400	50.1 %	1,022.2 %	0.5 %
Island	311,058	301,600	97.0 %	79.5 %	0.1 %
Macedonia	2,077,328	1,057,400	50.9 %	3,424.7 %	0.2 %
Montenegro	661,807	294,000	44.1 %	n/a	0.1 %
Turkey	78,785,548	35,000,000	34.9 %	1,650.0 %	7.3 %
Total	85,657,738	38,603,400	34.9 %	1,509.8 %	8.2 %

Source: <http://www.internetworldstats.com>
Table 5: Users of Internet in Serbia

Country	Population (2011)	Users of Internet (2011.)	Users of Internet (in %)	Users of Internet in Europe
Serbia	7,310,555	4,107,000	56.2 %	0.9 %

Source: <http://www.internetworldstats.com>

In Europe, 58.3% of the population uses the Internet, which is less than in North America and Oceania. Looking at the most developed countries of Europe, the countries that make up the European Union, we can see that the percentage of people who use the parking it is 67.3% and 16.2% of all Internet users worldwide. The percentage share of Internet users in the total population in the EU may be important also to notice the difference. On the one hand, as Sweden with 92.4%, Netherlands with 88.3%, Denmark with 85.9% as the country where the highest percentage of Internet users. On the other hand is Romania with 35.5%, 38.7% from Cyprus and Greece with 46.2% as the EU member states that have the least percentage of Internet users in relation to the total population. If we look at the candidate countries for EU membership, we note that Iceland leads the world in the percentage of Internet users in relation to the total population, even with 97.0%, followed by Macedonia with 50.9%, 50.1% from Croatia, Montenegro with 44, 1%, and at the end of Turkey with 34.9%. Compared with the candidate countries for EU membership, and some newer EU member, Serbia with 56.2% of Internet users in relation to the total population has a good basis that this number will soon be above European average.

6. CONCLUSION

Modern information and communication technology (ICT) and their use in operations of multinational companies (MNCs) and other business systems lead to the globalization of the seal of the 21st century. Multinational companies seeking the possibility of diversification of business has been recognized ICT as a factor in raising the competitive advantage. Scientific and technical progress in the field of micro-electronics and applications of information and communication systems, such as: EAN system, scanning (bar codes), POS, EFTPOS system, electronic payment cards, EDI, EDIFACT and SWIFT system, leading to the re-engineering of carrier international business, affirming the concept of global information and communication strategy. When it comes to our country, the European Union has recognized the insufficient development of ICT in Serbia as a limiting factor for the development of "information society", on the one hand, and Web-digital economy, on the other. The development of digital communications and information society are a significant factor in increasing national competitiveness and improving the business climate and quality of life of citizens. To this end, EU economic policy makers in Serbia following sets of digital "tasks" as follows: 1) digitization of telecommunications infrastructure, 2) that the Internet is widely available, 3) fast, cheap and secure Internet, 4) development of broadband Internet, 5) Web Development Economics, 6) the introduction of digital television, 7) development of the industrial sector of electronic communications equipment, 8) development of mobile services, 9) the introduction of number portability, and 10) effective access to information and knowledge. Starting from these requirements, in Serbia are created institutional conditions for the development of "information society" and the "digital economy". When you speak, especially bearing

in mind that Serbia has adopted the Digital Agenda: 1) Development Strategy of electronic communications in 2010. Until 2020, 2) Strategy for Information Society by 2020, 3) development of e-government strategy for the period 2009-2013., 4) Law on Electronic Commerce, 5) Law on Electronic Signature, 6) Law on Electronic Documents, 7) Law on Secrecy, 8) Data Protection Act and the personality and 9) Act on Organization and Jurisdiction of the fight against high-tech crime.

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RATIONALIZATION OF POSTAL NETWORK IN SERBIA USING INFORMATION TECHNOLOGY⁶

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Abstract: *The development of technology leads to changes in people's daily communication. The Internet and mobile phones have become the communication tool of the modern man. New ways of communication are redesigning interfaces for providing postal service. Such advances in technology should be monitored because they could completely change the current way of conducting postal services. This work is about implementation possibilities of informational technologies in the process of postal network rationalization.*

Keywords: *post, information, technology, virtual, counters, network, rationalization*

1. INTRODUCTION

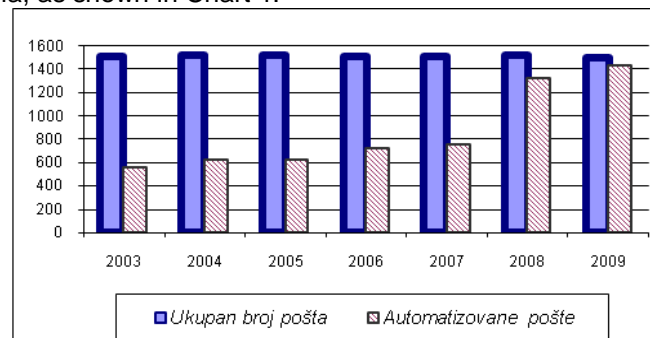
Idea of implementing information technology in the post, so far, was about post operability and increasing the availability of financial services to existing clients. Former applications of these technologies have not increased the availability of postal network units. Since 2003 the number of posts in Serbia has not significantly increased. Due to unprofitability problems of postal network in rural areas, post offices are being shut down and postal service reduced.

New trends in the development and providing of universal postal services impose the need to increase the number of posts and regular provision of postal services throughout the territory of the country. This is of course a challenge for the universal service provider, in Serbia that is the Post of Serbia. One of the solutions that is imposing is the use of IT in the realization of virtual post counters in rural areas. If we know that 70% or more costs of the operator are labor costs, then solutions with virtual counters are acceptable.

Introduction of virtual counters can significantly increase availability of postal network. By implementing a virtual post counter, users would constantly be served 24 hours, 7 days a week, regardless of postal office hours. The question arises whether all postal services may be provided in electronic format. Many of the services are established through the implementation of physical activities: supply and delivery of postal items. However, interfaces can change from the extent that the letters could be converted into electronic form to the extent of ensuring full postal service that allows physical receipt and delivery of mail.

2. INFORMATION TECHNOLOGY AND POST

Automation of technological processes in post offices, took place gradually. In 2009 were automated nearly all the post offices in Serbia, as shown in Chart 1.



⁶This paper is derived from research within the project funded by the Ministry of Education and Science of the Republic of Serbia, under the name of "Reengineering the operator network of the universal postal service, with the organizational synergy of governmental and economic resources" (TR36040)

Chart 13: Postal Automation

Post of Serbia, was the pioneer in introducing new advanced technologies. Information technology in Post of Serbia was introduced among the first in the world. Historical overview of information technology in the Post of Serbia is given in Table 1.

Table1: Implementation of information technology in Post of Serbia

Period	Implementation
1929-1950	1929. First of franking machines "Francotyp" in Belgrade.
1950-1960	1950. Franking machine "Hasler" and "Postalija".
1960-1970	1969. NCR446-Account Processing timer reduced from 30 to 10 days. 1967th IBM360th 1966th Machines for the reception of postal referral "Kienzle", and consignments booked "Camp. "
1970-1980	1979. Teller machine, "Kienzle 1200". 1974th Rent IBM CICS programming language. 1972nd IBM 370/135. 1970th Service EOP ..
1980-1990	1988. Olivetti M19, Fujitsu DX2100. 1984th Computer system TIM-100 -Mihajlo Pupin Institute. 1983rd Teller EDS90 computer system. 1982nd Terminals for Payment Bunker Ramo. 1980th IBM4341 in Novi Sad
1990-2011	2011. Post TIS. 1999th Post Net WAN network based on Internet technology. 1995th ON-LINE from PS. The 1991st Olivetti- Energodata PC386 and PC486, KIS, LAN, IBM3090

The biggest slowdown in further development of the postal network, are post offices in rural and village areas. Low demand for services and low population density in these areas make difficult to provide basic postal services. Nobody needs unprofitable network, but there is an obligation to provide it to every populated place and the population living in these low density areas is no exception (Kujačić, M., 2005) Attempts to solve the problem by introducing a post office by contracting local offices of different purpose, did not yield the desired results. In remote areas, reception and delivery of mail is carried out once a week. In order to perform the simplest service, you need to wait a week!? The solution is to get to the nearest post office. In district of Jablanica and Pcinj 10 villages go on one mailbox, in Zlatibor and Raska 7 villages go on one mailbox. On average in Serbia without Kosovo and Vojvodina, three towns go on one post. In Vojvodina, one town goes on one mailbox.

The use of information technology in solving the problem of providing services in rural areas is still in its infancy. In the world there are examples of using self-service automated machines and mobile post office in the process of reception and delivery of mail to sparsely populated areas. In our country, they are poorly used. For the purpose of postal network rationalization and analysis of resource utilization in Post of Serbia, we tested the possibility of introducing virtual counter in rural areas in Republic of Serbia.

3. VIRTUAL COUNTERS IN POST OF SERBIA

Virtual post office counter can be implemented as a self-service machine for the provision of financial services (ATM), with additional interfaces for the provision of postal services (receipt and delivery of postal items). Also, virtual post office counter can be implemented by using the Web sites that can, in addition to tracking sent postal items, offer the opportunity to perform some of the postal service. What is common in these ways of using virtual counter is that the user is not limited to working hours of postal units and may demand service regardless of time, day or night. Virtual post offices in rural and sparsely populated areas, close to highways..., can appear as ATM, POS system or terminal or be conceived as home banking, videotext, info kiosk.

ATM (Automated Teller Machines) is a self-service banking device that allows credit card use. Some of the functions that can be done using the ATM are cash withdrawal, making deposit, transfer of funds to other accounts, payments from different accounts, insight into the accounts. In relation to the micro location of installation, ATMs can be:

- "lobby" - posted at the entrances;
- "indoor" - in the counter hall and post office
- "outdoor" - at the entrances of public institutions and in the busy places

There are two types of ATM:

1. "off-line" devices, which are not connected to the central computer rather than working independently through units for reading and decoding of plastic money card and credit card.
2. "on-line" devices, which are connected to the central computer via a computer network, so that the system of protection and control is simplified.

External design of the ATM is composed of:

- small display;
- small keyboard with a few buttons;
- slot for the card, the card is placed during the operation of an ATM;
- slots for money with oval desk, which puts money (the investment), or from which it receives the money (at withdraw).

ATM configuration is reflected in the existence of the module that prevents unauthorized use of ATM and modules for encryption and decryption. Modules are tailored to work with standard international cards VISA, EUROCHQUE, SIBS ... This kind of use of modules is important in the tourist areas (eg, Zlatibor district) because it allows the use of ATMs to foreign tourists.

POS systems are self-service systems that can be owned by post office, banks and retail network. One POS system consists of the following components:

- POS terminals;
- concentrators;
- communications network;
- Switch Center;
- banking and / or post account systems and
- alternative systems for authentication checks, credit and debit cards.

POS terminals are classic or modified electronic - cash register system to provide terminal function and are associated with concentrators. In addition to basic functions, these terminals have a hardware add-ons that allow reading of the magnetic and electronic records from credit and debit cards as well as reading bar codes. Self-service POS terminals can be built where they can achieve their primary function of network availability to users of postal services. (Wincor Nixdorf, "ProCash 2150xe, ProCash 2150xe USB", 2006)

Home banking systems provide users of banking services financial transactions using personal computer, telephone and videotext system in your home without going to the post office. The development of Home banking system affects the development of telephone network capacity.

Videotext allows using postal service at home. This system enables direct transfer of resources, information and orders via the telephone network, without writing financial documents. The development of videotext system is affected by the telephone transfer because this system of self-service financial transactions looks like the ATM device, which has no possibility of cash payments. Videotext terminals in the system can be computers or TV sets, but for this system is necessary to introduce a special telecommunications system for the phone transfer and a device for videotext on the actual computers.

Payment via the Internet is an important factor in implementing the virtual counter through a Web site. For many smaller and larger companies, payment of goods and services via the Internet offers significant advantages. The Internet has become an efficient and cost effective distribution channel and the opportunities provided by the Internet market is still not fully exploited. (M. Hassinen, 2007). There are

different ways of electronic payments via the Internet that do not require physical presence of user in post office. Customers for this type of electronic payments are using credit and debit cards from banks that support such a pricing system. In addition to using credit and debit cards, there is the option of paying through PayPal account and E-Gold. Electronic payment system has general and specific security requirements. Such a system should be:

- safe and to ensure privacy, authenticity and confidentiality,
- easy to use and understand by the buyers and sellers,
- clear for bank's management,
- suitable for different types of currencies,
- low-cost implementation.

Equipment for purchasing over the Internet is extremely expensive, and Visa and MasterCard have strict procedures for obtaining technical certificates for these jobs. They prescribed the use of 3D Secure technology, which significantly reduces the risk of fraud with credit cards on the Internet. The system provides full security to all parties in a financial transaction because it also makes the chain in which is the bank that issued the card, the cardholder, a merchant who receives payment, the bank in which the merchants account is, international payment system Visa and MasterCard.(Y.A. Au & R.J. Kauffman,2006)

Info Kiosk is a self-service device designed for effective marketing, e-business, e-communication, that can provide a variety of information and services without the presence of authorized workers. All parts of kiosk are placed in housing that is planned and designed to resist negative outside influences. Within it is usually a computer that controls and operates the device. Depending on your operating system, it is created an application that will adequately respond to customer requests. User is interacting with a computer without using a mouse or a keyboard, but the touch screen, while some types of kiosks have integrated keypad, smart card reader for identification and payment, a printer, a device for receiving and issuing currency... For kiosk to connect to the existing information system, it is used standard network components (Milovanović, G., 2010). There are three types of these devices:

- Point of Information - the most frequently used type of info-kiosks, which is intended to provide specific information in different fields. Users of these devices can take over, but cannot affect the information provided by the kiosk.
- Point of Service - is an enhanced version of previous devices, in which a user can request and obtain the required service at a kiosk.
- Point of Sale - devices that provide buying of individual items.

Info Kiosk presents advertise and access database and tells status, reserve resources and terms, issues membership cards, certificates, instructions, account delays and interest, chooses the currently most favorable conditions. It can also give the latest news, give program of events, offer pictures and multimedia messages, marketing messaging, Internet access, exchange electronic mail (Mailing), access to the Internet, exchange e-mails, deals in tourism, recommended books, theatre, hotel, restaurant (taking into account the former interest), printed forms... It can be used for anonymous surveys and voting, it may possess information about the city, streets, buildings and office layout. Kiosk does not hire new work force, but decrease the current. It is a means accepted by all organizations that want to meet the increasing needs of the population for the rapid and timely information. Info kiosks have found broad application in the post. Main advantages of info kiosks are:

- vast amount of information which can be reached easily,
- users receive useful information that they cannot influence.

Info kiosk will be a quick and easy way to allow users access to a wide range of information. Info kiosks are of special importance because it provides a standardization of services. Using the info kiosks post would be permanently at the service for users, with fewer employees. For users of postal services, information kiosks can provide information on distribution counter, types of services, pricing, procedures, complaints, special offers and campaigns, discounts, access to the Internet or databases of general interest...

Developed postal administrations use kiosks to receive mail and sell postal packaging and valuables. In Serbia the information kiosks have emerged in the form of ATM devices to supplement the account of mobile phone and charge for parking spaces. Postal Savings Bank has set a kind of kiosk used to edit the order of

serving customers. Belgrade municipality is also planning to introduce info kiosks through which citizens would be provided with information on status of their case and about the work of municipal services. Also, information kiosks can be placed on the frequent location so that customer would be completely served. JP Informatika Novi Sad has implemented info kiosks in their offices, and the Web site offers its customers the following features:

- guide to the city government (city government for utilities, city government for transport and roads, the city administration of urban planning and housing services, city administration for social and child protection, the city administration of inspection, the city government of general affairs),
- virtual register
- unified billing receipts (insight into the account ...),
- assembly building
- electoral registers,
- statistics from general data,
- insight into unified receipts traffic,
- on-line loans.

Automatic postal center is the name of U.S. Postal Service automatic teller. This device allows you to perform as much as 80% of services provided by post. The basic functions of these devices are:

- receiving letters and packages;
- payment by credit cards;
- sale of postage stamps;
- providing additional services and information;
- Search postal codes;
- determine the weight and price of items;
- prepare forms and confirmation of receipt;
- issuance of billing statements.

Thanks to this device, the U.S. Postal Service since 2004 achieved revenue that was higher than planned.

U.S. Postal Service, in addition to traditional demands for the postal services, issues passports through a unique Web portal, enables on-line shopping of postage stamps, pay postage for packages and letters from your computer, changing addresses, calculate postage, etc..

The postal administration of France - LaPoste in cooperation with the French company, IER has developed and installed in the framework of its postal network a new self-service interactive kiosk Lisa 2. On the territory of France in the 1200 post offices there has been installed 2100 kiosks with a tendency of further expansion.

It is planned to implement Lisa 2 kiosks in Germany and Switzerland because the experience of implementation in France shown good results in the quality of service and cost-effective use of the counter. Software used on this kiosk is extremely flexible in terms of pricing attitudes, change currency and banking requirements that are specific to different postal administrations.

Singapore Post has implemented new automated service S.A.M plus (Self-service Automated Machine), which provides up to 50 applications available for different services. Self-service machines are installed at 90 locations in Singapore mainly in the halls of apartment buildings, hotels, restaurants and are primarily intended for specific groups of users. This system is available 24 hours and has the following features:

- Cash withdrawals
- Payment of bills and utilities,
- Reception and delivery of shipments in the domestic and international traffic,
- Buying and booking air tickets,
- Payment of fees for traffic violations,
- Returning borrowed books from libraries,
- Donations for humanitarian organizations,
- Payments for insurance companies,

- Delivery of groceries,
- "Leave for delivery" through which the user can give the shipment to be delivered to the recipient the next day until 17:00h.

4. CONCLUSION

Rationalization of postal network operations is possible by using modern information technologies. The aim of this approach is:

- decline in the share of labor costs in total production costs of postal services and
- increased availability of postal network.

Currently in Republic of Serbia more than 66% of posts are in rural and village areas. It is urgent to rationalize the network in terms of costs. Also, 35% of addresses where delivery is conducted belong to a wider and the widest delivery area. In this area the delivery is done from 1 to 3 times per week. In terms of accessibility it is necessary to increase the number of postal units and increase the number of deliveries per week. PostTis computer network owned by the Post of Serbia is an important resource in the realization of these objectives.

The implementation of virtual counters in rural areas requires extensive work by the Post and the wider community. This is a complex project that requires also the presence of hardware and software support. Education of virtual counter users is a prerequisite for their introduction.

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WEB STORES IN SERBIA: RECOMMENDATIONS FOR E-BUSINESS STRATEGY IMPLEMENTATION

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Abstract: *E-business strategy as a part of general business strategy is becoming a key element for effective and cost-efficient market penetration. This paper analyses the main factors that must be taken into account when developing and redesigning a web store, focusing on the current situation in the online Serbian market. The authors conducted a research of 479 websites in Serbia that provide electronic commerce services to determine all necessary features for a fully operational web store. The following features were identified: payment options; shipment and delivery; conditions of use; privacy notice; and the presence of a shopping cart. The results obtained provide several recommendations which should be taken into consideration when designing a commercial e-strategy. Firstly, it can be observed that over 85% of the examined websites do not have any payment option and below 20% of them do not have an e-cart feature for processing electronic commerce. Secondly, out of all the observed web stores, over 25% do not have any delivery options available. Finally, more than half of the websites do not have information provided on website regarding conditions of use and privacy notice. The Internet is an option but only if there is an adequate strategy.*

Keywords: *e-commerce, e-business, website, web store, e-strategy*

1. INTRODUCTION

Numerous changes in the environment, globalization of markets and economic regionalization have contributed to the substantial shifts in the business of many companies in the world, causing it to begin to think and act in new ways. Expansion of the Internet and creation of network among companies and public administration led to major changes in the manner and efficiency of business systems. In recent years, the quality of electronic business transactions is also significantly improved. All of that contributed that e-business strategy become a part of general business strategy. This integration is generating synergy while in return, organisations becoming effective and cost efficient in market penetration. In the process of forming a corporate strategy to respond to the challenges of environmental change, normative thinking requires that a company should analyze its industry forces and value-chain activities in order to identify opportunities for IT innovation (Changa, Jacksona & Groverb, 2003). They also strongly recommended that companies must clearly recognize their e-commerce initiatives as an integral part of t strategic objectives and carefully evaluate their customer and competitor base, as a part of strategic thinking in order to reap more benefits. The quality of electronically business transaction has also significantly improved in recent years and thus increases the importance of e-commerce. Industries get a new form under the influence of digital dimensions (Laudon & Traver, 2010). From the beginning of the commercial Internet use, in the mid 90's, are formed and changed business models, market and communication framework of electronic business and commerce implementation. Since then, there is a question: where should be turned all the participants in the process of e-commerce? The only answer is that they must turn to building trust (Turban, King, Lee, Liang & Turban, 2010). Information Technology, Internet and e-commerce have a powerful impact on productivity and management in general. One of the key advantages of the Internet is located in the area of electronic commerce (Jobber & Lancaster, 2006).

A recent study by Hausman and Siekpe (2009) found that computer factors are necessary antecedents to online shopping, albeit indirectly through attitudes toward the site and flow. In addition, they point out that website features should be considered primary in every site design to generate positive perceptions of usefulness while avoiding irritation. From the practical point of view, web design is critical in building customer relationships, facilitating customer support, and converting visitors into customers in the online environment (Ghose and Dou, 1998).

Statistical Office of the Republic of Serbia (2010) showed that only 4.9% of respondents using Internet to conduct a commerce. According to Internet World Stats (2010), in Republic of Serbia 55.9% of population are using Internet.

This paper analyses the main factors that must be taken into account when developing and redesigning a web store, focusing on current situation in online Serbian market.

2. KEY FEATURES OF WEB STORE

Unlike traditional information systems, e-commerce systems contain characteristics of both an information system and marketing channel (Hausman & Siekpe, 2009). Effective web design requires examination of both these factors from the users' point of view to ensure web stores provide required elements. Key dimensions for Web site quality in past research show that design, content, entertainment, usability, reliability, interactivity, security, privacy, trust, product value, delivery. Prior research has found that design of a quality website, as part of e-business strategy, has become a key element for success in the online market (Hernández, Jiménez & Martín, 2009.). They also pointed that accessibility, speed, navigability and content are important features which determine website quality. In the sense of consumer purchase intention, three groups of factors are identified as relative important: technology, shopping and product (Chen, Hsu, Lin, 2010).

A different research by Eastlick, Lotz and Warrington (2006) found that strongest relationships leading to online purchase intent were those between trust in and commitment toward an e-tailer and between firm reputation and trust. Privacy concerns influenced purchase intent with strong negative effects, both directly and indirectly through trust (Eastlick, Lotz & Warrington, 2006). Ranganathan and Ganapathy found, based on a questionnaire survey of 214 online shoppers, four key dimensions of B2C web sites: information content, design, security, and privacy. Though all these dimensions seem to have an impact on the online purchase intent of consumers, security and privacy were found to have greater effect on the purchase intent of consumers (Ranganathan & Ganapathy, 2002).

Another research investigated the relative importance, when purchasing goods and services over the Web, of four common trust indices:

- third party privacy seals,
- privacy statements,
- third party security seals, and
- security features (Belanger, Hiller & Smith, 2002).

Belanger, Hiller and Smith (2002) also investigated the relationship between these trust indices and the consumer's perceptions of a marketer's trustworthiness. The findings indicate that consumers' ratings of trustworthiness of Web merchants did not parallel experts' evaluation of sites' use of the trust indices. The results revealed that when making the decision to provide private information, consumers rely on their perceptions of trustworthiness irrespective of whether the merchant is electronic only or land and electronic. Privacy and security features were of lesser importance than pleasure features when considering consumers' intention to purchase (Belanger, Hiller & Smith, 2002). Both consumers and vendors perceive privacy concerns in terms of information control: who has access to personal data (disclosure), how personal data are used (appropriation) and what volume of advertising and marketing offers arises from the use of personal data (intrusion) (Cases Fournier, Dubois, Tanner).

Jarvenpaa and Todd (1996) investigated impact of the World Wide Web on consumer shopping behaviour. They gathered consumers' reactions via an open-ended survey using a sample of 220 shoppers, and related the reactions to the factors of product perceptions, shopping experience, customer service, and perceived consumer risk, which they had identified from the existing literature on retail patronage behaviour. The shopping experience by consumers was reported to be generally enjoyable, but at the same time frustrating. In the study it has been found that consumers could perceive the potential for time savings and reduced effort compared with traditional forms of shopping, but that, at present, goal-directed shopping was difficult. Overall, the results of this study suggest that World Wide Web vendors need to think more about how they perform on the factors known to affect consumer behaviour; namely, product perceptions, shopping experience, and customer service (Jarvenpaa & Todd, 1996).

3. METHODOLOGY

Authors performed identification and targeting of web sites in Serbia to determine which of them provide the service of electronic commerce. Research was conducted during the first half of 2011. The general level of search was performed by inserting following keywords into a web browser: internet shop, internet business, internet shopping, e-shop, e-commerce, e-shopping. After the search process final list of 479 web stores was created and content analysis was conducted. In the research authors used features of technology and shopping factors, as found by Chen, Hsu and Lin (2010). According to Hausman and Siekpe (2009) following features were identified:

- payment options,
- shipping and delivery,
- conditions of use,
- privacy notice, and
- presence of shopping cart

4. DISCUSSION AND RECOMMENDATIONS

It has been noticed that Serbia increased its presence of the Internet and new technologies through which it is possible to achieve a large number of transactions. Internet infrastructures developing but it is not used enough. In recent times, utilization level of servers, which is a significant data, is very small.

Table 8: Web site location

		Frequency	Percentage
Serbian hosting		159	33.2
International hosting	American and Germany hosting	228	47.6
	Other international hosting	89	18.6
Total		479	100

This research show that 67% web sites use hosting services from international providers. In the last several years, difference between quality and price of domestic and international hosting system is reduced. International hosting services has advantage due to reliability, higher quality and cost than the local systems.

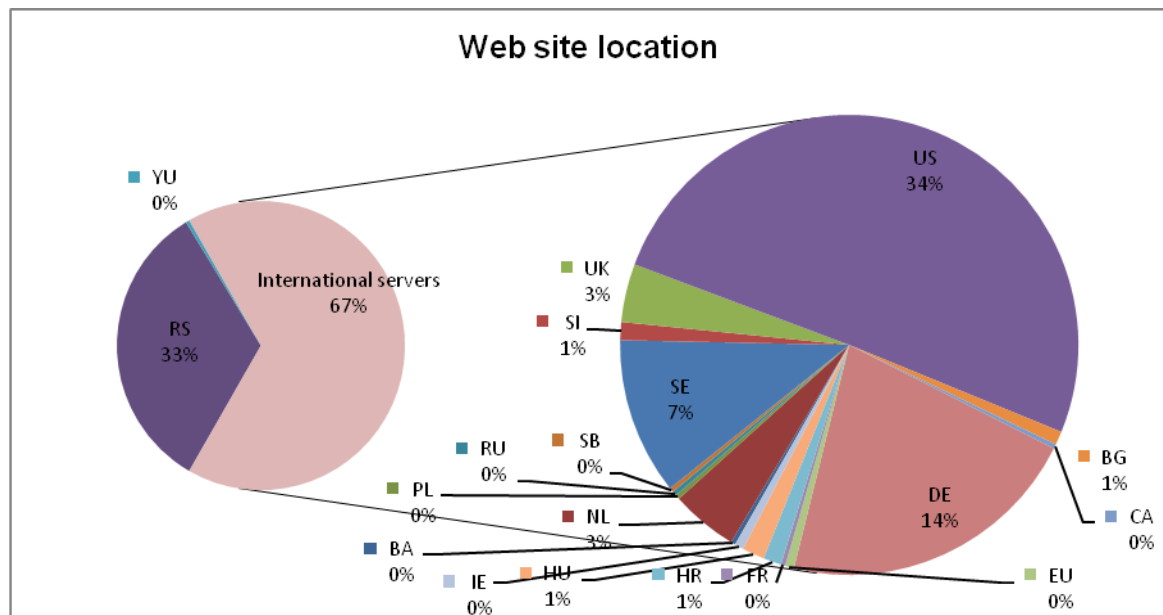


Figure 14: Web site location

4.1. Payment options

Table 2: Payment options

		Frequency	Percentage
Not determined		5	1
Does not exist		415	85.6
Exist	Banca Intesa	26	5.4
	PayPal	5	1
	Western Union	3	0.6
	Moneybookers	9	1.9
	2CO	17	3.5
	QVoucher	2	0.4
Total		479	100

Almost 87% of websites focusing on e-commerce do not use any payment provider, 8% of websites focusing on trade collected over a foreign provider, while only 5% of web stores using the provider from Serbia.

4.2. Shipping and delivery

Table 3: Shipping and delivery

		Frequency	Percentage
Not determined		4	0.7
Does not exist		125	26.4
Exist	PTT	62	13
	DHL	19	4
	FedEx	5	1
	Own delivery	32	6
	Some other carrier	232	48.9
Total		479	100

27% of websites do not have any Shipping and delivery option, 6% of web stores are delivering products by themselves, and 67% are using carrier service.

4.3. Conditions of use

Table 4: Conditions of use

	Frequency	Percentage
Not determined	2	0.4
Does not exist	255	53.2
Exist	222	46.3
Total	479	100

The research showed that 53% of web stores does not contain the terms of use, which usually serves as an explanations of how to shop over the internet.

1.4. Privacy notice

Table 5: Privacy notice

	Frequency	Percentage
Not determined	21	4.4
Does not exist	260	54.3
Exist	198	41.3
Total	479	100

More than a half of identified web stores do not have indication of security in the form of privacy notice.

1.5. Presence of shopping cart

Table 6: Presence of shopping cart

	Frequency	Percentage
Does not exist	85	17.7
Exist	394	82.3
Total	479	100

The research showed that 17.7% of web stores do not contain presence of shopping cart at their web site.

5.0. Recommendations for electronic business strategy development - web store case

Firstly recommendation is that current or future web stores in the Republic of Serbia must implement any kind of payment over internet. Weather it is a bank system for online payment processing, payment providing or paypal system. This problem has to be addressed to proper government body in order to create fair climate for implementation of payment options at web stores. Secondly, web store vendors have to include presence of shopping cart at their web stores in order to be identified as electronic commerce subjects. Thirdly, current or future web stores must implement delivery options in order to be able to provide complete service for e-customers. Especially, delivery have to be reliable and on time, because these factors are essential for customer satisfaction. Finally, as all prior research found that trust and privacy are very important elements of web store, Serbian e-vendors must pay more attention to the conditions of use and privacy notice at their web stores. Chen, Hsu and Lin pointed out that the protection of privacy is imperative for online transactions (Chen, Hsu, Lin, 2010). Both consumers and vendors perceive privacy concerns in terms of information control: who has access to personal data (disclosure), how personal data are used (appropriation) and what volume of advertising and marketing offers arises from the use of personal data (intrusion) (Cases, Fournier, Dubois, Tanner). Also, Belanger, Hiller and Smith said that a privacy statement can enhance the perceived trustworthiness of e-vendors.

5. CONCLUSION

According to research results it can be concluded that e-commerce situation in Republic of Serbia is alarming. Internet is an option but only if there is an adequate strategy.

Electronic Commerce in Serbia is certainly a possibility to achieve a model that would bring the benefit of vendors (faster and more efficient sales), customers (faster, more efficient and better shopping) and government (more money in the budget to shop online, increasing turnover, starting a business), only if all advantages of new technology is used in the right way. Further research should pay more attention consumer protection, antitrust and unfair competition, the fight against corruption, fight against the illegal import and export of products from the country. It is important that new technologies help facilitate the launch of a new business and self-employment. Electronic commerce increases the degree of innovation and competitiveness through the use of new technologies and increased visibility of operations.

Further research will be oriented on e-vendors and e-customers in order to identify main problems of e-commerce in Serbia.

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COMPARISON OF RELATIONAL AND NOSQL SYSTEMS

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Abstract: *Relational databases have been in use for many decades. Integrated with SQL language, this database technology is very efficient with flat records. Recently, there has been increasing actualization of data stores that do not exclusively use SQL language, called NoSQL databases. Some examples are Amazon's Dynamo and Google's BigTable. These systems should give advantage in executing statements with large, complex data types. Based on the collected system performance results, the aim of this paper is to compare relational with NoSQL systems and to decide which of the two is better for certain use. The paper analyses both systems from Oracle. Performance comparison was conducted in controlled, experimental conditions, with flat and complex data types. Based on results, it can easily be concluded that each system demonstrates excellent performance depending on different data types that were used.*

Key words: NoSQL, RDBMS, system performance comparison

1. INTRODUCTION

Database management systems based on the relation model become dominant in the last quarter of the last century. During the seventies the first commercial systems based on the mentioned model appeared and since then they have been widely use, usually as the only acceptable possibility for a system that has to provide access to large number of clients (Kriha W. 2011). Although there were different attempts to create a system which would replace relation systems, such as creating object and XML database, those technologies were not accepted from the users side nor have achieved proportionate share of the market such as relation systems (Kriha W. 2011). Mentioned alternatives were accepted by relational systems and they continued its life mostly as a integral part of relational systems (eg. Object-relational database). The best indicator for that is almost everyday usage of the word “database” which represents synonym for “relational database”.

Organisations that their business based on web and offer new or improved existing services have appeared about ten years ago. List of those type of organisations include Amazon.com which enabled popularization of B2B web sales, Google that has brought a revolution in information searching on the Internet, also MySpace, Facebook, LinkedIn and Twiter which enabled connecting people using “social” networks.

Although the trend of exponential growth of newly created data was evident, mentioned companies with its expansion contributed additional emphasize need for rapid manipulation of data, efficient storing large amount of data, usage of data with complex structure and their interconnection (Perdue T. 2012). By extremely large datasets often are consider event based transactions that occur in chronological order, for examples weblogs, shopping transactions, manufacturing data from assembly line devices, scientific data collections, large multimedia object etc. Amount and complexity of data have influence on time needed for displaying and manipulating with data.

NoSQL movement was initiated by the listed companies, primarily Google with their system BigTable, Amazon with Dynamo and Facebook with Cassandra, all in order to create database management system (DBMS) which would have performance and high speed of response as top priority, but with possibility inconsistencies of data in certain moments. Actualization of NoSQL solutions initiated a polemic of advantages and disadvantages of these two approaches for creating DBMS. Users and database administrators are splited into two groups. First one consist followers of relation database management system (RBBMS) and second one followers of NoSQL system. The primary goal of this work is to compare relational and NoSQL solution of the same manufacturer and to analyze advantages and disadvantages of these two possibilities for solving certain number of business tasks. Viewed from the aspect of IT manager, there is challenge giving preference to one system compared to the other i.e. benefits of usage of each of

them for appropriate business needs and requirements. This study should show to whom is each of systems intended.

The remainder of the paper is structured as follows. Section 2 gives an overview of different characteristics of RDBMS and noSQL systems. In section 3 design of experiment, used for performance comparison of these two systems, is introduced. Section 4 provides experimental results for RDBMS and NoSQL system and results analysis. Section 5 provides conclusion and suggest which system is better for certain business purpose, depending of amount and type of data in use.

2. GENERAL CHARACTERISTICS OF RDBMS AND NOSQL SYSTEMS

There are a certain group of characteristics of NoSQL databases that are universal and applicable for all solutions regardless of specificity of their functions or way of storage. In this part basic features will be shown. Within these basic features central part occupies CAP theorem (Consistency, Availability, tolerance to network Partitions) created by professor of Berkley University, dr. Eric Brewer. CAP theorem represents acronym of the word Consistency, Availability and tolerance to network Positions. This theorem says: "You can have at most two of these properties (Consistency, Availability, Tolerance to network Partitions) for any shared-data system" (Brewer E. 2000). Service that has consistency, as its feature, operating fully or not operating at all. It can be said that distributed system is available if any request accepted by the correct node must be followed by response of the system. Only fully crash of network (partition tolerance) can cause incorrect functioning of system. CAP theorem is proved in 2002 by Seth Gilbert and Nancy Lynch from MIT University. Gilbert and Lynch in his proof have used if their proof the word atomic (nuclear) instead of consistency. The term consistency they define as the existence of a clear sequence of operations that makes all operations were executed as they were done at once (Gilbert S, Lynch N. 2002). Reasons shall be reflected in the fact that consistency, strictly speaking, describes the property of database transaction which provides establishing relationships between all the data, as determined by pre-defined limitations. It is describing the letter "C" from ACID properties of the transaction. Unlike consistency, Bewer this term has used in term of atomicity, the letter "A" from ACID. Mentioned terminology discrepancy, according to some experts, was created as a result of creating practical creation of an acronym (Browne J. 2012).

Some basic features of each NoSQL database are derived based on CAP theorem. In contrast to relational databases, which own ACID characteristics, NoSQL databases have BASE features. The features that every transactions of relational database in execution has to have are:

- Atomicity – requires that all operations of the database should successfully complete or none
- Consistent – transaction transforms database from one consistent state to another and consistency is defined by constraints. During the execution of transaction consistency can be compromised
- Isolation – during the execution of two or more transactions in the same time their effects must be isolated. These effects must be the same like effects of some of their serial execution.
- Durability – serious failures of the system can not affect durability of results of completed transactions

Web with its content that offers (wiki, blogs, social networks, etc.) constantly increases amount of data that needs to be analyzed, processed and forwarded. Organisations who use mentioned content of web need to determinate their own requirements regarding performance, reliability, availability, consistency and durability. CAP theorem, as already mentioned, allows connection of only two characteristics, not three: atomicity, availability and tolerance to network partitions. However, for more and more applications, especially in large web and electronic stores, availability and tolerance to network partitions are more important than strict atomicity. Mentioned applications must be reliable which leads to availability and redundancy (also distribution between two or more nodes, since many systems work on "cheap and unreliable machines" which increase scalability also). These characteristics are hardly achieved using ACID features, so the usage BASE features has started to be applicable. According to Dr. Brewer, BASE approach is restricted with importance of consistency and isolation from ACID features and has emphasized availability, "gracious degradation" performance (Brewer E. 2000). Acronym BASE consists of the following characteristics:

- Basically available – system can have this characteristic even if some of its parts are not available
- Soft-state – system must not be consistent in every moment
- Eventual consistency – system will be in consistent state at some point of time. After some time, all nodes are consistent, but that may not be the case at some other point of time

NoSQL databases have also one more feature, which is very important. That is scalability. The general definition of scalability is that is the feature of the system, network or process to properly respond to increasing amount of work (Bondi A. 2000). NoSQL databases support horizontal scalability. This represents possibility of adding new nodes to the system, eg. movement from one web server on the server tree.

Categorization of NoSQL databases is usually done according to way of storage. In the beginning, with development NoSQL database there were dominant two solutions, Google's BigTable and Amazon's Dynamo. According to that there were only two categories and these two solutions were belonging to these categories. But, in time, the number of solutions has increased, thus has increased also number of possible types of storing data in NoSQL databases. That leads also to the growth in number of categories. Although on the Internet and in the literature can be found divisions which have different number of categories (some authors have made even nine categories) (Hoff T, 2012), most of them uses four or five categories. The categories are: key/value databases, databases based on a column, databases based on a document, graphs databases and object databases.

Object database can be seen as particular case of relational databases. Because of their (non) presence in practice, they are classified as object-relational databases or relational databases which have support for object types. Comparative overview and comparison of RDBMS and databases based on graphs clearly showed that between these systems there are differences in speed of query execution and it is hard to done general conclusion about effectiveness one in favor to another. (Vicknair & Macias, 2009).

Databases based on key/value principle of storing data have simple model: map/directory that enables customers to ask and require key value. Besides data model and API, this type of NoSQL database offers high scalability, but on the other side consistency suffer. That is the reason why most solutions in this category does not support neither complex ad-hoc queries nor analytical functionalities (there is no support for join operation neither for aggregate functions). Usually, the key length is limited by number of bytes and mostly there is no limits on possible values.

This type of database exists for a long time, but the most number of classes of NoSQL database appeared in last few years and were inspired by Amazon and Dynamo. They are based on hash table. Hash table is data structure which uses hash function for mapping an identified key with its assigned values. That provides access specific data for a certain key and avoiding searching through a large amount of data. By that immediately is allowed access to required data which significantly improves performance. This type of NoSQL database is important because one of their representatives will be tested in the further work.

3. DESIGN OF EXPERIMENTS

Presence of RDBMS system more than four decades has caused that RDBMS establish as completely dominant type of data storage in theory as well as practice (Vicknair & Macias, 2009). Today it can be found a big number of solutions from various manufactures in the market and also in use. From the other side, NoSQL solutions although much more younger than RDBMS solutions, experiencing expansion in last few years. The reason for that is popularity of companies which have initiated this movement: Amazon, Google and Facebook.

Two systems selected for testing are Oracle XE 11g (representative for RDBMS) and Oracle Kvlite 1.2.123 (representative for NoSQL). The question which solutions between these two system is more effective in favor to another is imposed. If there is no solid answer to previous, question which solution is better for use depending of amount and types of data may be consider.

The subject of this research is the performance comparison of these two systems. Since lite versions are widely intended for personal needs as well as for SME (primarily small and micro companies and that is defined by act of the European Union) (European Commission 2012) these systems own a certain number of restrictions regarding the number of tables that can be created, the number of used nodes and etc.

Performance is very complex concept and may include a big number of variables. In this study, one variable will be considered, comprehensible to users. It is speed of statement execution.

Potential impact on the speed of statement execution had to be eliminated and because of that all the tests were done on the same hardware, same computer, the local instances of the database and has not been used any type of optimization (triggers, indexes, partitioning, etc.). For database access it was used the same environment, NetBeans 7.1.1.

Executed statements are based on the most frequently used data types both for small or micro enterprise and private individuals. Those statements include manipulation of predefined types i.e. character data, numeric data and Date data type. Besides that there was executed statement for more advanced use of database. Specifically, statements for images manipulation was used and it was expected that NoSQL system shows the advantages of using key/value principle. Statements are labelled as I1 – insert predefined data entry; I2 – insert images; S1 – selecting predefined data; S2 – selecting images.

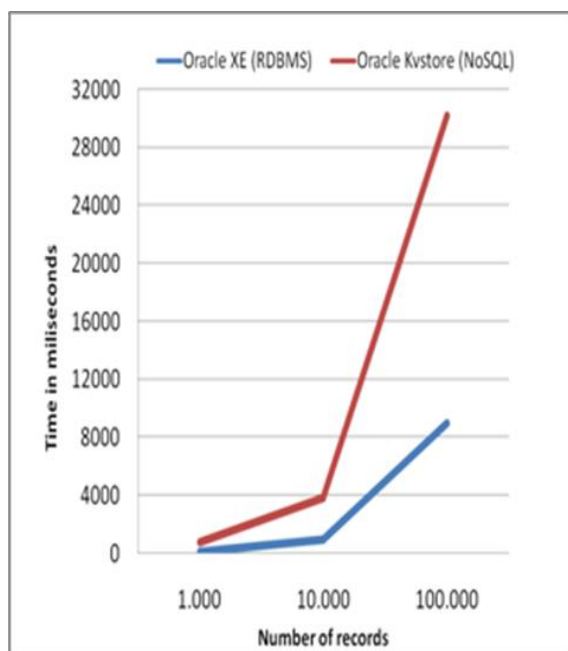
4. EXPERIMENTAL RESULTS

The experiment was realized in 40 series. Each statement was repeated in 40 iterations, then the minimum and maximum result values were removed and was calculated average value for remaining 38 iterations. Cache memory was emptying during the measuring to remove caching data in the memory i.e. to remove potential influence to results. Generation of the data was used in the statements. Statements that were used for manipulation with data consisting predefined types also generated values of numeric, character and date type, while statements that were used for manipulation with images also chose random picture from the predefined collection of images. Statements I1 and S1, for entry and display the values of predefined data types were conducted in series with 1.000 n-tuples, then with 10.000 n-tuples and finally with 100.000 n-tuples. The time was measured in milliseconds. The result is shown in Table 1.

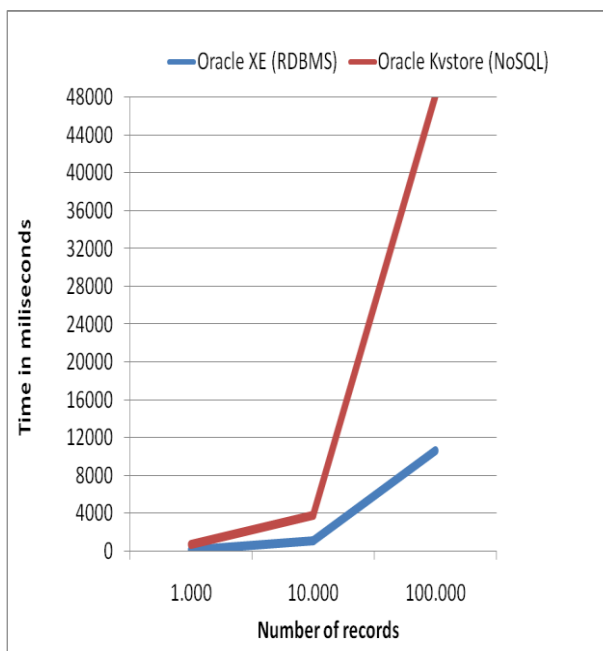
Table 9: Statements with predefined types

	N1.000		N10.000		N100.000	
	Insert (I1)	Select (S1)	Insert (I1)	Select (S1)	Insert (I1)	Select (S1)
Oracle XE (RDBMS)	91	115	915	1.096	8.992	10.558
Oracle Kvstore (NoSQL)	739	683	3.841	3.720	30.171	48.133

Next two graphs are showing how number of records affect execution time of I1 and S1 statement, respectively. Left graph shows how increase of number of records affects required time for statement I1 execution. Even with a increase to a 100.000 records, RDBMS is still dominantly faster then NoSQL system.



Picture 1: Execution time for I1 statement



Picture 2: Execution time for S1 statement

Right graph shows how increase of number of records affects required time for statement S1 execution. Like with previous statement, situation with S1 statement is almost the same: even with a increase to a 100.000 records, RDBMS is still dominantly faster then NoSQL system.

The results from Table 1 were expected. As it can be easily seen, RDBMS was much more faster than NoSQL solution. The greatest difference was during the entry of small amount of data (over 8 times higher speed). After increasing number of n-tuples big difference still remains (RDBMS is over 4.5 times faster). Explanation of results can be found in the fact that characteristics of the relational model (RDBMS is based on that model), are expressed during the storing the „simple“ type of data which can be easily stored in a table.

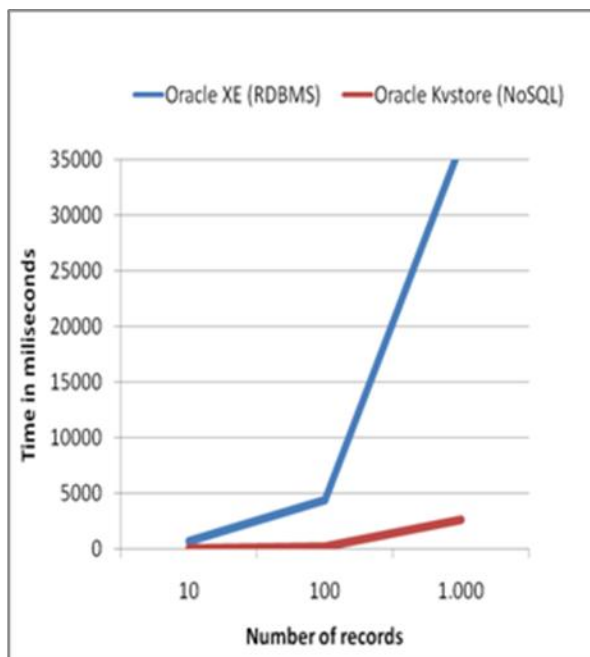
Statements I2 and S2, for entering and displaying files, in the specific case, have been conducted in series with 10 n-tuples, then with 100 n-tuples and at the end with 1.000 n-tuples, because of the duration and number of repetitions. Times are measured in milliseconds. The result is shown i Table 2.

Table 2: Statements with images

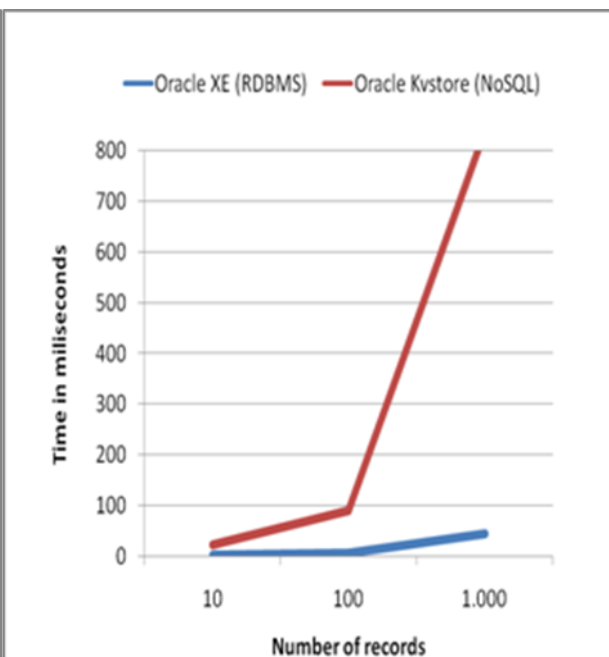
	N10		N100		N1.000	
	Insert (I2)	Select (S2)	Insert (I2)	Select (S2)	Insert (I2)	Select (S2)
Oracle XE (RDBMS)	667	2	4.425	5	36.377	44
Oracle Kvstore (NoSQL)	32	22	232	90	2.654	839

Next two graphs are showing how number of records affect execution time of I2 and S2 statement, respectively. Left graph shows how increase of number of records affects required time for statement I1 execution. In contrast to previous two statements (I1 and S1) statement I2 which is used for inserting images, shows a big difference between two systems, in favor of NoSQL system. Almost in same manner like RDBMS in previous statements, NoSQL was dominant in executing I2 statement. Even with a increase to a 1.000 records, NoSQL is still dominantly faster then RDBMS system.

Right graph shows how increase of number of records affects required time for statement S2 execution. In contrast to previous statement, RDBMS again shows dominant advantage in speed of executing S2 statement, which is statement with select command.



Picture 3: Execution time for I2 statement



Picture 4: Execution time for S2 statement

Results from Table 2 which are related to the commands for displaying data (here we mean of displaying byte representation of object, not the picture itself) clearly show dominance of RDBMS in relation to NoSQL solutions. Explanation for that is itself relational model and its advantages in work with flat data. However, when we are talking about pictures entry it is evident that NoSQL database is dominant. This result demonstrates the greatest advantage of NoSQL databases: the possibility of applying hash table principles (store data about key which shows the actual values) and possibility of sharing operations of writing in more nodes. NoSQL database consists of nodes for storage which consists of one or more nodes for replication. Greater number of nodes for storage leads to increasing of the number of nodes for replication. Between those nodes it is possible to share write operation which directly influences in lower speed of data writing. It could be expected additional reduction time of data entry in more advanced version of the software with possibility of defining a huge number of nodes for storing.

5. CONCLUSIONS

Conducted experiment, in fact, confirmed the results that could be expected before the test. It should be noted, once again, that this test was included two systems for small and micro enterprise, and private individuals. These solutions are available on the Oracle web site and can represent a cheap version for all users who are ready to make some compromises.

Taking into consideration all above it can be concluded that the relational database convincingly quicker executes statements, especially those with predefined types. Oracle XE response was almost immediate and that is especially expressed when displaying small number of data. The interesting fact is that, ignoring resource and hardware limitations, RDBMS was able to insert 100.000 records in less than 9 seconds, which is the result for every applause. With increasing number of n-tuples outcome has not been changed, so with 100.000 records XE system was much more faster than NoSQL system.

On the other hand, NoSQL solution did not have any chance against relational model when it comes speed of statement execution with standard data types. NoSQL enables access to the database only through its API. To be sure that both systems have the same conditions it was used NetBeans environment for connection and work with both databases. However, SQL language (with „select“ and „where“ commands for display and „insert“ for input) is so efficient that NoSQL integrated „put“ and „get“ methods can not be compared to it. But, NoSQL was extremely convincing where we expected so. During the storing images in the database efficiency key/value principles came to the fore. Oracle's solution is based on that. As already

mentioned, defining additional nodes for storage and replication would certainly had influence on reducing statement execution. Relational model with its BLOB objects could not be comparable with NoSQL solution in this segment.

During realisation of test, a problem was shown with Kvlite system. Inconsistency was expressed, which certainly is not welcome and must be thought as disadvantage of NoSQL system. In several occasions there were situations that data which have been entered in previous iteration in NoSQL were not possible to be seen or to be accessed. Also there were situations where the data that have been already deleted still remained in the database. That was possible to see during new entries.

After analysis of results the question that could be raised is whether the organisations should adopt NoSQL systems. The answer is obvious. If primary product of organisation is not social network (like Facebook, LinkedIn) or system where the speed of retrieving information is vital (like it is for Google, Amazon) then NoSQL solution is not acceptable. Inconsistent data still cause catastrophic consequences in many businesses. NoSQL databases have narrow range of use, but as these tests show they are really effective in situations when their usage is necessary. With 100.000 flat records that have been tested RDBMS still stays effective and faster solution. The question is whether average small or micro enterprise has a need to manipulate with greater amount of data than mentioned? One more question can be raised is who really has a need for NoSQL? Is that a small or micro enterprise that should be represent targeted market for tested lite versions of software? Concentrating on the one relevant aspect of performance, as a fundamental criterium for delivering fast and consist data, the answer is definitely negative. For the most number of users of small and micro enterprise relational database still meet all requirements of business. Even if it is used over tens and hundreds of thousands records they still represent faster and more reliable solution then NoSQL system.

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MANAGEMENT OF CLOUD COMPUTING INFRASTRUCTURE FOR E-LEARNING

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Abstract: *This paper discusses the management of cloud computing-based infrastructure for e-learning at a university level. The main issue in a modern e-learning system is to provide scalability and reliability of educational applications. The primary goal of the research is to develop a model for management of the cloud computing infrastructure for e-learning. A private cloud was implemented within the existing infrastructure at the Faculty of Organizational Sciences, University of Belgrade. The described solution is comprehensive and includes all cloud computing service models. Additionally, a description of features and management resources is provided for each service model.*

Key words: *cloud computing, infrastructure, e-learning, management, private cloud*

1. INTRODUCTION

With rapid increase in the number of users, services, educational content and resources required, educational institutions and their e-learning systems face new challenges in design and deployment of IT infrastructure for e-education. Modern information and communication technologies provide means for increasing efficiency, flexibility and cost-effectiveness of e-learning systems. The users of e-learning system have a need for including different resources into courses. These resources require more data and resource-demanding processes, such as interactive video, virtual worlds, modeling and simulations. Current, traditional, IT infrastructure used for the great majority of e-learning systems is not able to answer to all teachers' and students' requests and needs in effective and economical way.

One possible solution is investing in new equipment with the goal of enhancing existing IT infrastructure. This approach enables that an educational institution provides required technical resources for successful implementation of a distance learning system. The main con of this approach is economical unprofitability. The process of adding new physical resources to an existing IT infrastructure is expensive and durable. IT infrastructure, resources and business processes are able to provide flexible on-demand services to teachers and students in the e-learning process and they need to be innovated and optimized permanently.

Developing new technologies, growing the number of available services and participants of e-learning system showed many disadvantages of implementation of traditional IT infrastructure for e-learning systems in scope of learning institutions. The goal of each educational institution is to add new visions and technologies which permit qualitative, efficient and economical implementation of an e-learning system and its management. IT infrastructure is a backbone of e-learning systems and their deployment and maintenance requires certain expenses. During the initial acquisition of computers and network devices, it is needed to observe whether the features of scalability and expansibility of components are available. Desired level of expansibility is actually hardly to acquire because of infrastructure components' constraints. E-learning systems based on classic IT infrastructure consider that one server is used only for one service. Beside of the impossibility of physical expanding of servers and upgrading the performances, there are also problems related to software updates.

If we invest a big sum of money for buying a high-performance expandable server and if that server works with 20% or less of its capacity, the phenomenon of low utilization occurs. That means that educational institutions have greater expanses and also more time is required for maintaining, repairing and administration of many physical servers. Distance learning system can be implemented by using Moodle software solution in a virtualized environment (Barham et al., 2003). In that way, software consolidation is performed and the paradigm "one service = one server" is avoided. However, despite of organizing databases for storing all options and information about this system, new problems are system availability, improving performances, managing and fine tuning of the virtual environment. It is clear that it is necessary

to implement a tier for managing virtual infrastructure and virtual resources into this system to facilitate obtaining reliability, security, scalability and economy of the system (Vujin, Radenković, Milić, & Zrakić-Despotović, 2011).

2. CLOUD COMPUTING INFRASTRUCTURE

Cloud computing is an area of computing that refers to providing customers with highly scalable IT capacities as a service via the Internet. ("Cloud computing: benefits, risks and recommendations for information security," n.d.) (Parameswaran & Chaddha, 2009) (Sultan, 2010). It is an abstract, scalable and controlled computer infrastructure that hosts applications for end-users (Badger, Patt-corner, & Voas, 2011). Services and data coexist in a shared and dynamically scaled set of resources (Srinivasa, Nageswara, & Kumar, 2009). Virtualization is one of prerequisites for the realization of cloud computing and the main feature of cloud computing is its scalability (Dong, Zheng, Yang, Li, & Qiao, 2009) ("Cloud Platform - CA Technologies," n.d.).

The architecture of the private cloud is based on flexible federations of servers, storages and networking (Cerbelaud & Huylebroeck, 2009). Virtualization provides efficient resource usage through separation of abstract platform from IT infrastructure. Model of a private cloud enables a large number of users to share resources and leads to higher level of resource usage and cost effectiveness. Within an e-education system, this approach leads to a perception of limitless IT capacities, where services can be used according to users' needs. Architecture of a private cloud enables active planning and monitoring capacities in real time, so that infrastructure can dynamically be scaled to support high loads of users' requests. In this way, a balance between the need for agility and costs of unused capacities is easily achieved. The model of IT infrastructure enables continuous availability of e-learning services, even in cases of interruptions within the infrastructure itself. Permanent availability is achieved through an architecture of redundant IT infrastructure and application of standardized procedures for automated management. E-learning services are provided with the same level of quality independently of when or from where they are accessed to. High level of quality and functionality is achieved by standardization of system components, including physical servers, network devices, storage devices, re-sources, etc.

The security of e-learning IT infrastructure model is divided into three layers (Cayirci, Rong, Huiskamp, & Verkoelen, 2009):

- Infrastructure security – by applying security technologies and by controlling all architectural layers. This control is performed by assigning access rules to users, processes and IT components and by applying the principle of minimal privileges for accessing the user account. By using this strategy, users are always logged in with minimal privileges needed for normal functioning. Administrator privileges are used only by user authorized for administrative tasks;
- Accessing applications – considers using secure application access by applying identity management system;
- Accessing computer network – considers applying standard security tools and procedures.

Flexibility and other features of the model are achieved thanks to virtualization which separates operating systems, data and applications from physical hardware. Following processes are identified by this abstraction:

Automation of processes,
Resource management,
Organizing components,
Service management,
Personal services.

Automation layer consists of basic automation technologies and a set of commands and scripts which perform tasks, such as starting or stopping virtual machines, server restart or applying software updates. Modularity of this approach enables simplifying of software development, removing bugs and maintenance.

Management layer consists of tools and services which are used for organizing, using and managing of IT infrastructure components. In almost all cases, there are different tools for hardware, software and

application management. Management layer is used for performing following tasks: reserving storage resources and networks, operating system applications and application tracking. The key features of this layer are remote access, tracking each IT infrastructure component and tracking of dependencies of all infrastructure components.

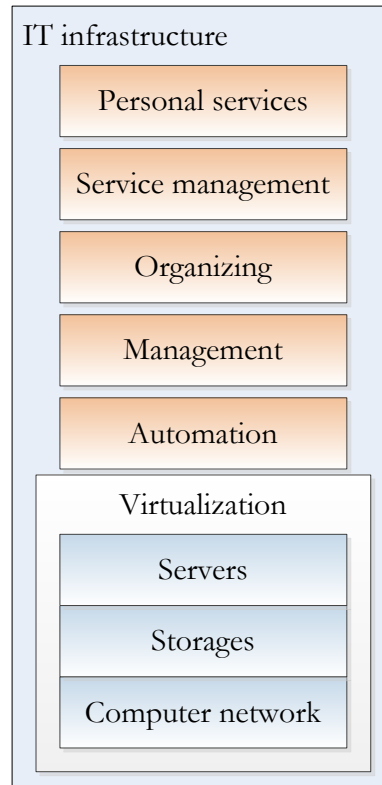


Figure 15: Layers of the infrastructure model

Organizing layer uses advantages of automation and management layers and it represents an interface between organization and its infrastructure. It is a layer which needs to provide designing, testing, deployment and tracking of complex business processes where the system components are integrated.

Service management layer needs to provide answers for solving incidents, problems and it needs to perform control by using best automation examples, such as Microsoft Operations Framework (MOF) and IT Infrastructure Library (ITIL). Service management by using the concept of integrated service management reduces unneeded and expensive deadlocks and it improves the quality of e-learning services.

Personal services provide user interface which can be used for accessing and managing services and assigned resources. By using access control based on user roles, several parts of system administration are being delegated.

3. CLOUD COMPUTING INFRASTRUCTURE MANAGEMENT

To provide better system scalability and to introduce new services for students, this model includes cloud computing infrastructure. The cloud computing architecture is based on physical infrastructure (Doddavula & Gawande, 2009)(Foster, Zhao, Raicu, & Lu, 2008). This is an example of a private cloud model, because the owner of the physical infrastructure is an educational institution. Beside of creating and managing the private cloud, public cloud interface is included in this model, as well(Foster et al., 2008). This model permits expanding of IT e-learning infrastructure with commercial infrastructure and commercial resources when request for resources are greater than the number of available resources or the performances of servers are not sufficient(Velte, Velte, & Elsenpeter, 2009).

Main components a private cloud include resource pool: servers, storage, and network. Server pools include physical resources, such as CPU, memory, network interfaces, graphical adapters, and storage units, which are all building blocks of virtual machines(Qian, Luo, Du, & Guo, 2009). Network pool includes address

services and package delivery between physical infrastructure and virtual machines. This component includes physical and virtual switches, routers, firewalls and virtual private networks. Storage resource pool refers to data stored in a private cloud. Storage resources need to be connected in a network in order to support migration of virtual machines across servers. Virtual hardware is presented to virtual machine's operating system by hypervisor(Raichura & Agarwal, 2009).

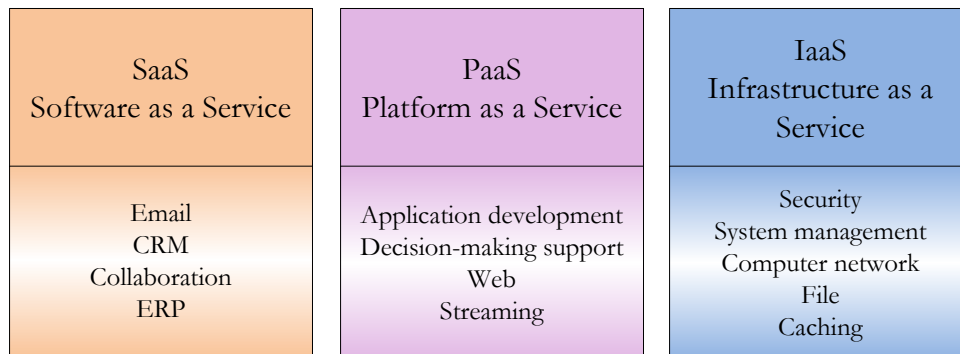


Figure 16: Types of delivering services

Primary goal of a private cloud is to decrease time and money necessary for deploying new hardware and software. In this way, new services can be deployed more quickly(Dong, Zheng, Xu, et al., 2009). Private cloud can provide its' users with infrastructure as a service, platform as a service and software as a service.

Infrastructure as a Service approach means that following components are delivered to users: CPUs, clusters, virtualized servers, memory, networks, storage and system software(Doelitzscher, Sulistio, Reich, Kuijs, & Wolf, 2011). Organization of these components is user's obligation. IaaS offers standardized infrastructure at the organization level. User organizes, manages and tracks delivered resources by using a standard logical interface for creating and changing the configuration, as well as for acquiring information related to the infrastructure, integrally. Availability of resources is performed by using of shared infrastructure components and the virtualization technology. Instead of providing new hardware for each new application or service, virtualization permits sharing of hardware resources and allocating them to a larger number of applications, which increases effectiveness and capacity usage and decreases expenses(Chine, 2009). Via administration interface, it is possible to increase or decrease volume of infrastructure, to move virtual machines by cloning or migration in the real time(Mahmood & Hill, 2011)(Rao & Sasidhar, 2012).

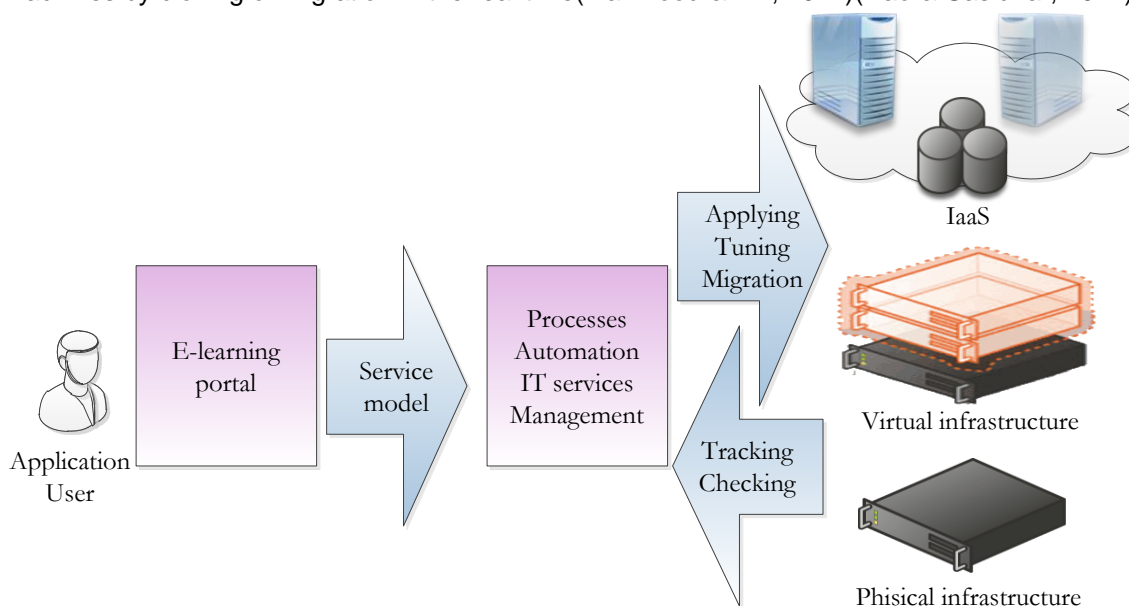


Figure 17: Delivering IaaS

It is possible to manage virtual infrastructure components by using administration interface or by creating automation scripts and commands which are started at special moments which are defined. Private cloud model enables high mobility and availability of the infrastructure and services, which creates an environment

where it is possible to track and to move application from development and testing phases into the production phase. After moving the application into the production phase, it is possible to deploy storage of these applications to a dedicated image repository.

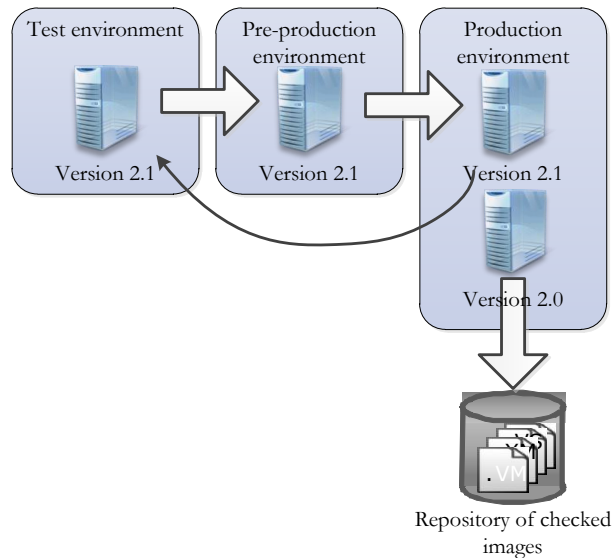


Figure 18: Mobility of infrastructure and services

Delivering and managing of virtual infrastructure resources as infrastructure enables that educational institution permits reservation of resources and their delivering to students. Students can design, implement and simulate computer network and network services. When the work is done in this environment, resources are being released and returned to pools of private cloud's available resources.

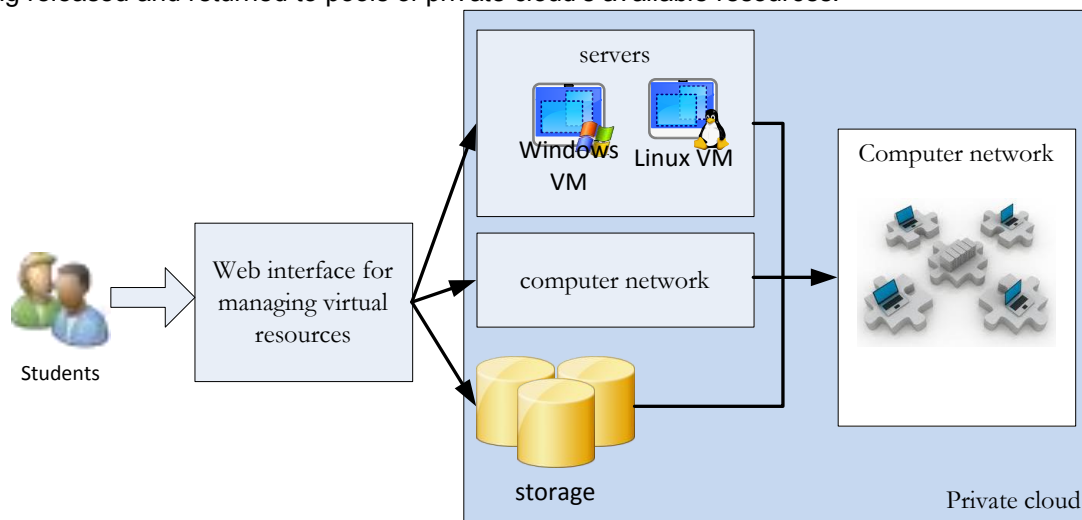


Figure 19: IaaS in e-learning

Model of PaaS through a private cloud also provides possibility to deliver platform as a service to end users. Platform as a service includes operation system, middleware, and development tools. On virtualized servers, users can run their applications, or develop new applications, but they cannot manage or configure operation systems, hardware or other infrastructure resources (Vouk, Sills, & Dreher, 2010). This way of delivering the application is convenient because of easy usage customization and application scalability. (Tian, Su, & Lu, 2010).

Platform as a service gives an educational institution an opportunity to provide each student with a virtual computer that they can use during the course of study (Schaffer et al., 2009). Through web interface, a student can manage virtual resources from the repository of platforms and choose a platform they want. After starting the image of a platform, a student can use all resources supported within that platform. After the platform is shut down, the image of the platform is stored in the repository and the student can use it later. It

is also possible to create repository of platforms for each subject, where students who study this subject can start the platform and use tools and applications related to that course. After a class, images may or may not be saved, depending on the concept of the course.

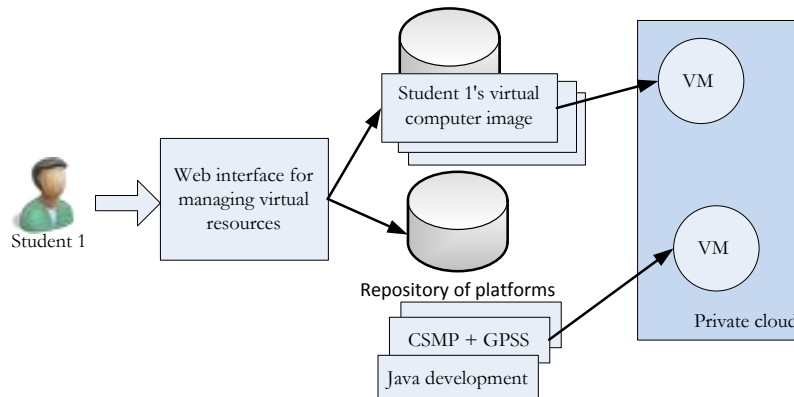


Figure 20: PaaS in e-learning

Finally, the model of a private cloud gives possibility to deliver software as a service. Unlike traditional application that need to be installed on a user's computer, software as a service presents one instance of the software that can be used by multiple users

With big cloud provides, users acquire perception of seamless cloud capacities, where limits are defined by providers' rules or contracts. However, there are no real limitless capacities, only an illusion created through optimized and efficient usage resources (Buyya, Yeo, & Venugopal, 2008). Educational institutions usually own less IT capacities comparing to cloud provides, therefore it is not always possible to provide all users with requested resources anytime. Therefore, requests need to be prioritized, and users need to be provided with possibility to reserve resources for specific period of time. Model of a private cloud must also provide a sophisticated system for resource scheduling (Rittinghouse & Ransome, 2009).

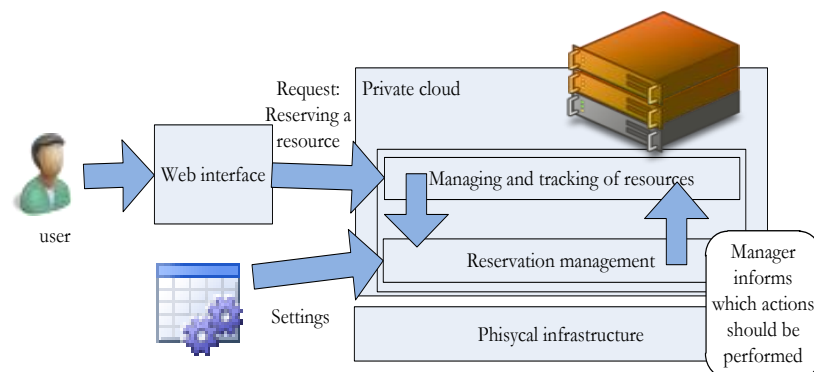


Figure 21: Allocating resources and making reservation of resources in the private cloud

Despite of current components for managing the resources of cloud computing infrastructure, a module which enables resource management via Android application is developed, as well ("Cloud computing: benefits, risks and recommendations for information security," n.d.). This module uses current cloud computing infrastructure and it is integrated with LDAP directory where students' accounts are located. It uses web services, which enables developing other applications in the future. Target users of this application are students of the Faculty of Organizational Sciences. They can run predefined images with installed operating system and required software, which is used in teaching process.

4. CONCLUSION

Cloud computing is emerging area that enable high educational institutions to use the existing software and hardware resources in more effective way. However there are not many papers that deal with cloud computing education in e-learning. This paper introduces a model for management of cloud computing

based infrastructure for e-learning. One of the most significant contributions of described model is that it solves problems of scalability with a more efficient use of existing resources within the private infrastructure.

Future research is directed toward cloud computing applications in developing e-education infrastructure with focus on: implementing a system for centralized identity management and research that will be include evaluation in real e-learning system.

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SOFTWARE TOOL FOR STRATEGIC ANALYSIS OF ENTERPRISE ENVIRONMENT - MATRIX OF QUALITY AND PRODUCT INNOVATION

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Abstract: *This paper presents a strategic matrix of quality and product innovation (QPI) - a tool for strategic analysis of enterprise environment, in order to identify relevant aspects, assess their impact on business performance, and take appropriate strategies. The strategic matrix QPI is designed for strategic management for the purpose of positioning the product within a product range from the standpoint of competitiveness, and defining strategic and tactical choices of products priority in terms of future treatment. A prototype tool is implemented in MS Excel, and the positioning of products within the product range of the company is interpreted graphically. In the assessment of the strategic position, relevant product dimensions are involved, including: volume, price, quality and innovative features. The strategic matrix QPI is created and its implementation is managed by the marketing office.*

Keywords: *strategic management, tools, quality, innovation, product*

1. INTRODUCTION

From a strategic standpoint of view, the analysis of enterprise environment is applied for the analysis and evaluation of its environment (external and internal) for a specific period of time, to identify all relevant aspects, as well as assess their impact on business performance, and is used in order to make adequate corporate strategy. A number of tools and techniques are used for this purpose today, including: questionnaires, measurement of value for consumers; BPEST analysis, BCG matrix, McKinsey GE Matrix, Ansoff's matrix, process development map; SIPOC diagram, analysis of business models; key resources and capabilities of enterprises map; analysis of critical success factors, and others (Coulter, M., 2008).

This paper presents strategic matrix of quality and product innovation (QPI) that represents a realized prototype software tool for the analysis of companies environment, and also implemented model of strategic tool for the analysis of the production program of company - portfolio of products. The tool is primarily designed for strategic management, in order to strategically position each individual product within the product range, and is used to determine the strategic and tactical choices of products priority (Covin, Slevin, Schultz, 1994), to make decisions regarding of dealing with it in the future (volume, pricing, resource allocation, quality improvement, innovation, etc.). The positioning of products within the product range in the company is interpreted graphically with the help of strategic matrix QPI. In forming a strategic assessment of the position, the relevant dimensions of the product are involved, including: volume, price, quality and innovative products. From the organizational point of view, strategic matrix QPI is created and its implementation is managed by the marketing office. Software tool is implemented in MS Excel, and its structure, inputs, the method of their preparation, method of assessment of relevant characteristics for the evaluation, outputs, and the possibility of its application, are explained in more detail below.

2. THEORETICAL AND METHODOLOGICAL BASIS OF STRATEGIC MATRIX

Theoretical basis

Quality and innovation are two important factors that determine the competitiveness of products. This claim is clearly confirmed by the results of theoretical analysis (Krstić, Bojković, 2011), from which we can conclude that between these two phenomena - the quality and innovation of business systems, there is some connection, which is reflected in the fact that both phenomena have strategic importance for business

system and give a joint contribution to the level of competitiveness, and also are complementary factors of competitiveness of products, and ultimately of the business system.

Quality, in this context can be defined as the set of all good qualities, characteristics or values of the goods or services, which enable to meet the established, indirectly stated or implied needs of stakeholders. This definition integrates external and internal quality of the product. The external quality of the product as a measure of satisfaction is related to the main features of products / services and can be measured in relation to expectations. Internal quality of the product includes the ability of business systems to carry out the implementation of the product from the first attempt, with minimal degree of nonconformity, and in an efficient manner. Strategic QPI matrix includes the following features of products quality, namely: quality, cost, design, safety, maintenance, reliability, standardization, environmental criteria, ease of use, transportability, recyclability.

Innovation in this context can be defined in accordance with (Tether, 2003) as "the successful use of ideas, or guidance of ideas into profitable products, processes, services or business practices." Strategic QPI matrix includes the following categories of product innovation, including: marketing innovation, product/service innovation, process innovation for product realization, organizational innovation for product realization and business model innovation for the specific product.

Program basis

In the introduction to this paper the most important tools and techniques used today for the strategic analysis of enterprise environments are listed. From the standpoint of program implementation, commercial software packages developed on an Excel platform are most commonly used today (*Excel4Marketing Toolbox, 2012*), such as: BCG Matrix, Perceptual Mapping/Positioning Maps, Marketing Metrics and Dashboard Report, Benchmarking, Radar Charting, Performance Gap Analysis, Pareto Analysis and Pareto Charting, Ansoff Matrix, Trend Chart, McKinsey GE Matrix.

The strategic matrix QPI, which is presented in this paper, is built on similar program foundations as the above mentioned software packages (it is also implemented in Excel), but differs from them by theoretical soles.

3. PRACTICAL IMPLEMENTATION OF STRATEGIC MATRIX

The strategic matrix QPI consists of the following constituent modules, as follows:

- Organization,
- Data entry,
- Assessment of factors,
- Calculation,
- Output,

which are hereinafter more elaborated.

Module: Organization

Within this module relevant information regarding the organization's work with the Strategic QPI matrix are presented, as follows: input data for calculation, production program- portfolio of products, determining the weight factors, assessment of product quality characteristics, assessment of the level of product innovation, outputs, and the purpose of the matrix output. The application of this matrix is in large measure determined by the organization or the manner in which the necessary data are to be collected. Since the data are collected within the company, and partly externally, the role is here entrusted to marketing service.

Module: Data Entry

Within this module are entered input data for the formation of strategic QPI matrix, which is actually related to the definition and assignment of the production program, which is subject to strategic analysis. The data is retrieved as follows: product number, product model and planned quantities of certain products. In doing so it automatically calculates the value of each production in absolute terms and in percentage (Figure 1).

DATA ENTRY					
Product/service					
Number	Model	Quantity	Price (din)	Production value (din)	Relative production value (%)
Product 7	TT7	7000	123	861000	61.4
Product 6	TT6	6000	42	252000	18.0
Product 2	TT2	3000	50	150000	10.7
Product 8	TT8	400	240	96000	6.8
Product 1	TT1	230	134	30820	2.2
Product 3	TT3	1100	5.5	6050	0.4
Product 5	TT5	470	7.5	3525	0.3
Product 4	TT4	280	11	3080	0.2
			Sum	1402475	100

Figure 22: Data Entry

The program provides 8 products, but it can be expanded as needed, however the expansion may require the expansion of other modules. The user is offered practical instructions for proper sorting of the entered data.

Module: Assessment of factors

Within this module, the assessment of relevant factors is implemented. The assessment factors includes assessment of the weight factor, the assessment of product quality and determination of the level of product innovation (Figure 2).

Weighting factor (weight) is awarded to participants in brainstorming or users surveyed by the person who manages the creation of strategic matrix.

Assessing quality characteristics of products can be done in two ways, depending on the organization of matrix creation, as follows:

1. Through a brainstorming organized within the company, and attended by experts for specific areas of product quality. Each of the experts makes its own range of products from 1 to 10 based on characteristics that evaluates;
2. Through research based on surveys of users in terms of quality characteristics of each product individually, ranging from 1 to 10, conducted by marketing service. As the assessment of quality characteristics are used to middle-grade quality characteristics of the individual products, which are formed in the summary report of research.

ASSESSMENT OF FACTORS									
Assessing product quality characteristics		Grade 1-10							
Quality	Weight factor	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8
		TT7	TT6	TT2	TT8	TT1	TT3	TT5	TT4
1 Price	10	3	1	5	2	3	4	1	7
2 Design	15	2	2	1	3	4	2	1	3
3 Safety	25	1	3	1	3	4	5	4	1
4 Maintenance	1	10	2	1	2	3	4	1	5
5 Reliability	4	5	3	1	1	6	4	2	5
6 Standardization	5	1	2	1	6	6	4	1	5
7 Ecological criteria	15	2	9	7	8	6	6	6	5
8 Ease of use	5	2	9	8	3	9	6	1	3
9 Transportability	5	8	2	2	9	6	2	9	4
10 Recycleability	15	10	3	1	2	5	1	1	1
	100	44	36	28	39	52	38	27	39
Assessing the level of product innovation		1= unchanged		2=modified		3=new			
Inovativnost	Weight factor	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8
	%	TT7	TT6	TT2	TT8	TT1	TT3	TT5	TT4
1 marketing model	25	3	2	3	3	1	1	2	1
2 product/service model	30	1	2	1	2	1	1	1	2
3 process model	10	3	1	1	1	2	3	3	3
4 organization model	5	2	2	3	2	1	1	1	1
5 business model	30	1	3	1	1	6	2	1	1
	100	10	10	9	9	11	8	8	8

Figure 23: Assessment of factors

Assessing the level of product innovation is done by the company experts for specific areas of innovation of products, each of the experts makes its own range of products from 1 to 3 (1 = unchanged, 2 = modified, 3=new product) based on models of innovation (marketing model, product/service model, process model, organizational model, business model).

Module: Calculation

Within this module (Figure 3), based on input data and the estimated factors, the calculation of the relevant values is done, necessary for the formation of strategic matrix.

Product quality factors			Calculation of relevant values																	
			product quality																	
Quality			Weight factor		Product 1		Product 2		Product 3		Product 4		Product 5		Product 6		Product 7		Product 8	
1	Price	1	30	3	90	1	30	5	150	2	60	3	90	4	120	1	30	7	210	
2	Design	2	15	2	30	2	30	1	15	3	45	4	60	2	30	1	15	3	45	
3	Safety	3	10	1	10	3	30	1	10	3	30	4	40	5	50	4	40	1	10	
4	Maintenance	4	1	10	10	2	2	1	1	2	2	3	3	4	4	1	1	5	5	
5	Reliability	5	4	5	20	3	12	1	4	1	4	6	24	4	16	2	8	5	20	
6	Standardization	6	4	1	4	2	8	1	4	6	24	6	24	4	16	1	4	5	20	
7	Ecological criteria	7	6	2	12	9	54	7	42	8	48	6	36	6	36	6	36	5	30	
8	Ease of use	8	5	2	10	9	45	8	40	3	15	9	45	6	30	1	5	3	15	
9	Transportability	9	5	8	40	2	10	2	10	9	45	6	30	2	10	9	45	4	20	
10	Recycleability	10	15	10	150	3	45	1	15	2	30	5	75	1	15	1	15	1	15	
score			95	44	376	36	266	28	291	39	303	52	427	38	327	27	199	39	390	
Relevant values of product quality					6.52		4.32		4.82		5.06		7.54		5.54		2.98		6.8	
Product innovation factors			product innovation																	
Innovation			Weight factor		Product 1		Product 2		Product 3		Product 4		Product 5		Product 6		Product 7		Product 8	
1	marketing model	1	25	3	75	2	50	3	75	3	75	1	25	1	25	2	50	1	25	
2	product/service model	2	30	1	30	2	60	1	30	2	60	1	30	1	30	1	30	2	60	
3	process model	3	10	3	30	1	10	1	10	1	10	2	20	3	30	3	30	3	30	
4	organization model	4	5	2	10	2	10	3	15	2	10	1	5	1	5	1	5	1	5	
5	business model	5	30	1	30	3	90	1	30	1	30	6	180	2	60	1	30	1	30	
score			100	175	220	160	185	260	150	145	150									
Relevant values of product innovation					3.25		4.6		2.8		3.55		5.8		2.5		2.35		2.5	
					TT7		TT6		TT2		TT8		TT1		TT3		TT5		TT4	
					6.52		4.32		4.82		5.06		7.54		5.54		2.98		6.8	

Figure 24: Calculation of relevant values

Module: Output

Within this module, based on the calculation of relevant values, the output of strategic matrix QPI is formed (Figure 4).

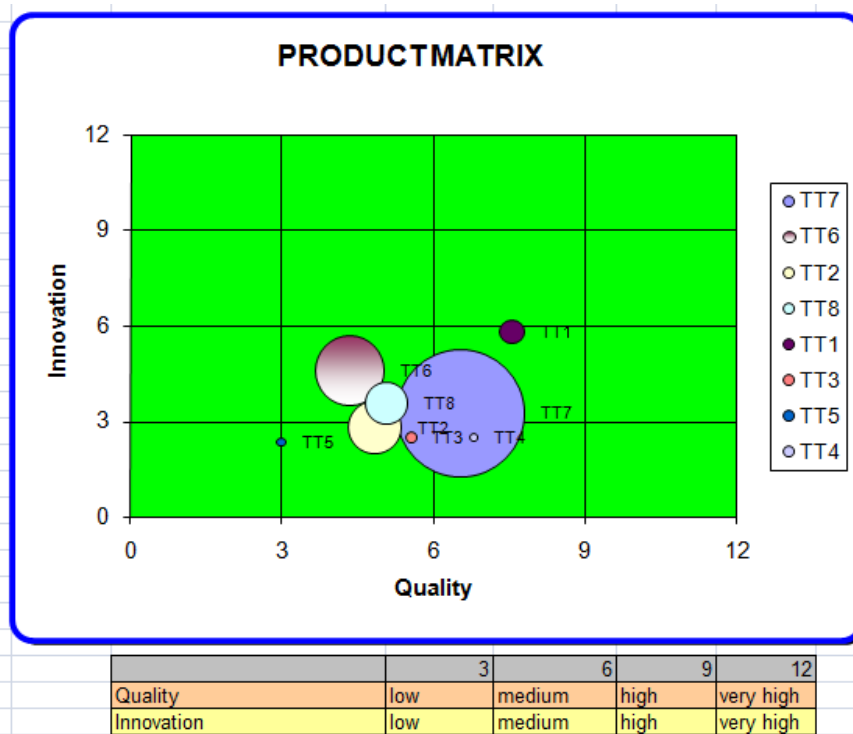


Figure 25: Output

The strategic matrix QPI is a two-dimensional matrix, whose dimensions are quality and innovation. Products from the production program of the company are positioned inside these dimensions of matrix. Circle diameter determines the volume of product production. In this way, the strategic position of each product is visually determined. Higher value on the vertical dimension of the matrix indicates the positioning of the product from the standpoint of innovation, and higher value on the horizontal dimension of the matrix indicates the positioning of the product with regard to quality, while the larger diameter of the circle indicates the higher value of products production volume.

4. CONCLUSION

In this paper, a developed prototype software tool for analyzing strategic environment of companies is briefly presented.

The aim of strategic QPI matrix is to facilitate making of relevant policy decisions regarding the quality management and product innovation management within the production program of business systems, by strategic positioning of each product.

Strategic matrix QPI enables management function to designate the strategic and tactical choices of products priority in the analysis of the life cycle of the production program.

Because of its easy-to-use user interface and graphical displays, the further development of strategic QPI matrix is viewed in its incorporation into EIS (Executive Information Systems) or ERP systems (Enterprise Resource Planning), enriching them with yet another strategic management tool.

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COMPARATIVE ANALYSIS OF SPRING AND EJB TECHNOLOGY

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Abstract: *This paper will present the Spring framework and EJB technology, which are used for enterprise application development. Subsequent to the technology presentation, a review of ISO/IEC 9126 standard will be given. Standard ISO/IEC 9126 is used for defining the software metrics for measuring the performances of a software system. In accordance with a case study, the aforementioned technologies will be evaluated using the software metrics that are supported in the software package Swat4J.*

Keywords: *Spring, EJB, ISO/IEC 9126, software quality, software metrics*

1. INTRODUCTION

We are being witnesses of very fast technical-technological development. This is especially expressed in the field of software engineering. In this sense, a great number of software technologies intended for solving various problems emerge on the scene. For example, there are technologies intended for development of enterprise applications: Spring and EJB technology. The fact is that Spring introduces a completely different approach to the development of complex applications, and that it represents the alternative to EJB technology. Also, the indisputable fact is that the EJB technology (which is de facto standard in the process of complex applications development) has significantly progressed in the EJB 3.0 versions (Graudins & Zaitseva, 2006).

However, standards are being defined in the field of software engineering. For example, the International Organization for Standardization – ISO, has defined the standard ISO/IEC 9126 (ISO/IEC 9126, 2003) used to precisely define the software quality. The attributes of quality of software system, as well as of software metrics are defined in this standard. On the basis of these attributes it is possible to perform the static analysis of the software system.

The subject of this paper's survey is the comparative analysis of two already mentioned contemporary software technologies (Spring and EJB technology), which are used in development of enterprise applications.

2. ENTERPRISE JAVABEANS (EJB)

Enterprise JavaBeans are actually Java EE components that implement the EJB (Enterprise JavaBeans) specification. They are written in the Java program language, and represent the components executed on the server's side and, as a rule, encapsulate business logics of the given application. Enterprise beans are executed within the EJB container, which represents the executive surrounding of application server (Pieber & Spoerk, 2010).

Enterprise beans significantly simplify the development of large, distributed applications:

- EJB container provides services on the system level, such as transaction management and security of enterprise beans, so that software engineers could concentrate on solving business problems
- EJB components are performed at the server's side, so that client does not contain business logics of the application. This is the reason why engineers and designers engaged in development of presentational layer do not have to take into account neither the implementation of business rules nor approach to the system of managing the database
- Enterprise beans are quite transferable components, so that it is possible to compose different applications that will use the already existing EJB components. These applications could be performed on every Java EE server, but only if it supports Java EE specification and the standard API

Table 1: Types of Enterprise JavaBeans

Type		Purpose
Session	Stateless	Performs certain tasks for the client; optionally they could implement web service
	Stateful	
Message-Driven		It acts like a listener for a certain messaging type, such as Java Message Service API

We could say that EJB technology has following features (Pieber & Spoerk, 2010):

- EJB technology represents de facto standard in the process of developing the complex applications
- EJB uses good features of application server (e.g. declarative transaction management, security)
- Using Entity classes of EJB technologies outside of application server
- EJB technology takes over good features of other technologies
- EJB technology in the new EJB 3.0 version is significantly simplified and advanced
- It requires using the EJB container

3. SPRING FRAMEWORK

As it has already been pointed out, Java in the function of platform offers exceptional possibilities. Even more, today there are numerous Java specifications (Java Specification Request, JSR) which solve different kinds of problems.

Spring framework has found an immense application in the development of enterprise applications. It practically enables everything that EJB also performs, but it does not require the usage of EJB container (Graudins & Zaitseva, 2006). For example, it is possible to use Apache Tomcat servlet container. The application which is developed by using this framework is significantly clearer, and it contains less program code. The framework works off many things in the background, so that in this way we obtain applications that are quite simple to maintain. In addition, Spring facilitates the work with other frameworks (for example, Hibernate, iBatis, JDO). In this way it enables not only the use of standard Java technologies for approaching relational basis (JDBC), but of modern tools for mapping relational entities into objects (ORM) as well (Arthur & Azadegan, 2005).

Spring is not a solution for all problems, but it definitively facilitates the development of JEE applications. In the time of its emergence, many people didn't neither admit nor understand that the development of JEE applications faces many problems (Singh et al., 2002). However, Spring has a completely fresh and new approach, and it most certainly influenced the change of many people's opinion. After all, the fact is that the new EJB3 specification took over many ideas from Spring.

Spring enables the integration with great number of technologies. Some predefined implementations could also be used here (for example, Spring possesses the Spring Web MVC implementation). It is often said of Spring that it represents the lightweight container, which could be performed on the application server, or in servlet container⁷.

We could say that Spring technology has following features (Pieber & Spoerk, 2010):

- It does not require using the EJB container
- It contains the Spring MVC framework that could be used while developing web applications
- Possesses JDBC mechanism for persistency
- Spring enables the integration with ORM frameworks (e.g. Hibernate, iBatis)
- Spring enables declarative transaction management
- Spring enables the integration with other Web MVC frameworks (e.g. Struts, JSF)

⁷Lightweight containers are actually containers that use the Inversion of Control (IoC) principle in order to work with business objects of the system in a non-intrusive way.

4. SOFTWARE METRICS

ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) represent international organizations whose activities are directed towards establishing international standards in different areas. The standard ISO/IEC 9126 (which studies software metrics) is especially important for software engineering. It includes four parts (Kanellopoulos et al., 2010):

- ISO/IEC 9126-1 studies the Quality model
- ISO/IEC 9126-2 studies External metrics
- ISO/IEC 9126-3 studies Internal metrics
- ISO/IEC 9126-4 studies Quality in use

Before the beginning of using software system, it is needed to evaluate it by using software metrics. This evaluation is based on business goals related to usage and managing the software in a specified technical and organizational environment. Standard ISO/IEC 9126 is used to define the software metrics that are used for measuring the performances of software system. This standard is also used to define the attributes of software system, and then adequate metrics are being defined for every attribute (Schackmann, 2009).

Swat4j (Swat4j, 2012) is the software tool intended for following and managing the activities of development and maintaining the software system that is being written in Java program language. It is based on the principles of the ISO/IEC 9126-1 (Quality model) and ISO/IEC 9126-3 (Software Product Quality, Internal Metrics) standards (Laval et al., 2008). Following software quality attributes are defined by this software tool:

- Testability
- Design quality
- Performance
- Understandability
- Maintainability
- Reusability

In addition, the software tool could be used for finding the potential bugs in the program. Over 30 metrics are integrated within the Swat4j (metrics are adjusted to characteristics of Java program language), and over 100 industrial standards that relate to the best practice rules in writing the program code (Laval et al., 2008). According to predefined model of software quality, several metrics are linked to every attribute of software system, i.e. there are several rules in writing the program code. In the other hand, one metric/one rule could apply to more than one attribute of software system, which is showed in Figure 1.

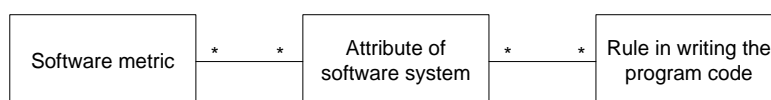


Figure 26: Relation between attributes of software system, software metrics and rules in writing the program code

We could say that Swat4j contains following groups of metrics:

- Object-oriented metrics – they enable the measurement of object projection quality, as well as of couples and dependence between objects, as well as of some other principles (Kanellopoulos et al., 2010):
 - Weighted Methods Complexity (WMC) is defined as a sum of complexity methods
 - Response For Class (RFC) defines the set of all methods that can be invoked in response to a message to an object of the class
 - Lack Of Cohesive Methods (LCOM) represents the measure of mutual connection of methods
 - Coupling Between Object (CBO) is based on the idea that one object is related to some other object if one object uses the features and methods of that other object (for example, the method of the first object uses the methods or appearance of the second one)
 - Depth of Inheritance Tree (DIT) – The depth of a class in the inheritance hierarchy is defined as a maximal number of levels starting from the observed node to the tree's root
 - Number of Children (NOC) - Calculates the number of direct sub-classes of the observed class/interface in the class hierarchy

- Complexity metrics – The complexity of a system or its components represents the difficulty of understanding the software system, or the components of the software system. We differentiate following metrics for determining the complexity:
 - Cyclomatic Complexity – McCabe - The cyclomatic complexity of the software system is measured by calculating the number of decision points or conditional statements of the observed program language
 - Halstead Complexity Metric - serves for measuring the complexity of the module directly from the original program code by using operators and operands
 - Maintainability Index metric – Represent the quantitative measure intended for measuring and following the maintenance in order to reduce or terminate the system's tendency towards entropy of program code
- Code metrics – The mentioned metrics represents specialized metrics which enables the specific insight into quality of the program code. These metrics are used in combination with one, or more than one specialized metrics such as object-oriented metrics, or complexity metrics. In addition, we can observe these metrics in four different levels: the Method level, Class level, File level, and Package level

5. CASE STUDY

A case study was created for needs of this research by using the Larman's method of software development. CRUD operations are implemented for all objects that are defined in the data model shown in Figure 2.

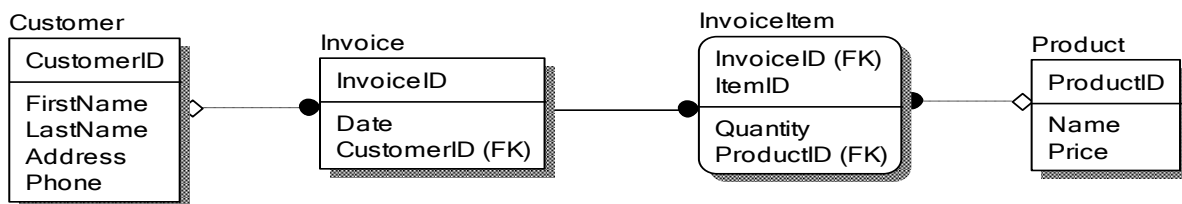


Figure 27: Case study data model

The case study we have just demonstrated was realized by using Spring and EJB 3.0 technologies. Software metrics supported by the software package Swat4j are used for static analysis of this case study. The emphasis is primarily set on the object-oriented metrics, complexity metrics and maintainability index metrics. On the basis of performed analysis, following data on Software quality model are obtained:



Figure 28: Software quality model – Spring



Figure 29: Software quality model – EJB

The graphical display of quality model of this case study, developed by using the Spring framework, is presented in the Figure 3. As we can see, Design Quality (8.78) and the Reusability (8.51) attributes are lower graded. In the other hand, Figure 4 represents the quality of model of case study developed by using

EJB technology. As we can see, lower grades are awarded to the Design quality (7.53) and Reusability (8.98).

However, it is important to point out that the value of the Design quality attribute in EJB technology is less than comparing to the Spring framework (7.53 to 8.78). Oppositely, the value of Reusability attribute is higher than in EJB technology comparing to the Spring framework (8.98 to 8.51). Other attributes are quite equally graded.

Based on the obtained attribute values in the model of software quality, we can say that the application developed by using the Spring framework is better designed comparing to application developed by using the EJB technology. And contrary, the application developed by using the EJB technology has greater possibility of re-use comparing to the application developed by using the Spring technology.

Based on the performed static software analysis, we can reach following conclusions on the observed technologies:

- The set of class responses is well defined
- Methods are well designed and not complexed
- There is a lack of method's cohesion within classes. We should discuss the option of dividing some classes into several classes
- Classes are poorly coupled
- Classes inherit greater number of classes then they should. The number of inherited classes should be reduced, or discuss the option of using the composition instead of inheritance
- By using these technologies, we get easy to maintain applications

6. CONCLUSION

This paper shows the basic concepts of EJB 3.0 and Spring technologies. Both Spring and EJB enable the development of complex (enterprise) applications, but approaches are slightly different. The fact is that both technologies have their advantages, but disadvantages as well.

Based on everything that was stated in this paper, we could say that EJB technology has following features:

- EJB technology represents de facto standard in the process of developing the complex applications
- EJB uses good features of application server (declarative transaction management, security...)
- Using Entity classes of EJB technologies outside of application server
- EJB technology takes over good features of other technologies
- EJB technology in the new EJB 3.0 version is significantly simplified and advanced
- It requires using the EJB container

After the survey of EJB 3.0 technology, we've given a short survey of the Spring framework. We have presented the components of the Spring framework and their purpose. In this context, we determined that the Spring technology has following features:

- It does not require using the EJB container
- It contains the Spring MVC framework that could be used while developing web applications
- Possesses JDBC mechanism for persistency
- Spring enables the integration with ORM frameworks (e.g. Hibernate, iBatis)
- Spring enables declarative transaction management
- Spring enables the integration with other Web MVC frameworks (e.g. Struts, JSF)

Based on the previous research, we have concluded that the Spring framework enables the exact same things as EJB does, while it is not necessary to use the EJB containers. Applications written by using the Spring technology could be performed within the application server. However, applications written by using the EJB technology could not be performed without the application server. Also, Spring facilitates working with other frameworks (it could integrate with ORM frameworks, as well as with Web MVC frameworks). However, the fact is that the EJB 3.0 technology has overtaken many good characteristics of the already existing technologies. Good features of the Spring framework had been used (for example, the support for IoC concept had been added) and Hibernate framework (annotations added, as well as support for mapping

the classes into POJO entities for simple securing of persistency). In this way, the technology is significantly improved and simplified. Many operations are made automatic and the container carries them out in the background (without the explicit invitation coming from user). In addition, the use of Entity classes of EJB technologies in this new specification is made possible and outside the application server.

After the survey of EJB 3.0 and Spring technologies, we've given the survey of ISO/IEC 9126 standards used to define the quality of the software system. This standard comprises of four parts: ISO/IEC 9126-1 (used for defining the software Quality model), ISO/IEC 9126-2 (for defining External metrics), ISO/IEC 9126-3 (for defining Internal metrics) and ISO/IEC 9126-4 (for defining Quality in use). For needs of this research, the case study has been completely planned, and two realizations were given: one by using the Spring framework, and the other by using the EJB technology. These two applications represented the base for performing static analysis of the software (software metrics that satisfy the ISO/IEC 9126 standard is used). Results of the static analysis of Spring and EJB technology are shown in Table 2.

Table 1: Spring and EJB quality model

	Testability	Design quality	Performance	Understandability	Maintainability	Reusability
Spring	10	8.78	10	10	10	8.51
EJB	10	7.53	10	10	10	8.95

Based on the obtained values of attributes in the model of software quality, we can say that the application developed by using the Spring framework is better designed than the application developed by using the EJB technology. However, application developed by using the EJB technology is easier to re-use comparing to application developed by using the Spring technology. Based on the metrics value, we have reached the following conclusions on observed technologies:

- The set of class responses is well defined
- Methods are well designed and not complexed
- There is a lack of method's cohesion within classes. We should discuss the option of dividing some classes into several classes
- Classes are poorly coupled
- Classes inherit greater number of classes then they should. The number of inherited classes should be reduced, or discuss the option of using the composition instead of inheritance
- By using these technologies, we get easy to maintain applications

We have an impression that the EJB technology slowly evolves. The fact that technology progresses and takes over good features of other technologies is praiseworthy indeed. In this context, many companies have been engaged in the development of new Java EE specification. In addition, we believe that the Spring technology is completely opened for expansion towards other technologies.

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WHERE ARE WOMEN IN IT SERBIA?

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Abstract: *Rapid development of information systems and technologies calls for the establishment of gender equality at all levels. The issue of women's underrepresentation in information technology has been recognized, yet the number of women is still disappointing. The study is implemented through an online survey, where a link was distributed via email to women who work at jobs related to IT, in the IT sector or other organizations.*

Initial results indicate that women are outnumbered in Serbia and they face certain challenges and obstacles that men do not. The aim of the paper is to point out the necessity of a declining gender gap in information systems and technology in Serbia, in order for it to take advantage of the overall potential of a fast-growing market.

Keywords: *gender gap, women in IT, retention of women, gender stereotypes, female computer scientists*

2. INTRODUCTION

For more than a few decades information systems and technologies have changed the world and interpersonal relationships, improving quality of business processes, facilitating access to information and creating new forms of communication. They have led to changes in various spheres of social life, becoming one of the most dominant technology in today's world. The modern, competitive and profitable business cannot be imagined without the use of information technology.

Fast development of information systems and technologies had a huge impact on employment, as well as women's employment. On the other side, a disparity between women and men has persisted in the requirement and retention of women at all levels of information technology [IT], particularly in the highest corporate and academic positions. There is still established perception that it is a traditionally male dominating profession and employers prefer more male ICT professionals. Women face different challenges and barriers in this so-called "male" field.

Facing continuously with different stereotypes, through childhood and schooling time, girls don't recognize technology as perspective career. IT sector, which is growing continuously, are seen as boring activity which is not worth getting involved with. Is it female lack of interest or lack of support and long-term stereotypes that keeping women away?

Despite a number of obstacles, some women succeed at the top of IT. As Fahmida Y. Rashid (2011) pointed out "the bulk of female power seems to be concentrated in the vice presidents, COOs and CTOs. Women tend to be second-in-command and leaders of major divisions. That's not a bad place to be, considering where women were only a few short years ago". Unfortunately these women are rare examples, but only with the real role models and good work learning environment the situation can be improved.

Therefore, this study will be addressing this issue. Paper goal will be to assess the general status of women in IT profession in Serbian market.

The basic question to be answered is where the women are in information technology in Serbia, as well as does the market referring differently male computer engineers than female. We want to investigate gender gap in IT field, in order to awake community and government how serious the problem is and to get involved them in solving it.

The starting point is the survey we conducted among female population working in the field. The main results will be presented in this paper, which could be a good starting point for further research and case studies.

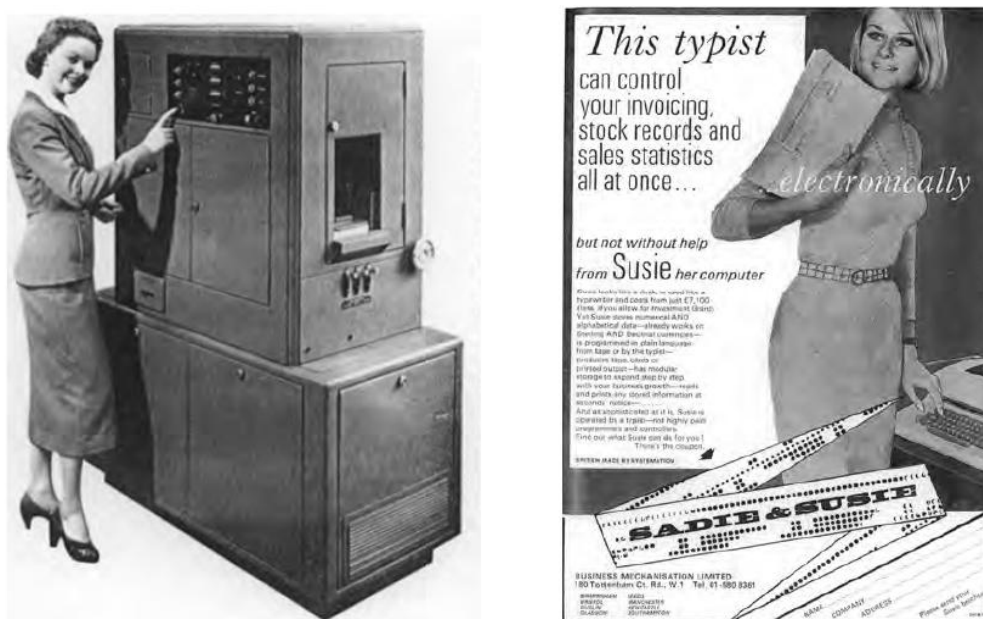
3. LITERATURE OVERVIEW

The issue of women's underrepresentation in information technology, whether in school, higher education, or industry, has been studied in many ways over several decades. It is receiving growing attention not just from

scientists, but also in industry. A number of firms and institutions have recognized the problem, women are facing with, trying to discover its very complicated nature.

Gender Gap in IT has been known since as far back as 50s, with appearing of first dedicated electronic business computer (Hicks Marie, 2010). In early computing, women had been mostly involved in advertising to sell data processing equipment and as data processing labour force. The image of woman as low-cost, unskilled worker was then created and seems to left significant mark on further female professional position in the field.

From the 1950s through the mid-1960s, the primary roll of female worker was to demonstrate power of early office machine quite easy to use. The photographs of female workers on adverts, standing by and working on machine, shared the message „although the electronic computers they use “are so complex,” nonetheless, “a girl can be taught how to work in only ten minutes”“(Hicks Marie, 2010, p.7-8). Machine was tending to complete complex tasks, where low skill and inexpensive replaceable labour can use it. Therefore, routine jobs were dedicated to female worker. In 1960s, women raised their voice and tried to improve their position on the market, convincing community to see them not as „cheap labour but as qualified technicians“(Hicks Marie, 2010, p.8). Despite this effort, employers continued to perceive women as unreliable, not committed to a career worker, meant to be on lower-level positions. They were more demonstrators instead of real computer workers. Unfortunately, in 1970s culture norms were more changed and women started to be use as a sexual object in commercials, focusing on their bodies, which more marginalized them.



Picture 1: The advertisements appeared in early computing

Today's situation is quite better. The number of women in science and engineering was growing, yet men continue to outnumber women, especially at the upper levels of these professions. But recent studies in USA showed that the number is dropped in last few years (Swift Mike, 2011). The percentage of women in IT is declining despite the programs that specifically addressed young women. The research from June 2002 (James Justin, 2010) presented the same results for countries around the world. India was the only exception, where programming is seen as better option in comparison to working in a factory or a farm.

Different theories and empirical studies concentrate on the question why there is a lack of women within the IT profession. Ellen Spertus (1991) have come to the conclusion that not just the problems resulting from working in primary male environment, but also the different ways in which children are raised can influence a girl not to pursue an interest in technology. She highlighted the existence of different expectations for men and women based on culture. Bearing in mind the words of eminent computer scientists, Professor Dame Wendy Hall, “girls still perceive computing to be “for geeks” and that this has proved to be “cultural” obstacle,

so far impossible to overcome" (Shepherd Jessica, 2012), we can conclude that cultural stereotypes of gender skills, abilities and competences are well-established in academic and corporate world.

On the other hand, there is an opinion that women are not quite aware of variety of options IT career has to offer. Mostly women think that IT is mainly about programming and not explore creative parts of the field, which can be more interesting and inspiring for them (Morton Ella, 2005).

Furthermore, it is not enough just to encourage girls to pursue IT career but also to stay within for long-term. Women face difficulties with keeping up with new coming technologies in everyday changing environment, when they make a decision to have a family or to take maternity leave. However, technology itself provides more flexibility with opportunity for working from home via Internet.

4. RESEARCH RESULTS

The main focus of this research is to look at the state of job and working environment satisfaction among women participating in IT sector in Serbia. Data was collected through online survey, where the link was distributed via email to women who work at jobs related to IT, in organizations where IT is core work or others. The survey is posted on the website <https://docs.google.com>.

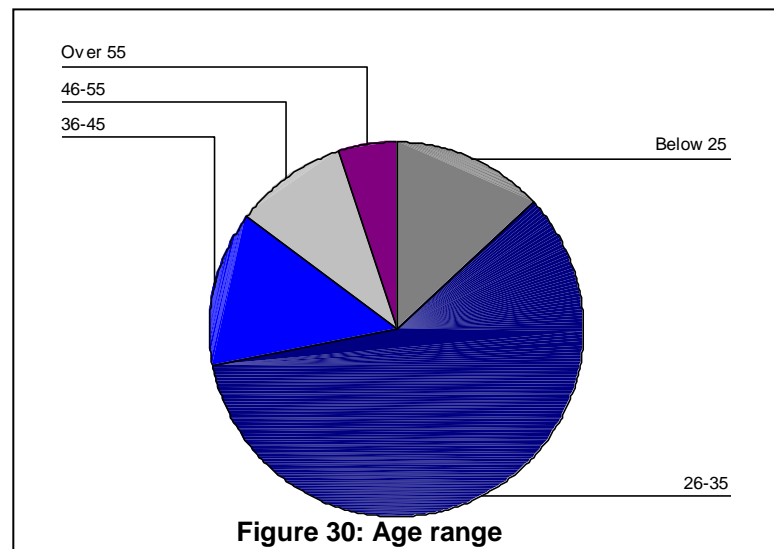
The research was conducted in March 2012 and initial results are presented in this paper. The results should be used for information purposes and be considered as good base for further in-depth comprehensive study of women in information systems and technologies. We used statistical software SPSS version 11.5 to process survey results.

The number of participants involved in the survey is 182, with different educational background and working experience. They are connecting through the interest in technology and science. For the purpose of presenting them, we start with the main variables which can have significant impact on final results.

In Figure 1 we can see participation rates by age, with the age groups as defined in survey. Most female participants are young. The vast majority (72 percent) of women are below the age of 35 years old. Only 14.8 percent are over the age of 46, and about one-half of those individuals are over 55 years old.

Table 10: Age range of participants

	Frequency	Percent
Below 25	24	13.2
26-35	107	58.8
36-45	24	13.2
46-55	18	9.9
Over 55	9	4.9
Total	182	100.0



Furthermore, the examination of company profile variable is quite interesting. As we expected most participants (53.3 percent) are coming from companies where IT is core business work. 17 percent of them are working in service industries and substantial number of women is in the companies related to education. Figure 2 provides a view on outcomes for this independent variable, which impact on results would be discussed in next section.

Leading companies are failing to capitalize on the talents of women in the workforce, according to the report (Saadia Zahidi & Herminia Ibarra, 2010). Lack of women's participation in the workforce can cost the billions of dollars every year developed and growing fast economies. For purpose of monitoring gender gap in IT

sector in Serbia, we observed the percentage of women in companies working at IT related jobs. The rate of IT female professionals in the labor force can be seen in the graph (Figure 3). Not surprisingly, only 33 participants responded that in their companies, women present over 50 percent of workforce.

Table 11: Company profile

	Frequency	Percent
Education / Training	20	11.0
IT core business	97	53.3
The public sector	12	6.6
Service industries	31	17.0
Other	22	12.1
Total	182	100.0

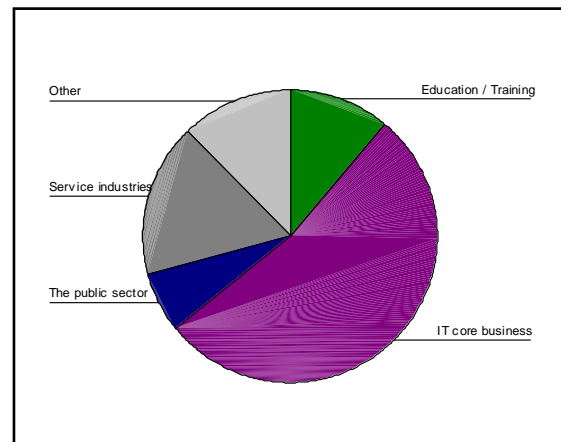


Table 2: Company profile distribution

	Frequency	Percent
below 1%	14	7.7
1-5%	16	8.8
6-10%	13	7.1
11-20%	33	18.1
21-50%	73	40.1
over 50%	33	18.1
Total	182	100.0

Table 12: Frequency of women's percentage

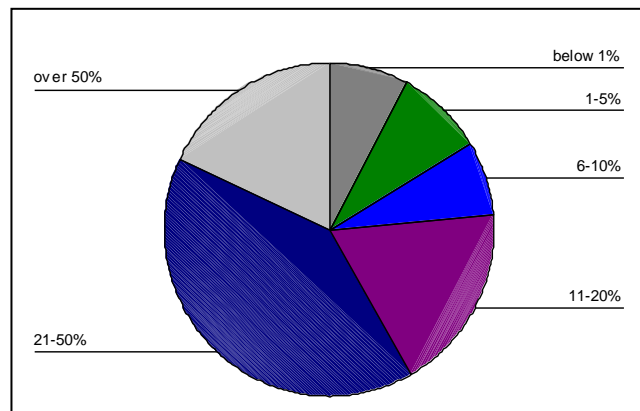


Figure 31: Frequency of women's percentage in companies

The leading discussion in this field is regarding different career challenges female IT workers face than their male counterparts. Moreover, there is existing assumption of fewer women at high level positions with responsibilities of leading complex projects. Is this mean that being the women represent disadvantage in getting a job? 85.7 percent of women responded on this question with negative answer. They don't consider men have an advantage on women in getting a job in IT industry. The distribution of responses is more or less even in all age groups and it is presented in Figure 4.

On the other side, the statement that women don't so often lead complex projects is not completely confirmed. Around 27 percent of participants say that no women in their companies get to lead a complex projects. It is more emphasized among younger population, where one-half of respondents below 25 years old say the same (Figure 5). Performing Chi-square test, we made comparison among these two and company profile variable. Outcome show statistical significant relationship between profile of participants' companies and their responses regarding gender discrimination in getting a job. The corresponding probability is 0.001, which is lower than the conventionally accepted significance level of 0.05 or 5 percent.

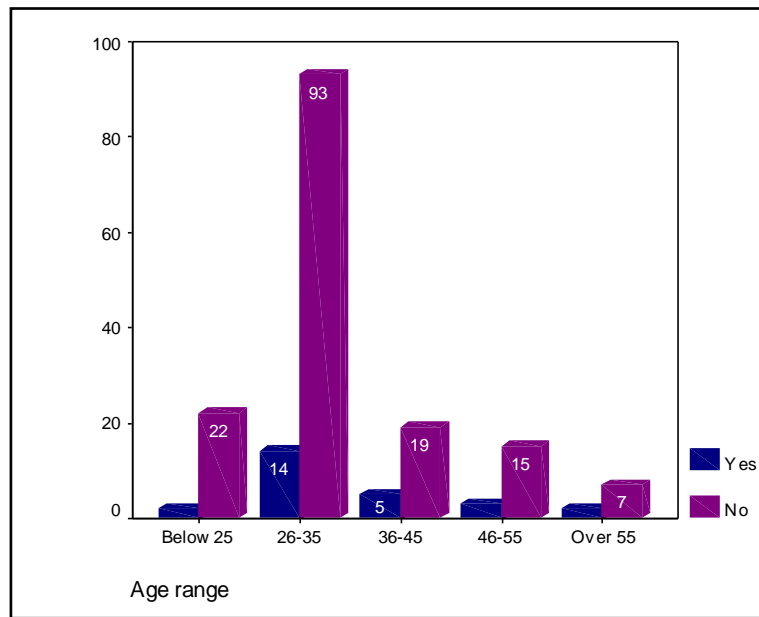


Figure 32: Gender difference in getting job

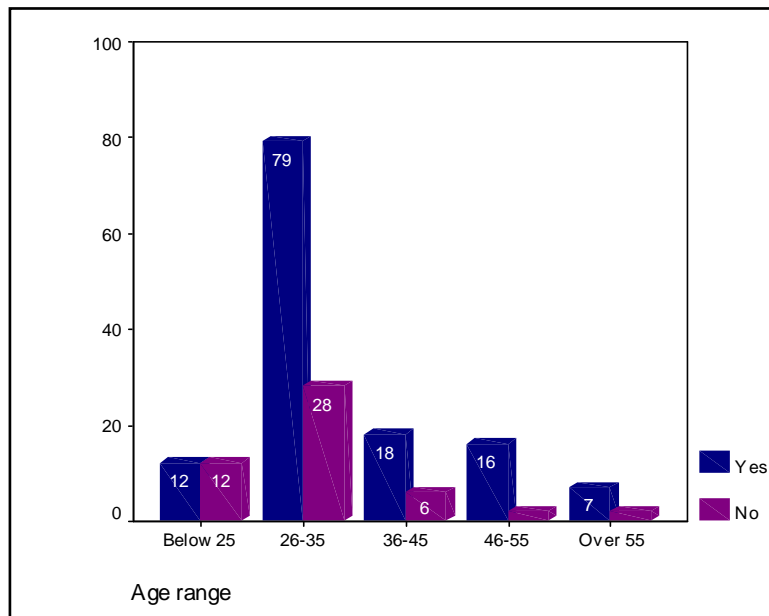


Figure 33: Women lead complex projects

The brief statistical analysis of gender pay gap shows that women are equally compensated for their work compared to men. There is not substantial difference in wage among IT workers in Serbia in the opinion of research participants. Slightly disagreement can be observed in younger age groups, particularly in group between 35-45 years old. The differences become non-significant as we move up a group (Figure 6).

The similar results are obtained regarding appreciation of women in IT. Around 24 percent of responders are not satisfied with the treatment from the employers and coworkers. Mostly it is visible in the group between 36-55 years old. The response overview is showed using Figure 7. Undertaken Chi-square test shows an important influence of company profile variable on equality in appreciation of both genders. The corresponding probability is 0.02. We can say that there is a tendency of it to affect also payment equality, which should be confirmed with extended empirical data.

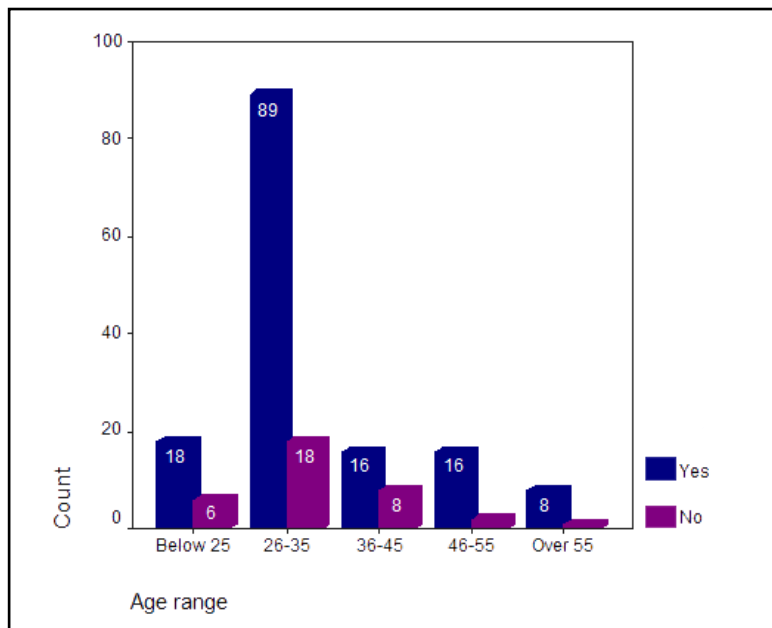


Figure 34: Gender pay gap

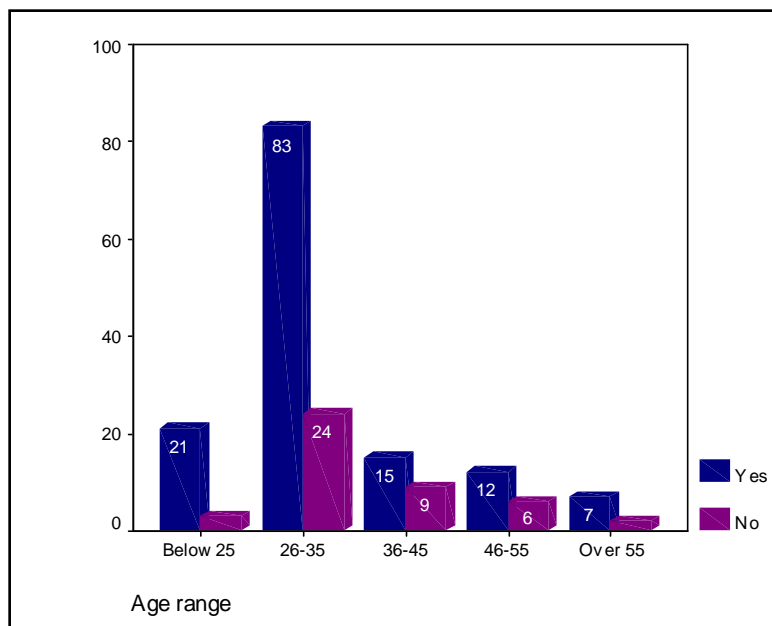


Figure 35: Appreciation of women in IT

5. CONCLUSION AND FURTHER WORK

The study analysis indicates that more proactive guidelines need to be implemented in order to bring a balance in the participation of women in ICT. Women and men are still divided by their perceptions of growth opportunities and compensation levels. Reducing gender gap for technology worker is a slow process and a big challenge.

Pursuing the objective of obtaining relevant data regarding status of women in IT profession in Serbia, we have presenting following:

- undertake a descriptive study to characterize the independent variables, such as number of women working at IT related jobs in responders companies expressing as a percentage (values presented in Figure 1, 2 and 3).
- in order to understand behaviour and obstacles women facing in IT career, we assess attitudes and opinions of responders regarding gender stereotypes and commonly used statements over women discrimination in IT world.

Results show that the majority of involved women believe in equality between women and men in getting job, leading complex project and payment. As already mentioned, we observed the statistical significant correlation between company profile variable and distribution of responses regarding gender payment gap, women appreciations and differences in getting a job. Therefore, we can't ignore the other part of the population which disagrees with them.

In spite of the encouraging findings of the current study, we identified a number of weaknesses. A limited number of data values were collected during the execution of the survey, due to the limited amount of time and the number of subjects. We may consider the quality of data collection to be not enough for deep comprehensive analysis. Furthermore, we asked subjects firstly for their personal opinion, came from their experience, which should be reviewed with more data in the future. The results of this research should therefore be interpreted only as findings and good basis for further projects.

In view of the brief analysis of the gender gap statistics in IT Serbia, it is important to continue research on this population as studies provide essential information about experience women facing. We intend to conduct more of field studies in cooperation with other institutions and to analyse the representation of females enrolled on studies at Belgrade University.

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STRATEGIC OPTIONS AND COMPANY PERFORMANCE IMPROVEMENT IN INTERNATIONAL BUSINESS

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Abstract: *This paper considers the complex relationship between managerial strategic choices and business performance in a dynamic international environment. This topic is extremely current in the conditions of the world economic crisis and is relevant for companies, as well as in the final instance, for economic growth. The goal of the paper is to indicate the key aspects of company performance improvement as the result of successful realization of a chosen strategic option in international business. Comparative analysis of the approaches and results of empirical research points to a variety of implications of strategic managerial decision-making on performance and also to the expressed multidimensionality in this field. Dynamic approach and focus on considering qualitative and quantitative aspects of the analyzed connectedness in an international framework is necessary.*

Keywords: *strategic option, international business, managerial choice, company performance improvement, international competitiveness, innovative strategic orientation*

1. INTRODUCTION

Managers in international business must make decisions about entering a certain foreign market, and introducing new products and services, which is reflected in the selection of an appropriate strategic option. The company should reinforce its strengths in order to face the challenges of a rapidly changing external environment for which discontinuity is the norm. Analysis and prediction of changes in business environment help to successfully create strategies and conduct business towards improving performance in the future period. In any case, the international environment has an important impact on the company, which largely depends on the dynamics of the environment. It is also necessary to consider variety of its factors – social, economic, political, cultural, technological, ecological. Managers must take into consideration the acceleration of business competition activities, shortening the product and service life cycle, shifting of economic power between countries and regions, desegregation in many business spheres, increasing uncertainty and operations in a more volatile contemporary world. There is an important tendency for companies, especially in certain types of product and service fields, to use the flow of information in order to create a competitive advantage in foreign markets, especially in conditions of intensification of knowledge based competition. The use of communication technologies is of increasing importance in the realization of strategic options in the international business.

The global economic crisis has influenced a change in the strategic approach of many managerial teams, as well as factors of creating strategic advantages in an international framework. The strengthening of the role of the state in the economic sphere, protectionist tendencies and the necessity of considering national differences and adapting to local conditions must be taken into consideration. Increasing significance of product and process innovation, product and service customization and resource allocation of companies to strategic priorities is evident in contemporary business. The expanding role of cost management and price competition imply the importance of the creation of an appropriate pricing strategy. Generally speaking, the complexity and dynamics of the contemporary environment demand a flexible approach to strategic options and an effective managing of strategic changes.

A particular challenge for managers is the selection and realization of a strategic option which will lead to the improving of company performance. This is essential from the aspect of economic development, but also for the enhancing of dignity and reputation of the business on a global scale. For the managerial profession what is becoming crucial is multidisciplinaryity, as well as development of new approaches, methods and techniques of modern management, new ideas and creativity. Also, attention should be focused on the

¹This paper includes the research results of the author realized on Project record no. 179081 financed by the Ministry of Education and Science of the Republic of Serbia.

connection between strategic management and performance management, with the appropriate information support. The importance of economic knowledge is also now center stage, including both microeconomics and macroeconomics, which relates to production and service industries, with their focus on more intensive, successful inclusion in international business in the complex dynamic environment of the second decade of the 21st century.

2. MANAGERIAL STRATEGIC CHOICES IN CONTEMPORARY INTERNATIONAL BUSINESS

Companies must reexamine their strategic choices as a response to changes in the environment. Starting from the altered economic landscape, adaptation is necessary of the following functional strategic components: market and products; operations and innovations, organization and people; identity and reputation (Ghemawat, 2010).

As regards market and products as strategic components, companies in developed countries should reconsider the manner of customer targeting. The second challenge is related to pricing pressures. The necessity of lowering prices has been influenced by the economic crisis, fall in purchasing power and surplus of capacity, and the expansion to poorer markets, both domestic as well as foreign is also contributing to this trend. Finally, companies must develop products and services fundamentally different from previous ones, taking into account local differences, such as consumer preferences, price sensitivity and infrastructure, as can be seen from the example of the company *Nokia*, which developed a mobile phone, intended for rural communities in India in accordance with their particular local needs. Possible adjustments are likewise expressed through the focusing on underserved market segments throughout the world.

The domain of business operations is specific by its tendency to shorten and simplify supply chains, and adjustments often imply rethinking the scope of offshoring. Another characteristic is importing process innovation from the emerging economies. In addition to this, high-tech firms especially have a pronounced tendency to move R&D where the researchers and market growth are present. As regards organization and people, it is becoming more important in the case of multinational companies to re-create country manager functions and develop a globally representative talent pool (Ghemawat, 2010). From the aspect of developing strategic options of multinational companies the possibility of having dual headquarters— one in a developed Western country and the other in Asia is becoming up-to-date. Certain adjustments are needed in the domain of reputation as a strategic component, such as building a strong corporate identity, emphasizing belonging to a corporation and restoring the general reputation to a business in the contemporary world in the conditions of the economic crisis.

Manager must respect the fact that many industries are being transformed by the fast development, acceptance and application of innovation from the sphere of information and communication technologies (ICT). Especially noticeable are changes in the field of expanding service sectors. From the viewpoint of companies and the economy, the influence of ICT on lowering transaction costs is now foremost. The location of the company in the case of creation of an ICT cluster is also becoming important. In creating an appropriate competitive strategy in the conditions of digital economy, managers should reexamine the position of the company in relation to competitors in the sphere of e-business (Milićević, Ilić, 2011). Abilities of the firm in the domain of information and communication technologies must be objectively considered, as well as the need for financial resources. Development in the field of mobile communications is becoming important.

In the recent period the importance of strategies that help to outthink the competition is stressed. Leaders in companies that have applied this strategy spot an opportunity in the environment which others do not, intelligently choose and quickly react to this new strategic option which basically disrupts the established market relations. Traditionalists are defeated in an environment in which business competition is undergoing a fundamental paradigm shift (Krippendorff, 2012). Specifically, breakthrough companies are creating a new strategic reality by seizing asymmetric advantages. Examples of these companies are *Apple*, *Microsoft*, *Google*, *Tesla Motors*, *Vistaprint*. Strategic creativity here is important as the result of a new way of thinking which through acting differently, in the final instance, leads to the reshaping of particular industries. As a result, performance of hypergrowth companies is often considerably improved as reflected in an increased market share, income and profit. The original strategic approach and following new paths in the altered environment have led to the global business success of companies *Dell*, *Facebook*, *Amazon*, *L'Oréal*. What is characteristic and often stands out is the power of coordinating things outside the company itself in implementing innovative strategies.

In modern strategic management in Asia, but also throughout the world, starting from hypercompetition, the common practice of creating and realizing strategies is often linked with the classic work of the Chinese writer Sun Tzu *The Art of War* (Sun Cu, translation 2009). It is typical of these approaches to treat the market as a battlefield and it is of key importance to realize the strategic option which will defeat the competition, especially in conditions when supply exceeds demand.

In this context it is important to consider the essentially different approach to strategic options expressed in the concept "blue ocean strategy" created on the basis of a detailed empirical study of 150 strategic moves spanning more than a hundred years and thirty industries (Chan Kim, Mauborgne, 2005). Here the metaphor of a red and blue ocean is used for different market spaces. "Red oceans" refer to the known market space where industry boundaries are defined and accepted, and the competitive rules of the game are well known. As the market space gets crowded, prospects for profits and growth are reduced (blueoceanstrategy.com). According to this concept, tomorrow's leading companies will succeed not by battling competition, but by creating the blue oceans of uncontested market space. Even though some blue oceans were created beyond existing industries boundaries, many were created with new game rules from within red oceans by expanding existing industry boundaries. A typical example is the Canadian company *Cirque du Soleil*, which successfully created new market space that made the competition irrelevant through a strategic orientation towards an alternative form of entertainment for a new group of customers. There will always be red oceans in the environment, but companies, by creating blue oceans, followed by a new aggregate demand, can use the new opportunities for development and realizing profit, i.e. improving performance, and this strategy is defined as value innovation. It implies a leap in value for the enterprise and for its buyers and is based on differentiation and low costs, i.e. improved efficiency, which implies a "win-win scenario" (Chan Kim, Mauborgne, 2005). In contemporary conditions of ICT development in international business, the blue ocean strategy execution in mobile industry is becoming particularly relevant.

3. CONNECTION BETWEEN THE STRATEGIC ORIENTATION OF A COMPANY AND BUSINESS PERFORMANCE IN THE INTERNATIONAL ENVIRONMENT

It is necessary to constantly examine the external international environment in order to timely observe the signs of possible unfavorable economic trends, demand saturation, technology substitution, consumption structure change, and social discontinuities. If there are indications that a certain foreign market won't be profitable in the future period, the company shall seek an opportunity on a new market or on a more narrow market segment.

In order to be successful, a company must create value for its customers/service users and other relevant stakeholders in a distinct manner through competitive positioning and by offering an integral service. Strategy is defined also as the skill of creating value which offers a conceptual framework based on which managers can identify chances of providing value to clients with the company attaining profit. In this sense the strategy is seen as a way for the firm to define its operations and integrate resources, including the intangible ones.

Considering the importance of business performance improvement from the aspect of survival, and especially the development of companies in the world economic crisis, the focus is on studying the relationship between strategy and different aspects of enterprise performance. In this context, besides the profitability ratios, newer approaches and models of measuring performance of a contemporary company must also be considered, especially the advantages offered by the creative application of competitive benchmarking (Miličević, 2005). In designing a specific system of measuring performance as the result of realization of a particular strategic option, the interests of internal and external stakeholders should be considered.

It is important to stress the role of the Balanced Scorecard - BSC as the original model of measuring company performance (Kaplan, Norton, 1996). Application of BSC and strategy maps is especially current from the aspect of increasing the importance of knowledge as an intangible resource which often leads to important innovation and in this sense BSC enables the successful overview of results from innovation and learning perspective. Innovation can result in lower costs, differentiation or faster response to opportunities and threats from the external environment, where the core competence and abilities of the organization must come to the fore.

Employees can effectively implement a strategy when they fully understand it and when they realize how they can contribute to future business success. It is especially important to have communication between managers and employees and cooperation. In this context the newer approach through "performance-driven organization" is more relevant as it integrates the performance of employees and the performance of organizations (Siffler, 2006).

The empirical study of the relationship between strategy and performance is relevant, determining the business strategy from the aspect of pursuit, achievement, and maintenance of competitive advantage in an industry (Morgan, Strong, 2003). In this manner strategy is linked to the outcome of strategic decisions of managers. Multidimensionality is implied in the assessment of business performance with the incorporating of the driving forces of future growth. The manner in which the business strategy content is expressed in a company is determined differently, namely as a strategic fit, strategic predisposition, strategic thrust, strategic orientation or as a strategic choice.

In assessment of business strategies the comparative approach is affirmed which evaluates the strategy based on numerous traits and dimensions common to all companies. It surpasses the empirical limitations typical of the classification approach for strategies and starts from the following six dimensions of strategic orientation which have been developed from several angles in literature in the field of strategic management: *aggressiveness*, *analysis*, *defensiveness*, *futurity*, *proactiveness* and *riskiness* (Morgan, Strong, 2003).

Aggressiveness as a dimension of strategic orientation of an organization is primarily linked with using and developing resources faster than the competition. In markets characterized by turbulence and intense competition aggressive strategic behavior should improve organization performance through increased sales and profitability. This dimension entails a clear orientation towards sales which emphasizes the importance of increasing the market share and plays an important role in direct confrontation with competitors in order to defeat them. *Analysis* relates to the capacity of creating knowledge and securing the process of organizational learning. It reflects an organizational approach to problem solving formed by understanding the internal and external environment context. It has been observed that in turbulent international environment the successful managers are those who base their decisions on more information, considering a larger number of alternatives and seeking more advice in decision making. The level of business performance can depend on the ability of the company to retain its existing competitive position with a slight emphasis on development outside its business field or market. The dimension of defensiveness is characterized by a high degree of strategy specialization, stronger focus on the defense of the existing area and belief that expert knowledge in a certain field leads to a high level of business performance. In endeavoring to secure a high level of business performance, the organization is seeking a market position which it is able to defend from the competition. The *futurity* dimension implies that in conditions of considerable environment changes, the existence of a long-term vision is a strategic imperative for preserving a competitive market position. Such an orientation secures the basis for understanding the pattern, form and scope of potential changes in the competitive environment, industry and market. *Proactiveness* reflects innovative behavior and the tendency of the organization to take advantage of the observed opportunities, experiment with change and assume the so-called "first-mover" actions. This dimension of strategic orientation enables the creation of a competitive advantage on the basis of a proactive approach to seeking new products and markets. Organizations with such a strategic orientation realize a high level of performance based on their responsiveness to market signals, access to rare resources, customer and user loyalty and strong commitment to innovative improvement of business. *Riskiness* as a dimension of strategic orientation can be specified as possible gains or losses which are the result of an implemented action. The allocation of resources is very important and can be the key parameter in making decisions related to the choice of a competitive strategy (Morgan, Strong, 2003).

Empirical research regarding these dimensions of strategic orientation and business performance of companies was conducted on a sample of 149 medium and large production high-tech companies. The influence of these dimensions of strategic orientation of companies on business performance was examined which were presented through a combination of the following indicators: accounting-based items – return on investment and sales growth; market-based items – market share, customer satisfaction, competitive position and customer retention and "overall firm performance" as a generic indicator (Morgan, Strong, 2003). The results of this research showed that companies whose strategic orientation was based on futurity, analytical skills and abilities but also defensive tactics achieved the highest level of business performance. On the other hand, also relevant is research that indicated proactivity, preference towards risk and aggressiveness as very common dimensions of strategic orientation of many successful companies,

especially linked with intrapreneurship practice. Thus we must consider the connectedness of an entrepreneurial strategy and firm performance (Dess, Lumpkin, 1997).

The results of cluster analysis are relevant, according to which four basic types of innovative strategic orientations are differentiated, based on which businesses can be classified into four groups: (1) product innovators or current pioneers – companies with the highest rate of introducing new products and relatively high allocations for research and product development; (2) process innovators – firms with the highest costs of research and development, that enter target markets relatively early; (3) late entrant non-innovators – the least innovative, with the lowest rate of introducing new products and relatively small research and development expenditures; (4) former pioneers – businesses that are currently not innovative, viewed from the aspect of introducing new products and allocations for research and development (Manu, Sriram, 1996).

The relationship between the innovative strategic orientation type and the following business performance indicators: return on investment, cash flow of investment, cash flow from operations, market share, relative market share, market share growth is important in international management. The results of research of this connection are specific (Manu, Sriram, 1996). A characteristic of the first group of companies, product innovators, was weak financial performance such as return on investment and cash flow due to high costs of this strategy, but the growth rate of the market share is very high. Process innovators were better than product innovators regarding financial performance, however cash flow was unsatisfactory. Firms from the third group – non-innovators realized a very low market share, as their strategy was not designed for acquiring a strong market position (Manu, Sriram, 1996). Former pioneers had superior performances according to all indicators, except market share growth. Excellent marketing and financial performances of this organization were realized on the basis of a superior market position which stems from the fact that these companies first appeared on these markets and had built a good image, and sometimes were successful franchisors, especially on an international scale.

Research results have shown that companies, instead of the complete realize around 60% of their strategies' potential value, due to losses and problems that occur in strategy planning and implementation. (Mankins, Steele, 2005). According to the research of these authors, average performance loss in strategy realization is 37%. The loss structure is as follows: 7.5% - inadequate or unavailable resources, 5.2% - poorly communicated strategy, 4.5% - actions required to execute not clearly defined, 4.1% - unclear accountabilities for execution, 3.7% - organizational silos and culture blocking execution, 3.0% - inadequate performance monitoring, 3.0% - inadequate consequences or rewards for failure or success, 2.6% - poor senior leading, 1.9% - uncommitted leadership, 0.7% - unapproved strategy, 0.7% - other obstacles, including inadequate skills and capabilities (Mankins, Steele, 2005).

The fact that in international business many high-performing companies have succeeded in closing the strategy-to-performance gap owing to effective planning and strategy realization is certainly positive. This complete and effective planning and execution process has contributed to the great performance of companies such as *Cisco Systems*, *Dow Chemical*, *3M* and *Roche*.

Price competitiveness in international markets is important, so the application of an adequate pricing strategy for a product or service is relevant. The example of the company *Apple* is illustrative as its new pricing strategy is considerably different from its strategy in the previous period. The company *Apple*, which was once known as a leader in the high-tech sector for its high prices, recently began to defeat the competition with a new strategy based on lower prices. Innovations, such as products like iPhone, iPad and the ultra-thin MacBook Air notebook are justifiably considered the key generators of the rebirth of the company under Steve Jobs. Analysts believe that the new pricing strategy has considerably contributed to having this company, besides loyal users of *Apple* products, win over a broader circle of consumers. Aggressive pricing is the results of *Apple's* ability to use its growing manufacturing scale to push down costs for parts for their devices which are saleable throughout the world (N. Wingfield, 2011).

4. CONCLUSION

In conditions of limited resources and great pressures on increasing efficiency and effectiveness, the importance of strategic planning in international business becomes apparent, i.e. making managerial decisions about the desired goals and strategies that will realize them. This implies the importance of successful connectedness of managerial strategic choices and business performance in a dynamic

international environment. This topic is extremely current in conditions of a world economic crisis and is relevant both from the microeconomic and macroeconomic aspect which relates to the export performance and economic development. The results of the research presented in this paper pointed to key aspects of business performance improvement as the result of a successful realization of the chosen strategic option by managers. Comparative analysis of the approaches and results of empirical research has stressed the variety of implications of strategic managerial decision-making on performance, as well as the pronounced multidimensionality in this domain. It has been shown that a dynamic approach is needed as well as a focus on reviewing quantitative as well as qualitative aspects of the analyzed connectedness in an international framework.

It stems from this that updating the company performance measurement system is necessary, as company itself is complex and changeable, with the apparent dynamics and complexity of external general and operating environment. From this aspect it is important to respond to managerial demands for a measurement system that supports the selected strategic option and links it with business operations. In large companies this is particularly useful, especially considering the possibility to better review the performance of certain organizational units and their contribution to realizing the business results of the company as a whole.

Besides experience and creativity, in the reexamining of the relationship between the strategic choice and business performance improvement, also important is the multidisciplinary knowledge from different fields such as corporate and competitive strategy, investing, value for owners, managing international business, development and innovation of products/services, operational management, organizational culture, human resources management, managing customers as stakeholders, leadership, ICT management.

Generally speaking, the connectedness of the application of a certain strategic option and the improvement of business performance in conditions of a rapidly changing modern international environment implies the integration of performance measuring in the sense of simultaneous consideration of different performance indicators with a deeper insight into their mutual relations. Parallel theoretical research, consideration of practical problems and particular solutions have led to an operationalization of different conceptual performance indicators in an international framework. Having this in mind, it is necessary to consider concrete results of a company, which in practice means the acceptance of the contingent approach. The information aspect is also important i.e. obtaining data for testing the given interdependency as well as appropriate software support. An integrated approach can entail the translating of performance indicators of an organization considered in a strategic sense into performance indicators of the operational type of individual employees, which means into a form of action plans. This incorporates the application of the technique "management by objectives – MBO" which has shown to be effective in many companies in the world. In practice it is necessary to set priorities and systematically analyze the connectedness of strategy realization and performance improvement, with continuous dedication of managers and employees, as well as their proactive approach.

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THE CHALLENGES OF BUSINESS STRATEGIES IN EMERGING MARKETS²

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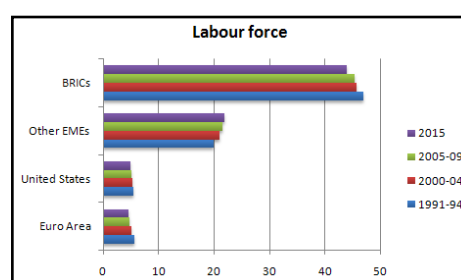
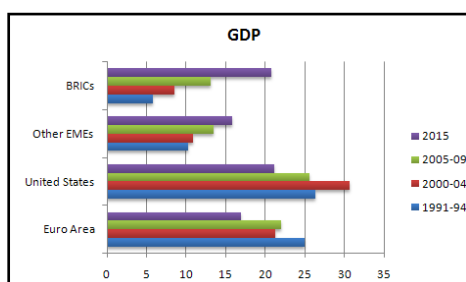
Abstract: *Emerging markets strengthening in the international trade and investment flows, including BRICS as the most important, change positions of key players in the world market. BRICS countries are a threat for both the developed and developing countries, because they shift investment focus and raise the competitiveness bar. Their markets are, at the same time, an opportunity for successful positioning of transnational or multinational companies assuming the model of their business strategies to the challenges of the emerging markets. This paper examines the specificity of business strategies of the successful companies in emerging markets.*

Key words: *business strategies, emerging markets, BRICS, capability, capacity, risk*

1. INTRODUCTION

Emerging economies are low-income, rapid-growth countries using economic liberalization as their primary engine of growth. They fall into two groups: developing countries in Asia, Latin America, Africa, and the Middle East and transition economies in the former Soviet Union, East Europe and China. Private and public enterprises have had to develop unique strategies to cope with the broad scope and rapidity of economic and political change in emerging economies.

With a combined labor force of more than 1 billion people, BRIC (Brazil, Russia, India and China) have always had the potential to be key players in the global economy. Rapid economic growth in recent decades has enabled BRICs to begin to tap this potential. With a large population base and relatively low per capita income, role of this group of countries in the world economy, is only likely to increase over time as they narrow their gap with advanced countries in income levels.



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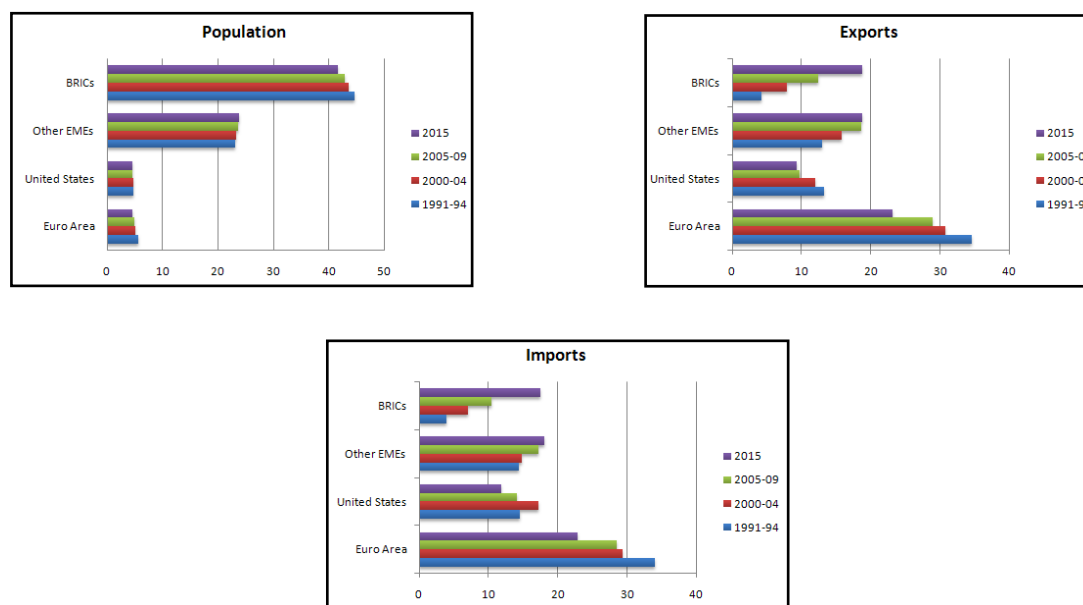


Figure 1: BRIC in the global economy, 1991-2015
Sources: IMF and World Economic Outlook, October 2010

The world population in 2011 was estimated at 7 billion people. Almost three out of every seven people in the world today live in BRICs. Although the share of these countries in world population is projected to decline over time, similar to that of the United States and the Euro Area, it will remain a multiple of that of the United States and Euro area combined and could eventually supports economies that are commensurate to BRICs human resource base (Issouf, Yongzheng, 2011).

Regarding growth, since the early 1990, BRICs have more than doubled their share in global output. BRICs GDP (based on market exchange rate) are now the third largest in the world after United States and the Euro area. According to the IMF projections, BRICs GDP will surpass that of the Euro area before 2015 (Issouf, Yongzheng, 2011).

Finally, BRICs exports have been the most dynamic in their integration into the world economy. Over the past two decades, BRICs share in world exports have nearly tripled, overtaking that of the United States and catching up rapidly with that of the Euro area. The growth of BRICs imports has been less spectacular but still very impressive -nearly doubling their share in world imports over the past two decades and should catch up with the United States soon (Issouf, Yongzheng, 2011).

Investment focus move to emerging markets has made their economic development more dynamic, strengthen trade position and greatly sharpened the competitive environment in these markets. According to the latest UNCTAD report (UNCTAD Report, 2011), BRICS countries (Brazil, Russia, India, China and South Africa) were among the biggest recipients of greenfield investments in period 2005-2011. This equally applies to the value and to the number of individual greenfield investments. Number of investments ranged in South Africa from 29 to 65, in Brazil from 34 to 102, in India, which is recorder with China, from 191 to 358, in Russia from 133 to 192 and in China from 141 to 330 of individual investment.

Recent research by the World Bank about profiles of countries according to certain indicators of the attractiveness of foreign investment such as the ability and the safety of investments in certain sectors (especially in those of interest to investors on a global world trends), start up their own business, taking of land for lease for greenfield investments, judicial experience in that country etc.) indicate that the profiles of BRICS countries, of most aspects, are above average and recommend them for FDI and in the future. On question, in which developing countries is your firm presently investing, BRICS countries take leading positions, in this order: China, India, Brasil, Russia, the fifth place is Poland, and a sixth take South Africa. Each second asked investor said that investing in China and each fourth in South Africa. (World Bank Group, 2011).

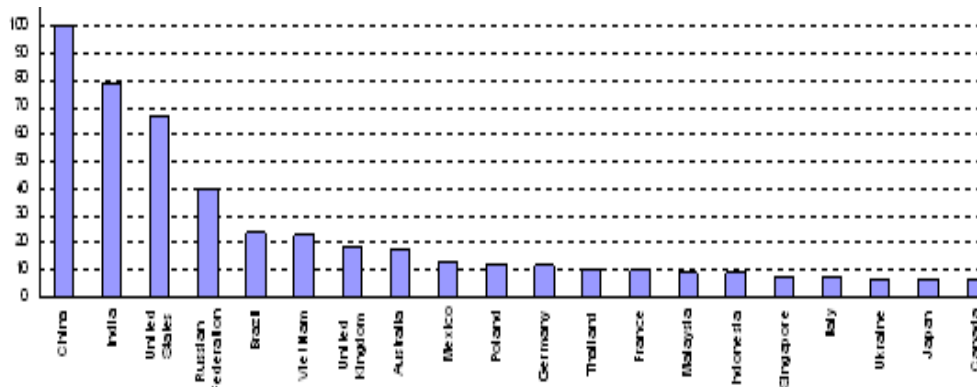


Figure 2: The most attractive investment destination by 2020
Source. World Investment Report 2010, Investing in a low-carbon economy

2. STRATEGIC EXPANSION IN EMERGING MARKETS

For more than a decade now, multinational companies have flocked into emerging markets under the banner of globalization to access low-cost sourcing in high growth economies. Many of these companies have established fairly successful operations and realized significant cost arbitrage. According to the survey of 247 executives from consumer and industrial product companies performed by Deloitte during 2009, it can be concluded that companies are increasingly making emerging geographic markets a centerpiece of their global business model. Over the next three years, 88 percent of companies plan to expand their presence in emerging markets; 50 percent of companies expect 20 percent or more of their global revenues to have their origins in emerging markets; a third of these companies plan to place more than 20 percent of their investments in these regions (Deloitte survey, 2009).

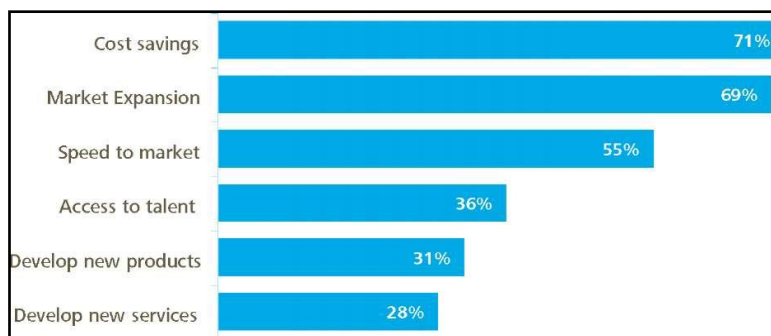


Figure 3: Top three strategic objectives for establishing functions in emerging markets
Source: Deloitte, Rethinking emerging market strategies: From off shoring to strategic expansion, 2009

The main reason of expansion to emerging markets is not only presents in low-cost centres, but for large number of multinational companies it means establishment of core functions of their value chains in these regions. Cost savings is still a key motivator, but market expansion, speed to market and access to the talented human resource become important decision making factors. Companies also spread their investments across multiple locations in order to diversify their investments across geographies. Also, they strive to broad the scope of their business in emerging economies; large number of them established commercial operations in addition to their manufacturing endeavours. Firstly, they try to generate more income from sales activities and secondly, they realize that material sourcing can be more payable and important. The companies' future returns will depend on emulating global business models in emerging markets. Recent research shows that there is strong correlation between the sort and number of business functions a company establishes in emerging markets and the percentage of global profits that come from these regions. According to the Deloitte's survey, a one third of the companies with five or more business functions in emerging markets earn 20 percent or more of their global profits from that market; companies with only a single operation derived 10 percent or less of their global profits from emerging markets.

Last period was characterised by some important changes in relation to the main trends in emerging markets: raw materials and production costs have become higher that had negative influence on the financial positions of the companies which main reason for entering emerging markets was cost savings. Those companies that declare market expansion as their key objective recorded increase in their global market share. Consequently, companies, that are not capable to keep pace with changes in emerging markets, will not be a part of global business model and their results in emerging markets will be unsatisfactory. Obviously, business operations in emerging markets became more complex: companies strategically shift specific functions of their value chains in order to realize new objectives: growth, innovation and sustainability. From a strategy standpoint (see figure 4), three factors determine the emerging market business model: capacity, capability and risk (Deloitte survey, 2009).

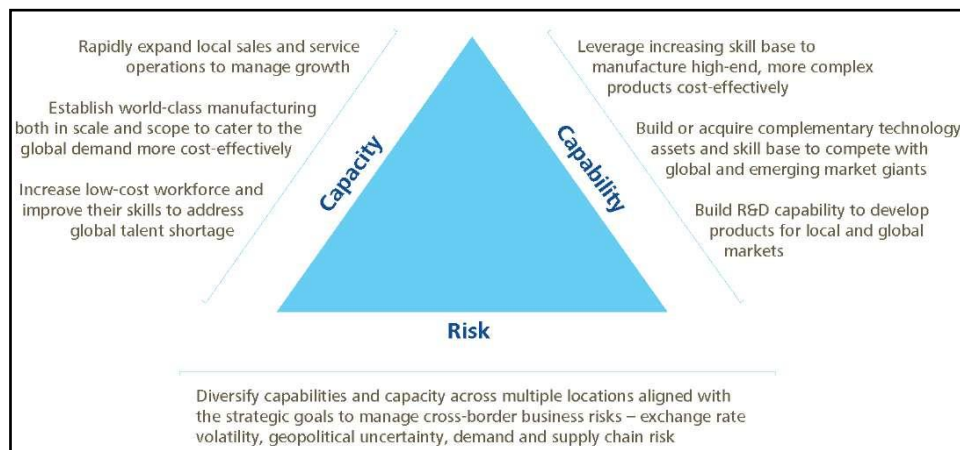


Figure 4: New strategies for emerging markets

Source: Deloitte, *Rethinking emerging market strategies: From off shoring to strategic expansion*, 2009

2.1. Capacity

Despite financial crisis and recession in large number of the world's economies, developing economies like BRICS will continue to be the pillars of global GDP growth. It is not easy task to satisfy consumers in developing countries, so companies have to aggressively target these economies to achieve their growth targets. Strong understanding of the market, culture and local constraints are crucial for introducing products to new regions. Some companies need even several decades to achieve this capacity. Business operations in emerging markets allow companies to take advantage of favorable currency arbitrage and build capacity for local and international markets.

Expanding the scale and the scope of production capacity became important issue. As it is in *Deloitte's survey (2009)* noticed "for example, the demand for consumer and industrial products in BRIC countries has grown exponentially in the last few years". (p.7). Consumer demand in emerging markets became very similar to the demand of developed countries so the companies will need to grow their capacity for product development and manufacturing if they want to increase local demand. Recent trends show that some companies transform their business in emerging markets into export hubs by increasing manufacturing capacity to account for both local and international consumers.

2.2. Capability

Capability means that companies are ready to move from assembly and low costs parts production stage to more complex business functions stage in order to upgrade their value chain. Multinational companies diverted its activities trying to build more complex, engineered products for local and global markets. For example, South Korean Hyundai Motor Co. recently started commercial production at its second engine plant in India in an attempt to drive up small-car sales in one of the world's fastest-growing auto markets. Hyundai, the world's sixth-largest automaker, aims to make its India plants the global hub of its compact car production (Deloitte survey, 2009).

Multinational companies became more aware of capability of emerging markets: they try to enhance their product or service offerings, either through acquisitions or alliances with local companies. On the other hand, multinational companies will extend their capability accessing to the new talents in emerging markets which are characterized with low cost, well skilled and good educated workforce. Some of them see emerging markets as good chance to improve or to supplement their capabilities in research and development. The world's largest steel company, Arcelor Mittal, was found a state-of-the-art R&D facility in Kolkata, India which will not only bolster the company's R&D capacity, but represent also the capabilities they need to enter the fast-growing, lucrative field of engineering consultancy. *Kumar, Runa Rajeev and Rakhi Mazumdar (2010) said that "additionally, the new facility will take advantage of the huge gap between supply and demand for consultancy jobs in that part of India: the company has recruited some 300 people to occupy the 25 000 square foot facility"* (p.12).

2.3. Risk

Last but not least factor that will determine the emerging market business model of multinational companies is risk. Strategic expansion of business involves cross-border business risks and companies have to take all necessary steps that will enable them to create a sustainable cost and revenue structure across geographies. Besides political, regulatory, market and increasingly geopolitical risks, that can also have a hand in the successes and failures of companies' endeavors in other countries, cross-border business risk has several forms of challenges: exchange and interest rate volatility, operational stability issues and experience. Fluctuating exchange rates may not allow companies to remain competitive in highly price-sensitive markets which are typically for emerging economies. The uncertain future of emerging market currencies adds risk to projected profits and cash flow over the long term. Operational stability is one of the greatest concerns among companies in emerging markets; mistakes and wrong decisions can easily jeopardize hard-won companies' reputation. Abandoning emerging markets due to such risk factors is clearly not a viable solution, but one of the crucial things is that companies have to manage risks absolutely proactively. Companies with more experience tend to do a better job of extending their value chains in emerging markets because they have deeper business relationships and understanding of local markets needs and relations and cultures. As it is in *Deloitte's survey (2009) pointed out "finally, careful consideration of strategic objectives that account for capability, capacity and risk can go a long way in choosing the right region"* (p 10).

3. WINNING IN EMERGING MARKETS

Emerging markets in Asia, Latin America and Eastern Europe are delivering some of the strongest revenue and profit growth for global makers of fast-moving consumer goods (everything from snacks to toothpaste) despite concerns that lower prices translate into lower profits. Emerging-market leaders like Coca-Cola, Unilever, Colgate-Palmolive, Groupe Danone and PepsiCo earn 5% to 15% of their total revenues from the three largest emerging markets in Asia: China, India and Indonesia (Shankar, Ormiston, Bloch, Schaus and Vishwanath, 2008).

Until the past few years, emerging markets were a relatively low priority for the leading consumer products companies with a few exceptions, even though these markets are home to about 85% of the world's population. With growth slowing in the mature markets of North America, Japan and Western Europe, some consumer goods companies have figured out how to tap into the purchasing power of a new and growing middle class (which has rising income, credit cards and access to personal loans) in these emerging markets. So, the question is how we can make differences between losers and winners?

Successful companies are willing to break away from business as usual. They adapt western marketing and business management practices to local customs and develop the resourcefulness to overcome inevitable barriers. Winners have consistently followed the six hard rules in emerging markets which includes participation in the mass market, than localization of 4Ps, management of costs aggressively, building local team; selectively conquer the local market and staying at the course. In first step they go beyond premium to achieve scale in distribution, manufacturing and brand building. After that, the winner move to the next step which include localization of production on the basis of consumer insights, mastering the dynamics of local distribution and placement, pricing at so called sweet spots and aggressively investment in promotion of the brand. When they take initial position on local market, than start to manage cost which means to avoid too much specification and reduce overhead. In the process of building a local team the winner empowers local management and minimizes regional span breakers. Also, they try to provide local management with global

career paths as well as to ensure that expatriates have long-term commitment. After that, expanding distribution base and acquisition with local product and brand may be very important. At the end, the winner considers an emerging-market organization and sustains investment while targeting near-term profitability (Shankar, Ormiston, Bloch, Schaus and Vishwanath, 2008).

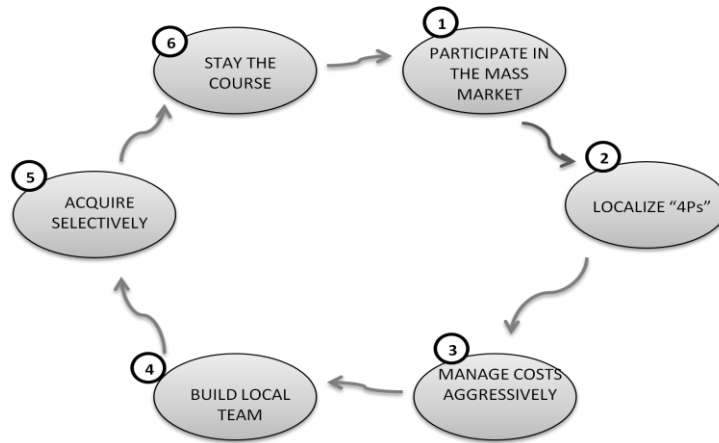


Figure 5: Keys to emerging-market success

Source: Satish Shankar, Charles Ormiston, Nicolas Bloch, Robert Schaus and Vijay Vishwanath, *How to Win in Emerging Markets*, MIT SLOAN Management Review, Harvard Business School, April 2008

Primarily, the emerging-market winners enter the mass market to achieve scale in distribution, brand building and operations. Multinational companies in developing nations targeted niche premium segments those that traditionally delivered the highest profit margins. They often were stuck with low growth, while local players were expanding rapidly in the low-end segments. As local companies moved into the premium and near-premium market segments, multinationals realized that the mass-market opportunity was too big and important to ignore, in other words they needed to enter the mass market for both the opportunity and to play defense.

Second business strategies include localization at every level. Competitors have several incumbent advantages, including, consumer understanding and loyalty, lower costs and home court advantages with government regulators. But by taking the time to learn and master local market complexities, multinational companies can gain a competitive edge. That often requires fundamental changes to the product offering switching to significantly smaller pack sizes, using unconventional distribution channels and developing products in local flavors, to name a few. Localizing also means taking an aggressive approach to brand building. That was the foundation for example for Coca-Cola's dramatic success in China, where it leads all carbonated soft-drink sales, with a 51% market share led by its Coke and Sprite brands against PepsiCo's 30% share. Now, China is Coca-Cola's fourth-largest market, approximately 5% of its worldwide sales. Therefore, the crux of all localization strategies is pricing which implies a price that is competitive in the local marketplace and that also delivers a profit (Shankar, Ormiston, Bloch, Schaus and Vishwanath, 2008).

Between the traditional premium and low-end market segments is the large and flourishing market for "good-enough" products, with higher quality than low-end goods but affordable prices that still generate profits. Feeding the good-enough market requires aggressive management of costs. Winners look at everything they can control to shift the competitive dynamics in their favor, from changing the specifications for packaging material to imposing greater operating efficiency to lowering overhead and using local equipment. For multinationals catering to the premium end of the market, a strategic acquisition can help slash costs enough to make them competitive. Example is Colgate-Palmolive Co. investment of \$21 million for a 40% stake in Sanxiao, a low-cost toothpaste brand in China. Colgate's benefits multiplied when it started using the factory as a worldwide distribution center (Shankar, Ormiston, Bloch, Schaus and Vishwanath, 2008).

Also, for better business success the winner sometimes make local acquisitions just to be sure to have a strong business fit. A strategic acquisition can accelerate a multinational's entry into an emerging market by adding popular local brands to its product lineup, broadening its reach with a stronger distribution network, providing a local talent pool and lowering operating costs. Again we can take Coca-cola as an example.

Coca-Cola acquired the Russian beverage group Aquavision, giving it state-of-the-art, expanded production capabilities. The move builds on Coca-Cola's previous purchase of Multon, the leading Russian fruit juice maker.

Like final business strategies which the leaders use maximization of their investments by building dedicated emerging-market capabilities. This enables them to approach each emerging market with strategies crafted to distinguish the characteristics they find there from the established practices they pursue in developed economies. For example, the French food conglomerate, Groupe Danone, has substantial presence in major emerging markets in Asia such as India, Indonesia and China, which share several common characteristics. The company has learned a lot from operating in these markets, such as positioning brands to appeal to local consumers, using low-cost Asian production equipment, keeping a tight lid on overhead and changing the specifications for packaging and raw materials to produce "good-enough" products. These lessons have been effectively cross-pollinated across the various emerging markets in which Danone operates (Shankar, Ormiston, Bloch, Schaus and Vishwanath, 2008).

CONCLUSION

The crucial moment for definition and choice of emerging market strategy is where and which business functions of the value chain the companies will establish. As one of the most complex business decisions, it needs to be aligned with the general strategy of the company rather than country rankings by macro-level indicators. Companies need to do more with less to stay competitive and improve products and speed to market. They must align their strategic objectives with the capabilities and market potential that locations can offer bearing in the mind significant opportunities for revenue growth of the local markets.

Succeeding in emerging markets is essential if multinational companies are to defend and increase their share of the global market. With consumer markets in Asia and Eastern Europe growing at double-digit rates, multinational companies are moving fast to build their brands and the expertise to manage them in emerging markets. Even more, it is generally accepted that how successful companies are in emerging markets is a critical indicator of how they will be successful in the world.

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ROMANIAN AND SERBIAN FOREIGN TRADE UNDER THE IMPACT OF RECESSION AND NEW RESTRUCTURING PROCESS DURING THE POST AND PRE-ACCESSION PERIODS TO THE EUROPEAN UNION

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Abstract: *This paper describes specific relations between Romanian and Serbian economies, especially the foreign trade impact, some structural characteristics and the recent trends during the last years. The foreign trade is one of the important activities of the national economy, providing factual transaction, change of ownership of products, and thus outlining the actual goods. This activity is seen as an isolated one, can grow exponentially an economy on the long term, but sometimes may go bankrupt during a short term, also. The first section describes Romania's economic evolutions during this recession period, underlying the significance of the foreign trade in the national external balance of Romanian economy as a new EU member. The second section analyzes the Serbian Economy during the same period as a pre-adherent country to EU. These sections also analyze the concentration or specialization process in the structure of Romanian and Serbian foreign trade using statistical methods, indices and coefficients. A final remark is about the forecast of the two economies which underlines that the sustainable and vigorous growth in the new context becomes somehow impossible, as a Romanian and Serbian reality and a goal within the timeframe of 2012-2013.*

Key words: *foreign trade, structure of import and export flux, Gini-Struck coefficient, concentration / specialization of foreign trade, indices' method.*

1. INTRODUCTION

The foreign trade is one of the most important activities of a national economy, providing factual transaction, change of ownership of products, and thus outlining the actual goods. Between Romanian and Serbian economies there are some similar and structural characteristics and some recent and mutual trends, during the last years. Either Serbian or Romanian economies participate in international trade, under the impact of recession and new restructuring process, the first economy during a specific pre-accession period and the second one during a difficult post -accession period to the same European Union.

The trade balance represents the synthetic expression of the degree of economic efficiency in each of this economy recorded in foreign trade activities, and shows the results of nationwide activity, as well as the place it occupies at Union European and international level, revealing the real competitiveness of its goods. The foreign trade activity seen as an isolated one, can grow exponentially an economy on the long term, but sometimes may go bankruptcy during the short term, also. The analyses of foreign trade focus on: a) the methods that describe the costs of export and import and highlight the importance of specific transactions; b) the methods of analysis of an external and globalized balance; c) the methods quantify the impact of the scale economies, underlining the major technologies' role in foreign trade; d) the method of game theory; e) the statistical and econometric methods for identifying and testing the different trends of the products to export and import; f) the specific empirical methods focusing on the specificity of import and export prices; g) the method of quantification of value and physical degrees of coverage and the net term of transfer between the external trade flows etc.

This paper describes and uses the classical version of the last mentioned method based on Serbian and Romanian economies (Korka and Tușa, 2004; Anghelache, Mitruț, Isaac-Maniu and Voineagu, 2009; Săvoiu, 2011), and improved with statistical instruments for measuring concentration – diversification. The result is called the extended method of exchange ratio indicators (Săvoiu and Dinu, 2012), and it has been already used in statistical and economic analysis.

The phenomena of concentration - diversification are assessed structurally, but also correlated with reference limits by using the Gini - Struck coefficient or index, as a statistical and mathematical solutions, continuously replicated since the appearance of that instrument, up to the presett moment, passing

successively through indices of the following types: Hirschman, Herfindahl-Hirschman, Grubel-Lloyd, Brühlhart, Greenaway, Neven, Hine-Milner, Sternberg-Litzenberger, Hannah-Kay, Finger-Kreinin, Andreosso-O'Callaghan, Gini-Struck in the curve ABC, (Hirschman, 1964, Grubel and Lloyd, 1971, Finger and Kreinin, 1979, Lilien, 1982, Curry and George, 1983; Neven, 1995, Sternberg and Litzenberger, 2004; Andreosso-O'Callaghan, 2009, Esteban and Ray, 2011; Săvoiu, Dinu and Tăchiciu, 2012).

The evolution of a national economy can be shown by foreign / external trading, through the balance of the export and import fluxes, as well as the dynamics of that balance, which has a direct impact on the level of the gross domestic product and that of foreign debt and here are included the following statistical instruments: a) the index of the value exchange ratio (the index of percentage coverage of imports by exports - ICXM); b) the index of the gross exchange ratio (the "gross barter" terms of trade index - IGB); c) the index of the net exchange ratio (the "net barter" terms of trade index - INB), known as the terms of trade index; d) the foreign trade price shears – FTPS); e) the effect, in absolute value, of the deterioration of the net exchange ratio (the absolute value of the losses - ΔVL); f) the purchasing power of exports index (IPPX); g) the factorial terms of trade index (IFTT).

Making use of the statistical instrument of Gini - Struck (G-S), the article identifies the trends and specific limits in processes of concentration and diversification in the export or import flows in Serbia and Romania

$$\text{Coefficient } G-S = \sqrt{\frac{n \sum_{i=1}^n g_i^2 - 1}{n-1}} \quad (1)$$

2. APPLIED METHOD, SOME RESULTS AND DISCUSSIONS

2.1. Developments and trends of Romania's export and import developments and trends

Due to the fact that the European Union is the main commercial partner of Romania, a country that became, after January 1 2007, its member, it is obvious that the external trade flows of our country depend, mostly, on the member countries of the European Union, between the years 2004 and 2010 (three pre-accession years and three other post-accession years), they accounted for between 69.5% and 74.3 %, of its total volume. In relation to import, the member states of the EU accounted for shares between 63.2 % and 73.3%, which shows that imports' dynamics was a much more upward one (in fact ¾ of Romania's balance of trade deficit stems from the EU member states as well).

Table 1: Romanian foreign trade, between 2004 and 2010

	2004	2005	2006	2007	2008	2009	2010
	Million Euro						
Exports (X)	18935	22255	25850	29549	33628	29116	37293
Imports (M)	26281	32569	40746	51322	56337	38897	46802
$\Delta = X-M$	-7346	-10314	-14896	-21773	-22709	-9781	-9509
	out of which with the European Union, in %:						
Exports (X_{UE})	72.9	69.5	70.5	71.98	70.4	74.3	72.2
Imports (M_{UE})	64.9	63.2	68.71	71.29	69.1	73.3	72.5

Source: Romanian Statistical Yearbook, 2011, NSI Edition, Bucharest.

The recession has diminished the negative impact of net exports in GDP as the only favourable effect of a major impact: in Romania, the balance deficit already has a continuous upward trend from about 8% to about 14% of GDP between 2004 - 2008, only to change sharply, to below 10% in 2010 (although the share of exports declined with 5 % in the same year 2010, the imports had a more severe setback).

Table 2: The most important statistical indicators according to the method of exchange ratio, in Romania, between 2004 and 2010

	2004	2005	2006	2007	2008	2009	2010
Previous year = 100%							
General evolutions of export and import							
Exports Index (X)	121.3	117.5	116.2	113.7	113.8	86.3	128.1
Imports Index (M)	124.0	123.8	125.1	125.2	109.8	67.9	120.3
Quantitative evolutions							
Export Quantum Index I_X^Q ()	115.4	107.3	107.4	107.3	109.6	96.7	119.7
Import Quantum Index I_M^Q ()	123.1	117.6	120.8	127.5	106.2	76.1	115.5
Evolutions of the prices							
Unit Value Index Exports Index (X)	105.1	109.5	108.2	106.0	103.8	89.3	107.0
Unit Value Index Imports Index (M)	100.7	105.3	103.6	98.2	103.4	89.3	104.2
Indicators of exchange ratio							
IGB (Gross Barter Index)	93.7	91.2	88.9	84.2	103.2	127.1	103.6
INB (Net Barter Index)	104.4	104.0	104.4	107.9	100.4	100.0	102.7
FTPS (price shears)	-	-	-	-	-	*	-
ΔVL (value of the losses)	Insignificant value						
ICXM = IGB \times INB	97.8	94.9	92.9	90.8	103.6	127.1	106.4
IPPX = $I_X^Q \times$ INB	120.4	111.6	112.2	115.8	110.0	96.7	122.9
IFTT = (Index of productivity*) \times INB	115.2	110.0	111.8	114.3	107.7	95.3	103.0

Source: Composed by the authors based on data of *Statistical Yearbook of Romania*, 2011, NSI Edition, Bucharest.

*Note: labour productivity considered per employed person, taken from the site: http://www.insse.ro/cms/rw/files/Web_IDD_BD_ro/index.htm.

Some of the major aspects describing the reactive external trade profile of the Romanian economy before and under the impact of recession are the specific elements of the analyzed indicators:

a) in the peak period of the recession, the volume or the index of quantity of the export increase maximally, the export prices fall, the price scissors is maintained as potential, while the volume of imports decreases much more, import prices are reduced at a maximum intensity;

b) the “gross barter” terms of trade index (IGB) reflects a sharp deterioration in the exports slightly delayed almost a year (in fact Romania certainly supports other partner economies, by paying the wages and profits incorporated in the imported goods, while failing to ensure the entire survival of the entrepreneurs and employees in its own economy);

c) the “net barter” terms of trade index (INB) emphasizes a shift from recording the effect of “rises” in absolute terms to quantifying in relative terms, a process that is more severe at the entrance in the recession as Romanian economy does not have a “critical” mass of internationally competitive products;

d) the difference in point of percentage rate between export and import price index tends to “zero” during the recession;

e) the signal generated by the purchasing power of exports index or IPPX, though it is a limit where imports had to be stopped, was by no means an important decision-making tool, which gave recession the character of a natural regulator in this respect. (Săvoiu, Dinu and Tăchiciu, 2012)

The impact of recession has changed structural trends of export and import flows of Romania, between 2001 and 2010, and identifies the persistence of both flows within the area of excessive concentration, according to the Gini-Struck index values in the curve ABC-Struck (Săvoiu, Crăciuneanu, Ţaicu, 2010). Even the trend for the four years prior to recession was one of the diversification, recession resumed the high level at the beginning of the decade under review, with however some positive aspects by the densification of both flows on the categories of manufacturing intensive products. The sources of imports and the destinations of exports also see a natural process of concentration in the destinations by groups of countries (by increasing trade with the European Union, and Europe as a whole), conforming to the political options to integrate the national economy.

Table 3: Annual values of the indices of concentration of exports and imports, in 2001 and 2010 in Romania

Categories of products	The structural values of g_i and g_i^2 determined through Gini - Struck							
	2001				2010			
	Export		Import		Export		Import	
	g_i	g_i^2	g_i	g_i^2	g_i	g_i^2	g_i	g_i^2
Mineral products	0.069	0.0048	0.144	0.0207	0.055	0.0030	0.110	0.0121
Food and agricultural products	0.038	0.0014	0.078	0.0061	0.084	0.0076	0.084	0.0071
Chemical products	0.064	0.0041	0.127	0.0161	0.095	0.0090	0.169	0.0286
Metallurgical products	0.133	0.0177	0.073	0.0053	0.119	0.0142	0.109	0.0119
Textiles, clothing, leather products, footwear	0.348	0.1211	0.177	0.0313	0.122	0.0149	0.090	0.0081
Transport means	0.200	0.0400	0.278	0.0773	0.154	0.0237	0.074	0.0055
Machines and mechanical devices					0.272	0.0740	0.285	0.0812
Other products	0.148	0.0219	0.123	0.0151	0.099	0.0098	0.079	0.0062
Total	1.000	0.211	1.000	0.1719	1.000	0.1562	1.000	0.1607
Hirschmann coefficient	-	0.4593	-	0.4158	-	0.3952	-	0.4009
Gini-Struck coefficient	-	0.6076	-	0.5643	-	0.5653	-	0.5615

Source: Composed by the authors based on data of *Statistical Yearbook of Romania*, 2011, NSI Edition, Bucharest.

2.2. Serbia's export and import developments and trades

In the last decade of the past century Serbia's foreign trade knew an unfavourable period that had three major causes: a) shifting from planned economy to the market economy, losing traditional economic partners in the former socialist bloc; b) the dismemberment of the former Yugoslavia and the wars that followed in the region led to the loss of commercial partners from the former union republics; c) the economic sanctions imposed by the European Union and the United Nations.

As a CEFTA member state since 2007 and especially after December 22nd, 2009, when it officially applied for membership to the European Union, entering a pre-accession stage comparable as trends with Romania between 2004 and 2007, Serbia provides unambiguous and methodologically unitary statistical databases. Unfortunately, they are still expressed in US dollars, and leads to the necessity of analyses that exploit relative indicators or Gini-Struck type indices.

The CEFTA (The Central European Free Trade Agreement) membership, held by countries in the South-Eastern Europe, allows Serbian companies to export duty free on a market of almost 30 million consumers. Serbia is the only country outside the Community of Independent States which has a free trade agreement with Russia, since 2000 (http://www.siepa.gov.rs/site/en/home/1/importing_from_serbia/trade_regulations/). Serbia also concluded such a free trade agreement with Turkey and with the EFTA member states (Switzerland, Liechtenstein, Norway and Iceland). From the point of view of the product, the structure of Serbian exports is in 2010 as follows: intermediary goods account for approx. 2/3, consumer goods for approx. 1/4 and capital goods almost 1/12 of the total volume. (http://www.siepa.gov.rs/site/en/home/1/importing_from_serbia/foreign_trade_data/foreign_trade_by_commodities/).

Table 4: Evolution of Serbia's foreign trade in the period 2004-2010

USD thousand

	2004	2005	2006	2007	2008	2009	2010
EXPORTS	3522424,6	4480801,5	6426633,9	8824013,1	10972201	8342909,5	9793048,1
IMPORTS	10750607	10458614,5	13169531,4	19161203,8	24327867,9	16052876,4	16731763,4
DEFICIT	-7228182,4	-5977813	-6742897,5	-10337190,7	-13355666,9	-7709966,9	-6938715,3

Source: Statistical Office of the Republic of Serbia

The chart of this evolution is presented in Figure 1.

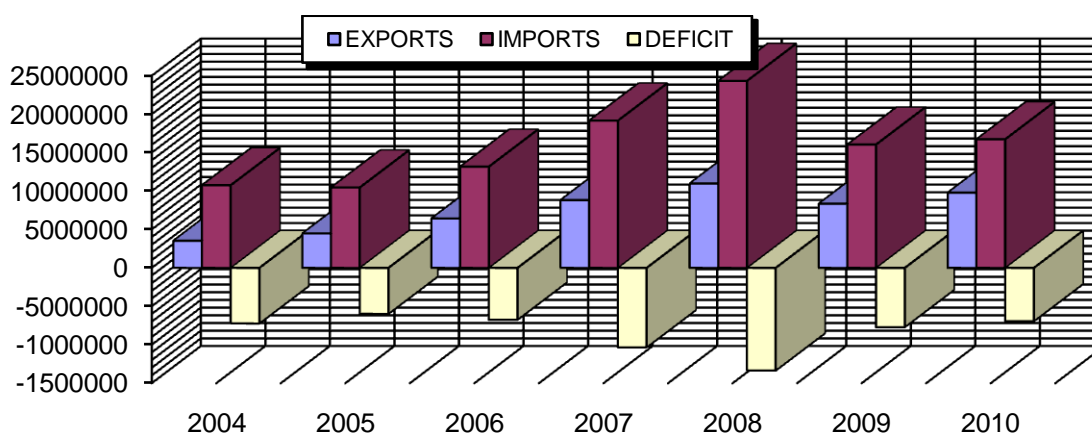


Figure 2: Serbia's export, import and balance of trade deficit

For the period 2004-2010 we can notice the diversification of Serbian foreign trade demonstrated by the continuous decrease of Gini-Struck coefficient values. This evolution is shown in table no. 5.

Table 5: The values of Gini-Struck coefficient for Serbia's foreign trade

	2004	2005	2006	2007	2008	2009	2010
Total Exports	0.3215	0.3417	0.3567	0.3341	0.3162	0.2770	0.2844
Total Imports	0.3175	0.2957	0.2972	0.2554	0.2543	0.2407	0.2354
Exports to Romania	0.7544	0.5955	0.5851	0.5151	0.4379	0.4343	0.4331
Imports from Romania	0.3863	0.3171	0.3563	0.4101	0.3578	0.3692	0.3406

Source: Composed by the authors based on data of *Statistical Office of the Republic of Serbia*

We can notice that the values of Gini-Struck coefficient are higher for the commerce with Romania, than those for the total foreign trade of Serbia. The conclusion is that in the case of commerce with Romania there is a higher concentration. However, there is also a tendency of decreasing values for this coefficient in the case of Serbian-Romanian bilateral trade. In 2011, Romania was Serbia's fifth export partner, with 6.9% of the total Serbian exports. In relation to imports, Romania holds the 6th place with 4.4% of the total value of Serbian imports. In table no. 6 is presented a detailed situation of bilateral commerce in 2010.

Table 6: Serbia's trade with Romania in 2010

Exports. by SITC rev. 4 sections		2010 Total. USD thousand	g %	g ²
0	Food and live animals	280277.9	43.075	0.18554309
1	Beverages and tobacco	1266.2	0.195	0.00000379
2	Crude materials, inedible, except fuels	10383.2	1.596	0.00025464
3	Mineral fuels, lubricants and related materials	84798.4	13.032	0.01698409
4	Animal and vegetable oils, fats and waxes	153.4	0.024	0.00000006
5	Chemicals and related products, not elsewhere specified	88312.1	13.572	0.01842076
6	Manufactured goods classified chiefly by material	137830.4	21.183	0.04487011
7	Machinery and transport equipment	18619.6	2.862	0.00081886
8	Miscellaneous manufactured articles	28542.2	4.387	0.00192416
9	SMTK Rev. 4 Commodities n.e.s. in the SITC Rev. 4	495.1	0.076	0.00000058
TOTAL EXPORTS		650678.5	100.000	0.26882014
Imports. by SITC rev. 4 sections		2010 Total. USD thousand	g %	g ²
0	Food and live animals	5220.1	0.875	0.00007657
1	Beverages and tobacco	153.3	0.026	0.00000007
2	Crude materials, inedible, except fuels	22024.4	3.692	0.00136298
3	Mineral fuels, lubricants and related materials	163531.5	27.412	0.07514208
4	Animal and vegetable oils. fats and waxes	4.6	0.001	0.00000000
5	Chemicals and related products. not elsewhere specified	56293.2	9.436	0.00890415
6	Manufactured goods classified chiefly by material	73246.2	12.278	0.01507477
7	Machinery and transport equipment	78396.6	13.141	0.01726930

8	Miscellaneous manufactured articles	23792.7	3.988	0.00159063
9	SMTK Rev. 4 Commodities n.e.s. in the SITC Rev. 4	173905.2	29.151	0.08497781
	TOTAL IMPORTS	596567.8	100.000	0.20439834

Source: Composed by the authors based on data of Statistical Office of the Republic of Serbia <http://webzs.stat.gov.rs>

For Serbia's exports to Romania in 2010, the Gini-Struck coefficient is calculated below:

$$G - S_{2010} = \sqrt{\frac{n \sum_{i=1}^n g_i^2 - 1}{n-1}} = \sqrt{\frac{10 \times 0,26882014 - 1}{10-1}} = 0,4331$$

In the case of Serbia's imports from Romania, the Gini-Struck coefficient has a smaller value:

$$G - S_{2010} = \sqrt{\frac{n \sum_{i=1}^n g_i^2 - 1}{n-1}} = \sqrt{\frac{10 \times 0,20439834 - 1}{10-1}} = 0,3406$$

In relation to Serbia's exports to Romania, in the period 2004 - 2010, there was a continuous decrease in the value of the Gini - Struck coefficient, which proves a diversification trend.

3. A FINAL REMARK

Smaller or less developed economies like Romanian or Serbian cases cannot afford scale interventions and policies in the competition and trading on international markets and Serbia and Romania's behaviours can be no exception to this truth. The extensive method seeks, through the additional information, to help a prompt and accurate response in times of crisis and recession, a reaction that can always be improved. The prognosis of the two economies underlines that the sustainable and vigorous growth in the new context becomes somehow difficult or even impossible, as a Romanian and Serbian reality and a goal within the timeframe of 2012-2013.

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SIGNIFICANCE OF CULTURE FOR EUROPEAN CREATIVE MANAGEMENT IN THE CONTEMPORARY INTERNATIONAL ENVIRONMENT

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Abstract: *This paper focuses on the study of the importance of culture for creative management and the expansion of creative industries in Europe, which represents a current and challenging area that requires an integrated and dynamic approach. The multidisciplinary nature of this topic in conditions of development of information and communication technologies in the environment of the new economy were a starting point. The results of Internet research of the authors are also presented. The ways in which cultural diversity in Europe can be encouraging to the development of creative management and for creative organizations performance improvement have been shown. The focus is on the results that stem from this.*

Keywords: *European culture, creative industries, innovations, European creative management, Europeana, international environment, business performance*

1. INTRODUCTION

Different aspects of human life and managerial practice, as well as their changes, are linked with culture. In this sense culture includes values, ideas, attitudes and symbols that shape human behaviour and are passed on from generation to generation. It encompasses the material and immaterial environment which people build and nurture. In order to understand the complex and multidimensional nature of culture, it is necessary to examine elements such as: language, religion, desirable behaviour, customs, material products, norms, beliefs, aesthetic criteria, education and social institutions.

From the position of creative management, it is important to differentiate between two views of culture. Culture in the final instance relates to the totality of knowledge and practice, intellectual and material, of a particular society or specific group. In this respect culture is relevant as a component of the external domestic and international environment of a company, as well as the organizational culture itself as part of the internal environment of the production or service firm. Culture often implies an entire range of artistic and philosophical works and creations. In this case management in the field of cultural and art organizations (museums, libraries, theatres, endowments, archives) stands out, which can have an international dimension. Culture is studied from the aspect of economics as a so-called non-economic factor of economic development on the one hand, and from the other culture as a collection of mainly non-profit organizations, although they can be profit oriented, especially certain segments. In relation to this, cultural product placement is important considered through this other aspect, which often implies the existence of an international market.

It has been stressed that societies are entering the post-industrial age, and culture the postmodern age. Today, less than ever before, is there "givenness" and even less "givenness once and for all". Any value judgment, definition or pattern is questioned and differently interpreted. An idea, content and trend in art change with the use of new media. Alternativity, as one of the principles of postmodernism, represents the core and meaning of creative impulses in culture. Culture is linked with the domain of speed and technology. The aims of an industrial society largely relate to mass consumption, while the information society is characterized by a great intellectual creativity which entails the action oriented information, the importance of ideas and dominance of intellectual capital, which is in the focus of creative management. From the macroeconomic aspect, the goal of sustainable development is typical with emphasis on social welfare and

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human values, linked to a focus on a new development criterion the GNW (gross national welfare), i.e. an advanced welfare society in which not only ecologic demands shall be fulfilled but also the human need for self-realization.

Culture is extremely important in the new creative economy of the 21st century based on ideas, information, knowledge and images. The interaction of culture, creativity, innovation and business is implied. This has implications on creative management, which incorporates rationality, creativity but also risk, especially in conditions of a turbulent environment and economic difficulties on a global level, but also at the level of regional economic integrations.

2. SPECIFICITY OF EUROPEAN CULTURE IN AN INTERNATIONAL FRAMEWORK

A characteristic of European culture is that it is often perceived as specific in a global framework by managers that manage international business, and originate from other cultures. We must keep in mind that, on the other hand, European culture is associated with variety, both from the aspect of tradition, but also from the angle of contemporary practice considering the European Union (EU) member states, and those that are not i.e. all European countries along with the challenges of multicultural creativity of contemporary Europe. There are different concepts and approaches to contemporary European culture (Stich, 2000).

What is implied by "European" refers to the period from Antiquity to the second decade of the 21st century, and the history of the idea of Europe as a cultural domain has not been linear. Especially analyzed is the period of European culture from 1848 as a historical turning point i.e. in the sphere of culture from the period of the Enlightenment and Romanticism, with the acknowledgment of a particular evolution from the Modern to the Postmodern period and further and also incorporating differences such as the Avant-garde and popular culture (Winders, 2001).

From the perspective of creative management, especially important is the symbolism of Europe and the different aspects of product design and packaging, visual firm identity, promotion in different media, as well as communication associated with it. The symbolism of Europe is also expressed in the design of the euro banknotes. It is believed that the Greek poet Hesiod, who lived in the late 8th and early 7th century BC, first used the name Europe. The starting point is usually the ancient myth of Europa, a girl sitting on the shoulders of the god Zeus, in the form of a bull, a scene which has been depicted by many European painters, and later accepted as a symbol by managers in some advertising campaigns.

The number twelve on the emblem and flag of the EU with twelve stars on a blue background is explained as the traditional symbol of completeness and unity, and the circle of stars represents unity and harmony among the peoples of the EU (<http://europa.eu/>, 2012). *The Ode to Joy* by L.V. Beethoven from his Symphony No. 9 has been accepted as the European anthem. The colour blue represents continuity from Antiquity, since remains of the colour blue have been found on ancient sculptures that depicted the Europa myth (Schmale, 2003). The EU motto is *United in diversity*, and diversity refers to differences in culture, tradition and language. *The European Agenda for Culture* wishes to promote: cultural diversity and dialogue; culture as a catalyst for creativity and innovation and culture as part of the EU's international relations. *The EU's Culture programme* (2007-2013) should realize the following main objectives: to promote **cross-border mobility** of those working in the cultural sector, to encourage the **transnational circulation** of cultural output, and to foster **intercultural dialogue** (<http://ec.europa.eu/culture/>, 2012). As part of the European Capitals of Culture initiative two cities are European Capitals of Culture each year. Beograd's application for the title of European Capital of Culture 2020 is important in the context of European cultural space.

The symbolism of Europe is expressed also in the design of the banknotes. The euro banknotes depict, depending on the denominations, the architectural styles of Europe's cultural history. The front side shows gateways, which are linked with the spirit of openness and cooperation, and the reverse bridges as the symbol of communication among Europeans, as well as between Europe and the rest of the world (<http://www.ecb.int>, 2012).

In this context it is important to stress that relying on the variety of the developed artistic practice throughout Europe, in the recent period there has been a particular development of culture and art management, which is relevant for many organizations with a long tradition in this field, including managing new projects, managing special events in the sphere of culture and art, especially festival management. Also characteristic is the focus on management related to profit organizations in the field of culture (publishing, music

production, film industry, etc.) which in many cases have over longer time periods achieved successful artistic and business results on an international scale. What is necessary is the strategic approach to project management in culture (Milićević, Vasić, Ilić, 2010). Cultural industries in Europe represent an important source of income and jobs. The importance of recent authentic development in European film and media culture in a global setting is stressed (Højbjerg, Søndergaard, 2006). Of particular importance is the successful development of cultural tourism and a typical example is Saint Petersburg (<http://gov.spb.ru/culture>, 2012). The City of London is characterized by a specific blend of business, finance and culture (<http://www.cityoflondon.gov.uk>, 2012).

3. CHALLENGES OF CONTEMPORARY CREATIVE MANAGEMENT

Creativity is considered extremely important for success of the innovation process in an organization. The concept of creativity itself is complex and defined in different ways. Creativity can be defined as the generation of novel and useful ideas for the organization (Muñoz-Doyague, González-Álvarez & Nieto, 2008). This implies that it must be relevant to the organization's goals and some value should be gained in the future period as the result of creativity. The connectedness of management of change, innovation, creativity, knowledge management and business performance is important in this.

In the context of rapid changes in the environment, creative management is linked with the 21st century as the synthesis of two related fields of knowledge, on the one hand newer management studies, and on the other, creativity as an interdisciplinary field. This means that creative management is the study and practice of management, drawing on the theories of creative processes and their application at individual, group, organizational and cultural levels (Xu, Rickards, 2007). Creativity in business is manifested in several areas – generating ideas, development of products and services, creating innovation, formulating strategies, increasing competitiveness, cost control, acquiring new knowledge, marketing, human resource development. Creative organizations represent the outcomes of creative management. The successful development of creative management in Scandinavian companies is a good example of this.

It is typical that creative management is linked with Postmodernism, along with the tendency to combine it with elements of Modernism. Creative management is compatible with the postmodern, largely open understanding of the world, which implies heterogeneity, informality, differentiation, seeing things through "images". The orientation towards long-term innovative development of an organization is present. From the perspective of managerial practice it is important to consider both continuous and radical change; objective knowledge and intuition; predictability and experimentation; product and company development; capital and knowledge driven development; single and multiple solutions; contingency and determinacy; reducibility and holism (Nyström, 1998). The interaction between firm development and product development is emphasized in business, which has shown to be important in market placement of new, unexpected products as results of new knowledge, especially in the case of consumer electronics, software, cosmetic products, which in the interaction has lead to considerable development of the companies that have launched these new products.

The cultural sector in the economic sense is linked with the production and distribution of cultural goods and services. It includes the visual arts, performing arts, museums, libraries, archives, archaeological sites, film, video, radio, television, video games, music, book publishing, press publishing, while in the case of creative industries it also incorporates advertising, architecture (especially architectural services), design (including product design, graphic design, fashion design). For creative management in these industries it is extremely important to consider the particular influence of culture in the context of development of information and communication technologies (ICT), digital economy, mobile business and knowledge society. Chiefly owing to the expansion of the ICT sector, there are new opportunities and challenges for the development of creative industries. Also characteristic is the approach of some Scandinavian countries, where in practice the recently affirmed "the experience economy" has now taken centre stage which elicits an experience from the customers consuming the physical products and services. This above all relates to different areas of art, including the market of artworks and antiques, artistic crafts, heritage, but also to design, software, entertainment, tourism, sport and implies that managers are closer to societal demand. Culture has a positive effect on creating an emotional experience. It has a role in innovative design and emotional branding.

Cultural diversity in Europe can be encouraging for creative management, for generating new ideas and developing products and services with economic value which also contribute to promoting prosperity of people and improving the quality of life. It is necessary to consider the influence of culture on the formulation

and realization of business strategies of European companies in conditions of a contemporary complex international environment, and especially in implementing strategic changes. Culture in the business sphere is present through cooperation, communication as well as through social networks on the Internet. Viewed as a whole, companies and institutions throughout Europe provide many cultural offers. There is talk about the affirmation of the Renaissance model as regards the personality of manager. More and more designers are included in managerial teams. Also companies are hiring creative people, especially artists, who spend time with employees, affirming esthetical values, which are becoming more important for many buyers of their products. On an international scale success was achieved with products bearing the names of famous European artists, and a typical example of this is the car Picasso of the French company Citroën which has launched the slogan "Creative technologié" (www.citroën.com, 2012) and Mozartkugel (www.mozartkugel.at, 2012) as part of the special offer of the city of Salzburg and its developed cultural tourism with Mozarteum University and the world-renowned Salzburg Festival. Many European companies are encouraging the work of artists, especially regarding contemporary art. A specific connectedness of business, artists and brands is being created, and the prints of photographs of artists, philosophers and works of art on products of mass consumption (especially clothes, leather goods and furniture) are becoming more common. Art works are exhibited in office space and are part of the interior of modern European firms, which is relevant for the employees as well as the customers, who with consuming the products and services, increasingly also expect an experience.

4. EUROPEANA AS A RESOURCE FOR DEVELOPING CREATIVE MANAGEMENT IN EUROPE

Europeana.eu a portal of digital objects of Europe represents a place on the Internet where millions of digital objects from libraries, museums and archives of European countries are available to Internet users. The Internet presentation allows searching the virtual content of over 20 million objects made available to users by 1500 institutions from 33 countries (europeana.eu, 2012). *Europeana* represents the central point of building content and availability of digital material related to the cultural and scientific heritage of Europe and thus is a very important part of the efforts of building a new creative economy in the territory of Europe. The importance of *Europeana* is reflected in the vast funds invested in its development which were earmarked in the budget of the European Commission for this purpose in the period until 2020. *Europeana* was opened for users in November 2008, and continuous support to its promotion has always been present (Purday, 2009). It has enabled the exploring of digital resources of Europe's museums, libraries, archives and audio-visual collections. Items include images, texts, sounds and videos.

In this sense *Europeana* represents an important basis for the development of creative management in Europe. This basis is twofold since the availability of materials encourages the creativity of the managers themselves, but also provides support to the development of a vast range of virtual services related to cultural and scientific heritage. The managers themselves in the process of creative management of an organization enrich and expand their knowledge, and the wealth of materials from different European countries encourages the mental associative and comparative processes, as well as the development of new ideas, which is crucial for the success of creative management. Access to the design of *Europeana* is such that it gives impulse to the creative use of materials available for users and development teams. The metadata model - EDM (*Europeana Data Model*) used to describe this materials has been created with the idea of encouraging innovation and the new use of materials through the creation of special applications (Doerr, Gradmann, Hennicke, Isaac, Meghini, & van de Sompel, 2010). This lays the important foundation for affirmation of creative management in Europe, since the development of applications which will efficiently utilize digitalized cultural heritage requires a high degree of creativity in all processes linked with managing an organization that develops such applications.

Innovativeness which can be developed in the process of planning and designing services based on the wealth of materials available on the *Europeana* portal was best demonstrated during the competition entitled "Programme for *Europeana*" held in four European cities in June 2011 (Highlights from Hack4Europe! Roadshow, 2012). Poznań, Barcelona, London and Stockholm were hosts to over 85 programmers from companies belonging to the sector of information and communication technologies and creative industries. The programming resulted in 48 applications, the most prominent being applications for mobile devices, applications with components for social networking and games, and applications for permanent content storage and its visualization and applications for integration with Wikipedia. Such events illustrate possibilities offered by *Europeana* regarding the development of creative ways for connecting users and the data that they need, available on the *Europeana* portal.

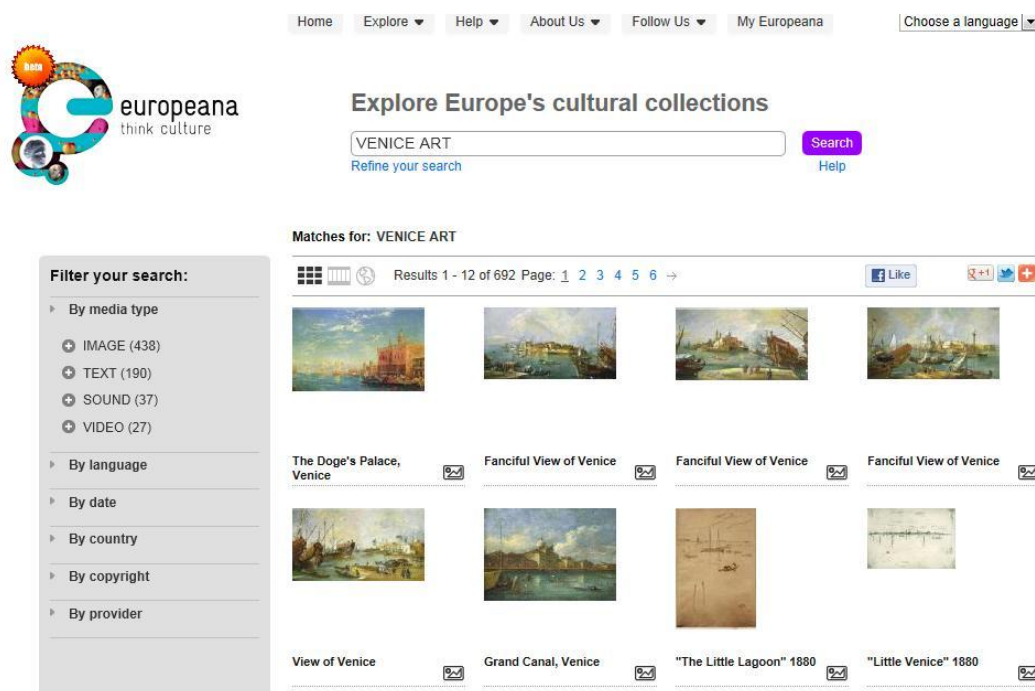


Figure 3: Europeana.eu webpage – keyword search “Venice Art” (Europeana.eu, 2012)

5. CONCLUSION

From the aspect of creative management the implications of culture on product/service development, communication, and branding are important. There is talk in Europe about a return to the idea of the Renaissance man, with many talents, skills and a broad knowledge base, involved in the arts, and science. Also current is the consideration of the expansion of creative industries from the aspect of overcoming the economic crisis and raising employment levels. The forming of creative clusters is being intensified as part of the European cultural space.

One must have in mind that creative management is crucial for the development of all European industries considering the connectedness of industrial fields and the increasing relevance of creativity as a factor of competitive advantages in a global setting. In the focus is the relationship of creativity as a multidimensional process and innovation, as well as creative approaches to marketing and strategic changes at the company level.

Cultural diversity in Europe can be encouraging to the development of creative management and for creative organizations performance improvement. On the side of output this should result in the development of new products and services that have an economic value, but also contribute to increasing the prosperity of people. Cultural products such as music, films, electronic books and magazines in the conditions of the new economy and ICT development in the 21st century in many cases have contributed to increasing competitiveness and the business success of many European companies in the contemporary international environment.

Viewed as a whole, the domain of connectedness of culture and European creative management is complex and full of challenges. Culture influences the creative capacities of organizations. It opens new issues which are qualitative in nature, above all linked with talent, vision, valuable ideas, novelty, differentiation, but also important are quantitative aspects, especially those related to measuring managerial creativity. Managing the corporate imagination and creative management processes as a whole should certainly contribute to business performance improvement in the future period.

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NEGOTIATING ASPECTS OF CORPORATE CULTURE IN INTERNATIONAL MANAGEMENT

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Abstract *International negotiations represent a very complex practice during which the negotiators encounter diverse cultural particularities which are brought into the process by their partners. In order to conduct the process as efficiently as possible, and, of course conclude it, negotiators should keep to certain principles which will give the negotiating process a much better chance for success. The overall goal of negotiation is to arrive at a solution acceptable to all parties involved. Increasing knowledge about negotiating partner is a way to become a more effective cross-cultural negotiator. Negotiation approaches differ considerably due to culture. Since international managers spend such a large amount of time negotiating, it is important to understand the negotiation process and how culture influences it.*

Key Words: *Negotiations, culture, negotiating strategy, negotiating process, negotiating style.*

1. COMPETITIVE IMPORTANCE OF BUSINESS NEGOTIATIONS

One of the most difficult, but also the most important tasks for international managers is successful planning, conducting and concluding the negotiating process. International negotiations are very complex and difficult since they include encountering different laws, regulations, standards, business practices, but first of all, cultural particularities which are 'brought' into the process by negotiators. It is very naive to enter the international negotiations believing that 'people are similar wherever they live, and that they behave in a very predictable way'. The negotiating style which has proved efficient in home environment, can be completely incompatible with the values, beliefs and attitudes of those who belong to other cultures. Each of them is shaped by its belonging national culture, geography, history and political system.

Negotiating is a process in which two or more parties try to reach an agreement which will bring them a mutual benefit (Acuff, 2008). By bringing closer their attitudes, the interlocutors try to create a situation which will enable creation, maintenance and further development of the relationship.

The negotiating process is conducted in stages. The negotiations should not be the confrontation of strengths, but the series of stages, starting with the preparation to reaching an agreement. The process should be defined in a way that primary goals as well as tactics and behaviour to be conducted are clear at every moment.

As it has already been mentioned, the negotiating process should result in a solution which is acceptable to both parties. However, there are different types of optimal outcomes in practice. The type of negotiations will primarily depend on the negotiating power of the participants, the issue discussed, as well as the personality of the negotiators. Also, each party 'starts' with their best alternative of the possible agreement (BATNA – 'Best alternative to Negotiated Agreement').

In the modern multicultural environment, negotiators should emphasize the integrative negotiations (Acuff, 2008), which is the most consistent with the win-win tactics. In order to reach an integrative outcome, each party has to understand the interests, preferences and priorities of the interlocutor. The subject of negotiations should always come first, and the development of the options which are mutually beneficial should be followed by a maximum objectivity (Acuff, 2008).

There is no universal 'recipe' for the success of cross-cultural negotiations, but the knowledge of dynamics of the process itself, the implementation of the proper strategies and tactics, as well as the acceptance of cultural diversities as a challenge which can 'open the door' to a further long-term cooperation has proved to be the best solution.

1.1. Business Negotiations Principles

International business negotiations represent a very sensitive field. Norms, values, beliefs and attitudes of the negotiators are completely culturally based – they behave and think differently. Each party has its expectations and goals, which are often different, but not irreconcilable. Unless the diversities are coordinated properly, the process will probably not pass its first stage. However, with the mutual respect of certain principles, participants will give a much better chance to the success of the whole negotiating process (Rakita, B., 2006).

- Before the beginning of negotiations, we should find out as much as possible about the members of the other negotiating team. Also, we should make sure that the number of members in the negotiating team is the same as in the other party. Thus the feeling of superiority of any party will be annulled and the negotiations will start in the atmosphere of equality. Changing the team members during the process should be avoided (except when absolutely necessary) since this will disturb the initial trust established, as well as the possible formation of a long-term business relationship.
- We should always get acquainted with the differences related to time, punctuality and the course of dealing with the activities. Negotiations cannot properly develop unless the mentioned points are considered and adopted. It is absolutely certain that a wide range of differences will appear in the field of interlocutors' corporate cultures.
- Establishing and maintaining a good interpersonal relationship is fundamental for the success of negotiations in many parts of the world (China, Japan, and Korea).
- In the situation when you do not speak the language of the other negotiating party, the first step is to find a good interpreter. But, during meetings, you should always address the interlocutor not the interpreter. He will translate from the 'background' while the interlocutors will, even if they speak different languages, establish a better contact talking face to face. The main task of the interpreter is to translate the meaning correctly and precisely, without omitting even the slightest details.
- Before the beginning of the negotiations, you should inform the interlocutors about the accomplished business results and experience. It is advisable to send a CV, necessary information about the company, as well as the list of the key topics to be discussed during the negotiations. In some cultures, especially Asian, it is very important to know all business achievements and the status of the interlocutor (Adler, N.J., 2002). The above mentioned information becomes even more relevant when negotiations are to be conducted by a woman – unless she has a good CV, she will not be taken seriously enough.
- The success of negotiations depends largely on patience. Reconsidering and discussing certain topics and issues sometimes represents a test of knowledge, politeness and the overall commitment to the process.
- The whole course of negotiations should be well prepared in advance. Each phase should be worked out in detail, and action plans should be created but always with a degree of flexibility. The negotiating process is filled with highs and lows and sudden twists. A good negotiator should consider all the changes as a challenge and get the maximum benefit from them.
- In the case of misunderstanding, further development of the events should be slowed down. Instead of continuing the discussion, you should locate the root of the problem, analyse it and work on solving it together with the other party. If the problem is not solved, you should let the other party get out of the process with 'due respect'.
- When a negotiator chooses a strategy, the next step is to balance it properly – you should always stick to the desired goals with necessary adaptability to your interlocutor and his culture.

1.2. The Influence of Culture on the Choice of Negotiating Strategy

The configuration of cultural dimensions determines the interests and priorities of the negotiators, and thus the choice of the appropriate strategy (Brett, J.M., 2007). When the interests and priorities are 'located', the negotiator chooses a strategy which represents a general approach to the negotiating process and it includes a set of behaviour which will lead to a desired outcome.

Basic cultural values and assumptions explain the differences in determining the interests and priorities (Brett, J.M., 2007). For example, companies that come from cultures with long-term orientation will always tend to build a noticeable presence on a new market and at the same time create a positive image. The motive for penetrating new markets is never to achieve short-term profitability. On the other hand, companies

from cultures with short-term orientation will focus all their strengths on generating a maximum short-term profit.

The strategy chosen by the negotiators is also influenced by the culture they come from (Brett, J.M., 2007). *In the case of confrontation strategy*, we deal with the choice of directness and/or indirectness in communication. Thus there is a direct strategy where a negotiator clearly states his interests and priorities, and indirect, which is characterized by a higher level of non-verbal communication. In the *motivation strategy*, negotiators state and underline all their interests, starting from the personal ones to the expectations of the outcome of the negotiations. The *Influence strategy* reflects the negotiator's use of power which largely depends on the best alternative of the possible agreement (BATNA) (Ury, W., 2003). The power is directly linked to the available satisfactory alternatives so it will be demonstrated by the party which possesses it. When BATNA is not attractive enough, a negotiator will depend on the other party much more, which automatically diminishes his influence on the further development of the process. In the *informative strategy* negotiators decide on how much information, as well as on the way to convey it to the other party, which directly determines the type of agreement which will be made. It can also be direct and indirect.

The members of individualistic cultures usually use motivation strategy together with setting very high goals and underlying the achievement of personal interests. They often refuse acceptable agreements if they do not meet their interests and demands completely (Brett, J.M., Okumura, T. 1988). However, the above mentioned sometimes non-negotiable attitudes, lead them to a situation where they come out of the process as the inferior party. In general, cross-cultural studies and research which deal with the comparison of the main characteristics of negotiators from individualistic and collectivistic cultures, show that the former are much more oriented towards strategies which, above all, provide the fulfilment of exclusively personal goals. On the other hand, negotiators from collectivistic cultures behave in much more cooperative way.

Cultural dimensions of egalitarianism and hierarchy influence the choice of strategy in which the possession of power is manipulated (Moran, T.R., Harris, R.P., 2004). Negotiators from egalitarian cultures (e.g. USA) believe that the power in negotiations comes from available information about the knowledge of the other party's best possible alternative (BATNA). However, if the process develops normally, they seldom resort to its direct use. On the other hand, negotiators from hierarchical cultures (e.g. Japan) believe that the power comes from various sources – status, persuasion ability, knowledge of the other party's best possible alternative and alike, and they use it much more. Their behaviour is characterized by the use of different types of power as well as tactics to influence the other party.

Directness or indirectness in the use of informative and confrontation strategy is determined by communication context. Negotiators from low-context cultures present information directly; e.g. American negotiators will act frankly in order to learn as much as possible about the interests of the other party, but they will also present their preferences and priorities very clearly without 'saving' information. Japanese negotiators, as members of high-context culture, are characterized by indirect approach. They present their priorities and interests in series of proposals.

2. Cultural variations in negotiation styles

Each culture has its own style of negotiation. Internationally, it is expected from negotiators to know the styles of interlocutors, in order to reach mutually useful agreement, as well as to avoid misunderstanding and keep further business collaboration.

Recognition and adaptation to the interlocutor's style has a direct impact on the success of a negotiation outcome. Generally, in practice, a large number of negotiation styles are established, but the following styles could be stated as fundamental: direct, analytical, motivational and mediating style (Brett, J.M., Okumura, T., 1998).

Direct style (persuasive) is characterized by the use of a phrase that points to urgency, directness, and speed at job performance. Since this style always insists on the efficiency of final outcome, negotiators who use this style often want to have control over others, and to keep strictly to the defined plan and to present their suggestions accurately. They rarely make any concessions. Since they always want to win, their appearance is persuasive, insisting on interlocutor's agreement.

Analytical style is characterized by aspiration to achievement of mutual understanding. Therefore, it always insists on logical sequence of events. Negotiators who use analytical style always stick to their priorities, and never make concessions if they can disorder them. They also try to induce the interlocutor to the conclusion, but without the use of overemphasized, direct insisting and persuasion.

Negotiators who use motivational style consider the mutual benefit as the main goal of the process. They always try to understand their interlocutor, since 'the good idea' is considered to be more important than precise agendas and abundance of information. Therefore, this style is characterized by creativity and enthusiasm. Negotiator - motivator considers himself smart, since he never closes the door in front of some new solutions.

Mediating style is characterized by aspiration towards consensus and good relationship between negotiating parties. Interlocutors who use this style will always listen to the other side and share the same opinion. Also, the efficiency of work is not of the most importance. The most important thing is to make an agreement, as well as further improvement and open perspective for mutual cooperation.

It is obvious that direct and analytical styles are characterized by the use of 'firm tactics' (the use of open threats, demands, sanctions, open approach to persuasion), while motivational and mediating styles comprise the use of 'soft tactics' (Brett, J. M., 2007), (insisting on friendly relationship, feeling of community and reciprocity, indirect approach to persuasion).

Generally, variations in the styles of negotiation are widely exposed in the following fields (Brett, J. M., 2007): 1) Rules in the process of negotiation 2) Selection of a negotiator, 3) Decision making process.

Cultural variations in the negotiation process

All cultures both explicitly and implicitly influence the behaviour of their members. They respect the established rules, no matter if they are about private or business life. The acquired rules reflect in the field of a negotiation process, - the way of running the process depends on cultural predispositions of negotiating sides. However, the biggest number of distinctions in the process of negotiation is visible in the domain of atmosphere by methods of approach and styles of communications characterized by specific cultures.

The atmosphere of a negotiating process is created by negotiators' sides, manifesting the behaviour which is culturally specified. French, Spaniards, Latin-Americans and Japanese consider negotiations as a social ceremony, which has its participants, protocol, time-frame, ethical principles related to the process of discussion, as well as the specified final outcome.

Members of Anglo- Saxon cultures (Americans, British, and Australians) have more pragmatic approach. The most important of all is the achievement of the 'economic goal' and constant focus on professional approach. American negotiators, regardless of their always friendly, open appearance, insist on an efficient and fast decision making process. For them, the agreement that brings the mutual benefit presents the main goal which they want to reach as soon as possible, neglecting the protocol. They send technically competent people to negotiations, who present concrete facts to interlocutors. Their directness and facts in outline make interlocutors often see them very harsh negotiators. Confrontations and verbal competitions are considered to be the challenge which can produce more constructive solutions (Moran, T. R., 2004).

French people experience negotiations as a ceremony, and forum during which they can demonstrate their acumen and logical way of thinking. At the very beginning of negotiation they show distrust to the interlocutors. With regard to historical heritage and their participation in a large number of international negotiations, members of this culture consider themselves as very experienced negotiators. A team leader is always the best orator, highly educated and self-confident. French negotiators are always ready for debates, and present well formulated solutions.

Japanese negotiators believe that socialization with interlocutor presents the integral part of the process. Since they insist on achieving long-term relationships, the reached agreement presents the beginning of the process of mutual adaptation. Members of this culture consider that it is important to create a relationship based on confidence, harmony and implicit understanding. (Moran T. R. Harris, R. P., 2004).

Approaching methods in the process of negotiation are also influenced by the core culture of a negotiator. There are two basic methods: width method and depth method. The first one insists on facts, details, written word, quantity of documentation, while the second one is focused on long-term relationships, relationship quality, given word.

American negotiators suppose that it is necessary to pass through the phase of agreement before reaching the final contract. Members of this culture are preoccupied by possession of facts and statistic data, and similar to French, they pay much attention to written contracts and agreements. Pronounced word or given promise is not of great importance to them. Therefore, the focus on quantity is obvious; the quality of relationship is put on the second place. Since time is money they do not use it over-excessively, even though they withhold important detailed explanations to the interlocutor.

Japanese negotiators consider that a negotiation already implies implicitly a large amount of details, so in their negotiating scenario there are no specific outcomes and facts defined in advance. They even try to avoid getting into great details, trying to give width to the agreement that will be specified during the process of negotiations (March, R., 1985, April). Japanese believe that the most important thing is to agree about main principles of both interlocutors, always making possibilities for new alternatives of the outcome which would bring benefit to both sides. Since the further cooperation is based on mutual confidence and agreement, a given word or a promise is sometimes much more appreciated than the signed agreement?

Communication style typical for members of American culture is characterized by positivism and openness (Scott, B., 2005). They usually start the communication process with assumption that the English language will be used during the whole session, which has shown to be one of the biggest shortcoming. The use of translator usually brings them in a situation to be late in discussion, since the other side often uses English actively or passively, which gives them time to think about the stating points. Furthermore, they insist on the use of a logical argumentation as well as on warning and pressure techniques even when interlocutors give no assent. They present their ideas clearly, considering the silence as unpleasant or as a sign of a problem.

Japanese make an impression of being easily persuaded negotiators, since they are apparently very passive. Reactions to interlocutor's presentation are usually based on expression of affirmative signs with different non verbal signals. They use period of silence in communication, during which they think calmly, expecting the other side to accept their behaviour completely. Generally, Japanese transfer only 10% of a message verbally, giving preference to non verbal communication. Even when they express themselves verbally, they are prone to indirectness, using phrases such as 'maybe', 'probably'... (Scott, B., 2005). Regarding the constant aspiration towards harmony maintenance, Japanese negotiators are almost never aggressive. Their communication is characterized by positivism and politeness.

Members of French culture often insist on their mother tongue to be used in a negotiation process. Negotiators from other cultures regard them as the most complicated European interlocutors. The French often use "no" in communication and they reject deals and compromises. They usually bring up all the information at the beginning of the process (which they also expect from the other party), and afterwards they establish their own principles and a way of thinking. They do not accept additional exposition of information, believing that the interlocutor has been hiding it up to that moment. Therefore, to the other negotiating party, they always appear as inflexible opponents (Kremenyk, V.A., 2002). French negotiators, who are always "furnished" with right arguments, take pleasure in debates, confrontations and competitive behaviour.

2.1. Variations in choosing a negotiator

The diversity in communication styles is also manifested within the purview of choosing a negotiator. The criteria for the number of negotiators that will make a team, on what grounds they will be chosen and connected, who will be a team leader, whether the authority will be strongly emphasized and similar issues, vary from culture to culture. By the way of choosing a negotiator and the structure of a negotiating team in general, the actual corporate culture of an organization can be clearly discerned.

American negotiators exclusively focused on the goal of efficiency, hold that a team should be as small as possible (sometimes even represented by a single person). In comparison to negotiators' age structure from many cultures, American negotiators belong to the youngest. They already take a prominent position in a team in their early thirties, sometimes even in their twenties. Women are often included in the structure of a team, although a small number of them hold highest managerial functions (Kremenyk, V.A., 2002).

Generally, the major criterion for the choice of a negotiator who will enter a team is represented by the level of their technical expertise. The criteria for the choice based on age and social status are considered completely irrelevant.

Americans always perceive their team as of a leader, applying so called “John Wayne” strategy. They are of the opinion that there is not a problem that they cannot solve. (Kremenynk, V.A., 2002).

Members of a French negotiation team are usually chosen by social and professional status criteria (Kremenynk, V.A., 2002). Regarding the fact that the tradition is highly esteemed in France, the existing relations are very important, not only family relations but also social and academic as well. The similarity between the members of a team (regarding the above stated criteria) is exceptionally emphasized and significant, and on the other side, it has an influence on the very way of managing the process. As opposed to other European countries, the above mentioned similarity is of the utmost significance in the structure of French teams.

Members of a Japanese negotiating team are usually in their late thirties, led by a senior leader. The choice of a negotiator in a team is based on their status and knowledge, the presence of women is very rare, while a leader is being chosen according to the age criterion. They will never send a small team to do negotiations. In most cases, they are striving to include representatives of various functions in a team, which will, in their opinion, automatically bring a competitive advantage to them.

2.2. Variations in the process of decision making

Every culture imposes certain characteristic thinking and reasoning patterns to their members, and accordingly, also ways of decision making. Generally, the very concept and acceptance of truth is different when we compare Eastern and Western culture clusters. In Western countries it is considered that the truth will be revealed by proper application of certain scientific methods. Therefore, if Aristotle's way of thinking is followed, all problems will be efficiently solved. In Eastern cultures, Taoist's way of thinking is adopted. The truth is an “active agent” and it can never be revealed by simple application of scientific methods. It can be reached in different ways, but also, it can have different forms.

The above mentioned variations are reflected in the way the decisions are made. American negotiators see each session as a process of problem solving, even when a problem does not really exist. What is also typical of them is that they do not negotiate all outcomes at the same time. They decompose them, solving them in a certain order, each in its own turn. What is very important to them is that they know who makes decisions in the other team, so that they target all proposals to a person in charge. During a negotiation process, they mostly use utterly rational way of thinking, utilizing all facts available. In this way, the other party is always exposed to a certain dose of persuasion based on being strongly “equipped” with information.

Within French negotiating teams, decisions are brought in a centralized way, by the highest authority. Generally, the French care a lot about the security of a decision that has been made, so while trying to keeping it safe, their behaviour can often be described as conservative. Also, in contrast to the American, they always set long-term goals.

The concept of decision making that is valid in Western countries is hardly applicable in Japan. In this country consensus-based decision-making process is used. Every employee that is potentially affected by the decision will participate in the consideration of its adoption or refusal. Hence, everyone has the right to express their opinion. Also, there is a constant feedback between the top management and employees in terms of prompt delivery and exchange of information relevant for joint decision-making. Top management holds in high esteem expert opinion of the middle-level management. Japanese negotiators make conclusions slowly, but once they reach them, they bring them into effect rapidly. Generally, once they make a decision based on adequate background information, they always stick to it. In contrast to them, within a Chinese negotiating team, an “exclusive right” of making decisions belongs only to the highest authorities, while other members are often not even asked for their opinions.

3. Instead of conclusion - Improving the process of cross-cultural negotiations

There are fundamental differences between national cultures related both to goals and behaviour during a negotiation process. Thus, it is always a current issue in what way a cross-cultural manager will most efficiently solve a potential problem rooted in great cultural diversification.

Firstly, an imperative in the contemporary business environment is to understand and accept as much as possible the culture of a partner negotiator. Once we are familiar with the culture of our interlocutor, and the way it influences the style of negotiations, it is much easier to understand characteristics of a specific situation. All data related to the interlocutor's organization, as well as their previous experience in cross-cultural negotiations should be taken into consideration. Afterwards, their needs, interests and desired goals should be re-examined and then compared and adjusted to our own. Negotiators must always bear in mind that there are great differences between intra- and inter-cultural negotiations. The approach that proved successful on a national "field" should never be taken as a benchmark for global success.

Author Stephen Weiss (Weiss, S.E., 1994) states that negotiators can choose a negotiation strategy according to their cultural similarity with an interlocutor. Accordingly, they will increase the possibility of maximizing the outcome of negotiations. Thus, in a situation of a *low-level cultural similarity*, the wisest thing to do is hire an agent, advisor or a mediator. *Middle-level cultural similarity* implies constant mutual adjustment – for example, American negotiators should know in advance that with any member of an Eastern culture they will never make an agreement rapidly. Negotiators, whose cultures are to a certain extent similar, may also choose so-called adaptation approach. In this case, considering the limited knowledge of specific characteristics of the interlocutor's culture, the whole process is being precisely coordinated. It is determined in advance who will talk to whom, what language will be used, how much information should be brought up and shared, as well as what interests, priorities and expectations related to the outcome of negotiating are. *High-level cultural similarity* implies full acceptance of the interlocutor's cultural characteristics. The existing differences are put aside and they become irrelevant, and so, the process is being personalized. The interlocutor is observed as an individual, not as a member of some other, unknown culture. This type of strategy enables mutual empathy and respect be improved, which represents the basis for creating any kind of long-term cooperation. The effect symphony is a strategy where both parties are willing to enter a negotiating process without exclusive predispositions imposed on them by the local culture. Therefore, they enter the process broad-mindedly, ready for certain renunciations, adjustments or adoption of completely new approaches. Cultural differences are put aside and together they create a new model of negotiations which suits best both parties' interests and priorities.

Moral, ethical and social responsibility are becoming more and more intensified when we take into consideration that there are contacts between different cultures on a global scene. Thence, when the question of ethics is applied to the field of cross-cultural negotiations, a motto that is desirable to be adopted is: 'Do as you would be done by'. However, corruption, lying, disclosing secrets or covering information relevant to the outcome of negotiations, still, for most parts, represent the reality in a field of negotiations.

The above mentioned diversity of national cultures constantly imposes an ongoing question of convergence and/or divergence on negotiators. As the knowledge of other cultures is considered almost essential, a convergent approach to doing negotiations seems like a logical solution.

However, cases where negotiations need a divergent approach are not rare. Members of different cultures often retain specific negotiation ways and patterns. Deeply rooted cultural behaviours are very hard to change, even when there is a strong possibility for overlapping with the interlocutor's behaviour and negotiation style. Still, another reason for divergence is a belief that an adopted (culturally specific) negotiation style is considerably more effective than the styles of other cultures (so one cannot expect that the interlocutor will change it).

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CONCEPTS FOR IMPLEMENTATION OF GLOBAL MANAGEMENT IN MACEDONIA AIMED AT INTERNATIONALIZATION OF THE NATIONAL ECONOMY

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Abstract: *The world economy prevails that the greatest merit for the development of powerful nations of the world is due to strong management. Changes occurring in the overall living as a result of the emergence of new technologies and information systems inevitably led to changes in management with managers giving guidance as individuals to find their place in the structure of the organization, and their knowledge and skills in the best possible way to fit into the overall setting. With the advent of globalization, the boundaries of organizations disappear; with its growth and expansion they exceeded local, regional and national frameworks and developed throughout the world. The scope of such management activities significantly increases and gets complicated so that managers also become experts on development and organization, planning, linguistic styles and multinational cultures, and mediators. Through its universality management allows fine organization and structuring of available resources to achieve effectiveness and efficiency, thus achieving the higher performances leading to najprisutnata reality before which set the modern concepts of management. The broad framework of its diversity does not limit nor narrows the possibility of freedom in creating the organizational and hierarchical structure, which opens the field for modeling okrozhuvanjeto. Big impact has management in the development of the economy is indisputably proven. Management throughout human history was constant companion and motor shekel which dragged and still pulling ahead in the new development. Good implementation of features enables management and economy of the Republic of Macedonia to engage in international business activities.*

Keywords: *management, internationalization, globalization.*

1. ALTERNATIVE POSSIBILITIES OF GLOBAL MANAGEMENT IN THE EFFECTIVE AND EFFICIENT UTILIZATION OF AVAILABLE RESOURCES

Taking into account the knowledge that today are available to science and practice indisputably is proven that the importance of the management in the development of a society is of particular importance. The management throughout the human history was a constant companion to the development and motor force that influenced and is still influencing to the direction of new development.

Today in modern scientific thought is widely accepted that the greatest merit in development of the most powerful countries in the world is due to strong management. The changes occurring in the overall living as a consequence of the emergence of new technologies and information systems inevitably led to changes in the concept of management where managers have a the final word in giving guidance how the individual should take its place in the structure of the organization and with its knowledge and skills in the best possible way to fit in the organizational setting. With the advent of globalization, national characteristics of organizations are lost and they with their growth and spread beyond local, regional and national frameworks with widely disseminated throughout the world. In such circumstances the scope of management significantly increases and complicates and managers are also profiled in experts from several areas: the development and organization, planning, linguistic styles and multinational cultures, mediators and others. Through this universality, the management provides organization and fine structure of the available resources to achieve effectiveness and efficiency, and thus exercise of the higher performance of the organization that is leading to the modern concepts of management. The broad framework of its diversity does not limit nor narrows the possibility of freedom in creating the organizational and hierarchical structure, which raises the most optimal box modeling environment.

From this aspect is undisputed that the successful implementation of managements' functions enables the economy of the Republic of Macedonia to join to the international production systems.

Today, to live and survive in a world of strong competition among businesses worldwide, presupposes a respect of the imperative that every manager needs to apply, and that is to know quickly and decisively to bring key decisions about the organization he leads. Adoption of strategic decisions often carries with it risks that can have long term implications to the operations of the company. The critical and difficult strategic decisions are actually everyday operation of business entities, in often limiting conditions regarding the flow of capital, investment in training and development, lack of resources or forced savings because of poor economic conditions. Each decision that will be made by the manager is strategic because it needs to maximize the economic impact of existing resources and it can be determined by action that would have the lowest risk, and thus bring maximum profit organization in general.

From here we can conclude that the strategic decisions depend on the character of each individual and that is what gives individuality to their essence. The strategic decisions of the executive and other managers are the choices that determine the direction where an organization will move from which derives its success or failure. In today's business world that is changing rapidly, it must be followed by quick adaptations in the domain of strategic decision making.

Analyzing the experiences of the practice can not even be concluded that today on national, much less on international level there is no single approach to the process of strategic decision making, or defining the term for them, because not every strategic decision or the its process fits every situation, organization or person. From here the existence of extensive and detailed explanations of techniques and approaches, and even established frameworks through which the process of making strategic decisions. The results of the process of making strategic decisions, as such, should be able to evaluate, and thereby the results or success that comes as a future can be measured by the results from the previous period. However, gaining experience with the making of strategic decisions not only to evaluate the possibility to compare the effects achieved with the results achieved in the past, but the process becomes important by itself, because of the experience that it is acquired and its application in the future. Such comparisons are important because they allow improving of the position of the management team for new insight into decisions. Therefore it is said that the process of making strategic decisions turned into art for by managers familiar with his reaction to new and unexplored situations and conditions, that is how we understand these situations and how they define the problems for which decision-makers. Besides experience, which is undoubtedly there and formal techniques for making strategic decisions that help managers to improve the functioning of the organization, to prepare for new and unknown situations imposed by the environment which is constantly and rapidly changing.

Following the dynamic development of global economic processes inevitable conclusion is that any executive, but the basic knowledge and skills, should have capabilities to initiate and create their own ideas and solutions, to understand the environment in acting, his organization (business and economic), to recognize the causes of problems, comply with the principles and the principles that make up global management, and thus has its clearly defined strategic thinking, which is expressed and implemented through the adoption of effective and sound strategic decisions.

According to scientific thought global management is a universal activity and under the general concept is a special form of management that uses the factors of environment and internal factors on performance in the world market.

The success of Global Management is the advantages of multinational companies using the strategies, functions and principles of it, realize maximum efficiency in operation, optimal management and long-term stability.

The basic features of global management: strategic planning, international organization, international personnel policy; international communication, negotiation of international operations; culture of international operations.

These functions are accomplished the ultimate goal, which is a competitive advantage in business or national economy. Today as a brake on this tendency occurs more external factors, such as: competitors, resources, technology, suppliers, consumers, labour supply, economic conditions, legislative, political, governmental, socio-cultural, international and other conditions.

The modern way of doing business, which is characterized by destruction of national barriers do not refer to the connection of global management, competitiveness and market, something which again suggests a

whole system of chain reactions, which arise as a consequence of their mutual interaction. The importance of competition policy for the national economy and the fact that all activities of the European Union are based on the belief that the competitiveness of companies is a prerequisite for successful performance of European businesses internationally.

2. MULTINATIONAL CORPORATIONS AS INVESTORS IN MACEDONIA

To date in the Republic of Macedonia (RM) were made numerous analyzes in order to discover the reasons - why Macedonia is not attractive for multinational corporations (MNC). Out of them comes almost unique conclusion that still can not speak to the overall stability of the security and political climate, corruption, contract enforcement, unpredictable government policies, inefficient judicial system, fully constructed tax system and the small market is one of the biggest reasons that deter foreign investors to choose RM as preferred destination for their business activities. MNC Macedonia seen as the country where there are still unresolved property rights, changing policies, long decision-making process at central and local level, inadequate banking services and underdeveloped and insufficient infrastructure.

As one of the few advantages of Macedonia for potential foreign investment, experts say the good location of land transport links, educated and cheap labour and open trade regimes.

Analyses show that the strategic task of the country should be achievement of the gross investment rate of around 25%, which is based on part of domestic savings, but most foreign investment. The priority should be attracting MNCs, mostly through independent projects of foreign investors, or through our partnerships with domestic firms.

In Macedonia there is no institution that can analyze the quality of foreign investment by MNCs in the country for the simple reason that no such data exist. What we have official institutions are data from the National Bank of Macedonia (NBM), which posted total foreign investment by year and by country.

With a large percentage of the total investments in Macedonia, part of Cyprus, Liechtenstein, and a few years investments have started to come from British Virgin Islands, Marshall Islands, Cayman Islands. These countries, due to tax exemptions present in them, the world's known as a "tax haven". Companies seeking to avoid taxes in their home country establish their own subsidiaries in these countries and by investing them in other countries.

3. INVESTMENT POLICY AND MNC

Investment policy is an economic category that considers key and one of the most important factors of economic development - investment. From their size, structure and efficiency of use is determined process of economic development of a country.

Therefore the investment policy is the most important part of developing macro-economic policy and plays an important role for economic growth of national economy and achieving higher levels of economic development of the country as a whole. Considering the goals of economic development, investment policy determines how to most effectively achieve the goals of development in each stage of development of national economy.

From here you can:

1. First Investment policy means a set of government measures that affect the realization of investment activity, i.e.
2. The second The investment policy includes measures and instruments relating to investment and economic development.

Depending on which level relate distinguish two levels of investment policy as follows:

- Investment policy head of government;
- Investment policy run businesses.

Basically, the role of government is to create a favourable environment for investment and businesses to make specific investment decisions. Therefore, no special instruments of economic policy that would have pertained only to the investment policy, but the measures and instruments of investment policy and overall measures that concern and economic policy.

In a market economy country does not interfere directly in the investment decisions of business entities. On the other hand, the instruments of monetary policy can affect the volume of money in circulation in order to encourage investment. In this regard recent example is the decision of the National Bank to limit the amounts of funds that banks can use to purchase treasury bills, or auctions for the same from one week down to once a month (Regulations and Decisions from the National bank of the Republic of Macedonia, Retrieved from <http://www.nbrm.mk>). Although this decision banks reacted immediately, the Central Bank left its stance defending the same with the explanation that this way the banks will remain more free resources that they will place in the economy which is generally known that there is a lack of liquidity means.

The instruments of fiscal policy can affect the acceleration of depreciation and the rate of reinvestment, and customs policy on the price of imported technology.

4. DEVELOPMENT POLICY OF THE GOVERNMENT AS A PREREQUISITE FOR THE CREATION OF ATTRACTIVE CONDITIONS FOR FOREIGN DIRECT INVESTMENT (FDI)

According to the Programme of the Government of the Republic of Macedonia (Programme of the Government of the Republic of Macedonia, Retrieved from <http://vlada.mk>) prepared a Public investment Programme in Macedonia 2010-2012 (Public Investment Programme in Macedonia 2010-2012, Retrieved from <http://www.finance.gov.mk/files/u1/PIP-2011novo.pdf>).

Starting in 1995, in the Ministry of Finance is established a database of investment projects of public infrastructure of the Republic of Macedonia, based on data submitted by the competent ministries and who constantly innovate.

In preparing the program is removed from the conclusion that actions taken to intensify the reform process in the country, especially the transformation processes in the public sector seeking to accede to the application of appropriate methodology in the implementation of public investment planning and monitoring their implementation.

In preparing the program takes into account development policies in the sectors and priority infrastructure projects contained in the Programme of the Government of the Republic of Macedonia for the period 2006 - 2010 year (Programme of the Government of the Republic of Macedonia 2006-2010, Retrieved from <http://archive.vlada.mk>). Enclosure Programme 2010-2012 the contribution of the Government in implementing the strategy to increase investments of MNC in the country, will be expressed, primarily by organizing, supporting, regulating, promoting and encouraging development activities, and adoption of appropriate legal and economic regulations.

Government of the Republic of Macedonia emphasized the priority given to creating conditions for successful implementation of the Stabilisation and Association Agreement with the European Union (Stabilisation and Association Agreement with the European Union, Retrieved from <http://www.sep.gov.mk/Default.aspx?ContentID=24>) and the Treaty with the World Trade Organization (Treaty with the World Trade Organization, Retrieved from <http://www.wto.org.mk.mk.gd/>).

These agreements, along with contracts or agreements with other countries in the region and beyond a free trade constitute a solid basis for increased economic cooperation with foreign countries, qualitative restructuring of the economy, and thus the total development (Free Trade agreements, Retrieved from <http://www.mchamber.org.mk/%28S%28tqvesj45khgpdrcnusici45%29%29/default.aspx?lId=2&mId=83&smlId=0&cId=0&pId=1>). This would lead to improvement of inflow of foreign direct investment by MNCs in Macedonia.

Republic of Macedonia, a small country with proclaimed permanent orientation towards open market economy, the priorities of development puts other forms of economic cooperation with neighbouring and other countries, especially member countries of the European Union.

In 2011, macroeconomic stability in the country was successfully held. The exchange rate is stable and inflation is controlled framework. Given that the Republic of Macedonia continue to be plagued by lack of capital investment, despite an increase in national savings, strategic goal and priority of the government is creating conditions for greater inflow of foreign investment.

In this connection, the Government is making efforts to improve the domestic environment, in terms of increased investment activity of MNCs, particularly by creating favourable conditions for attracting foreign direct investment.

One of the key benefits of the system state that "a priori" go encourages investment and certainly a legal certainty to investors (M. Andonovski (2010) Institutional Assumptions for Improving the Conditions of Business in the Republic of Macedonia. Prilep, R. Macedonia: Economic faculty - Prilep).

The same investor in the country, will be provided by completing reforms in the judiciary, promotion of arbitration (Laws and Regulations for the Economic Chamber of Macedonia, Retrieved from <http://www.mchamber.org.mk>) or non-judicial dispute resolution (Law on Mediation, 2009, Retrieve from www.pravda.gov.mk/download.asp?id=253), more efficient provision of capital creditors through appropriate means of providing payments and creation of legal prerequisites for eligibility ownership of property by foreign persons, and others.

Despite their determination to continue with economic reforms, will be very difficult for the country to persist in their efforts without a recent twist in the field of real investment and production.

Special investments of MNCs in infrastructure is vital especially for:

- reducing unemployment and poverty
- increase the competitiveness of national economy
- higher economic growth, and
- balanced regional development in order to intensify the process of European integration of Macedonia.

5. TARGET GROUP OF INVESTORS AND TARGET SECTORS FOR PROMOTION

From the analysis and comparison of the Republic of Macedonia in terms of region, can perform positioning of the target groups of foreign investors and target sectors that still need to focus in future promotional activities:

1. Medium and large enterprises (firms) of adjacent and nearby developed countries, who need to expand production;
2. Multinational companies that are not yet present in the region;
3. Multinational companies that are already positioned in neighboring countries;
4. Companies or firms that are main foreign trade partners of Macedonia, i.e. firms that have successfully cooperated with Macedonian companies.

According to previous experience and considering the current level of FDI of MNCs, the most important are those sectors where Macedonia has its own experience and knowledge, and it would be: the sector of industry of food and beverages sector of metal industry, the Department of Energy, the telecommunications sector, and lately the tourism sector.

STRENGTHS AND WEAKNESSES OF RM IN TERMS OF ATTRACTING FDI AND STRATEGIC ALLIANCES

Strengths:

- Solid political and macroeconomic stability
- Relatively favourable tax environment
- Level of privatization and a sound level of realized economic reforms
- Renewal of existing and creation of new institutions
- Restructured and privatized banking system
- Developed telecommunication infrastructure
- Solid level of high-educated staff
- National treatment of foreign investors
- Relatively low tariff rates
- The existence of free economic zones
- Short takes time to start a business
- Ability to use tax breaks and incentives

Weaknesses:

- Poorly developed infrastructure in general
- Still insufficient recognizable locations for attracting FDI
- Limited natural resources
- Implementation gap in the primary key laws
- Bad judicial system
- The size of the market
- Administrative barriers - long procedures for obtaining the necessary licenses to perform activities at the local level (building permits, frequent changes to the purposes of land etc).
- Poorly developed technological base in the sectors
- Low level of know how (especially managerial skills)

6. CONCLUSION

From the above it can be concluded that the field of creating conditions for attracting foreign investment and thus increase the level of globalization of Macedonian economy of multinational Plan of Macedonia and more opportunities and favourable conditions are available, i.e.:

- Commitment of the Government program of economic development, responsible fiscal policy, and creating a favourable environment for attracting FDI
- Further development of financial markets
- Development of strong institutions for attracting FDI
- Adjustment of legal regulations concerning labour relations in accordance with EU standards
- Borrowing in the international financial institutions and investment Concession for the construction of capital infrastructure facilities
- Creation of a fully liberalized fiscal system to attract FDI
- Further strengthening of the banking sector
- Reforms in education in accordance with the needs of the development departments of the Republic of Macedonia.

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ENHANCING COMPUTER MEDIATED COMMUNICATION BY APPLYING CONTEXTUALIZATION TO EMAIL DESIGN: A CASE STUDY

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Abstract: *This paper deals with communicational breakdowns and misunderstandings in computer mediated communication (CMC) and with ways to recover from them or prevent them. The paper describes a case study of CMC conducted in the company Artigiani. We observed communication and conducted content analysis of e-mail messages, focusing on message exchanges between customer service representatives (CSRs) and their contacts. In addition to task management difficulties, we identified communication breakdowns that result from differences between perspectives, and from the lack of contextual information, mainly technical background and professional jargon on the customers' side. We examined possible ways to enhance CMC and accordingly designed a prototype for an e-mail user interface that emphasizes a communicational strategy called contextualization as a central component for obtaining effective communication and for supporting effective management and control of organizational activities, especially handling orders, price quoting, and monitoring the supply and installation of products. Designers of systems that support distant communication and collaboration may find practical ideas to apply.*

Keywords: *Computer-Mediated-Communication (CMC), Computer Supported Cooperative Work (CSCW), e-mail design, Communication Breakdowns, Miscommunication, Contextualization, Mutual Understanding*

1. INTRODUCTION

Computer supported cooperative work (CSCW) and computer mediated communication (CMC) are most crucial in the activities of today's organizations. Organizations need to achieve goals that one person cannot accomplish alone, and knowledge that is collected by individuals should be reserved for the general use of the organizational community. Now, workers need more than ever to share knowledge, and are involved in joint activities that require the support of information systems. Communication is at large extent in the form of computer mediated cooperation, and computerized applications ascribed as groupware (group support systems that include shared environments, whiteboards, electronic group calendars, chat rooms and more) facilitate communication and improve coordination. The overall success of organizations is certainly dependent on CMC that need to be designed to achieve a high level of mutual understanding (hereafter MU) and minimal communication breakdowns.

Although e-mail is the most widespread mode of CMC at work, e-mail client software is poorly suited to support the collaborative quality of the organizational tasks, which results in a pernicious problem of people suffering from email overload (Bellotti et al., 2005; Whittaker, 2005). Users get frustrated with their e-mail because they feel overwhelmed by the high volume of messages. It seems that current structures within e-mail clients prove inadequate, especially for high-volume e-mail users. There is need for reinventing the e-mail client, moving it from the current electronic analog of physical mail to a tool that allows users to manage all of their digital communications. New visualizations of the information contained within e-mail inboxes are a key piece of the solution (Rohall, 2001).

The Problem of Communication Breakdowns

Communication problems are potentially present in organizational processes, which involve cooperative work between workers coming from different occupational backgrounds. The differences in language and knowledge eventually create a situation of distance between individuals who need to communicate in order to complete their tasks successfully. Therefore, the organizational process could be facing a problem of miscommunication that might lead to low performance and therefore to its failure.

On the one hand, collaboration between workers who come from diverse functional backgrounds is essential in organizations (Fischer, 1981). On the other hand, communication processes that involve individuals who come from different organizational occupations, domains or methodologies and hold different kinds of knowledge, impose certain demands and requirements on the form of messages exchanged between them (Sommerville et al, 1996). Research has shown that communication is more efficient when people share

greater amounts of common ground and when integration between individual member contributions is achieved. However, achieving integration will be more challenging if group members start from different practical realities - e.g. come from different functional backgrounds. Common to all situations requiring the communication of contextual information is the likelihood of being misunderstood because of information the speaker possesses but the listener does not. Such situations are more likely to occur in computer mediated team work than in face-to-face teams (Cramton, 2001).

Contextualization

Current communication theories suggest that communication breakdowns may be reduced by contextualization, i.e., an adaptive communication behavior of providing the explicit addition of contextual information to a core message to ensure effective communication. Communicators contextualize in order to overcome communication difficulties arising from perspective differences. The lack of contextualization has been named as one of the most frequently occurring problems in communication between distributed workers (Cramton, 2001; Hinds & Bailey, 2003). The decision to contextualize involves trade-offs between the benefit of gaining better communication and the costs in terms of the cognitive resources it requires. The cognitive effort required for the act of contextualization is particularly heavy on the e-mail author in CMC, because information transfer, especially complex information, is less efficient than in richer media (Kraut et al., 2002). Although the degree of context required in an e-mail message depends on the recipient, it is the sender (author) who must determine the context that the message provides, as well as its depth. Hence, the adaptive behavior of contextualization is at the sender's discretion. A sender who senses a problem in communication has motivation to contextualize in order to gain mutual understanding.

It has been reported that the impacts of contextualization on MU and on performance are contingent on whether communicators share or differ in their perspectives: contextualization increases MU and performance in cases of different perspectives, but it does not increase MU and even decreases performance in situations of shared perspectives. In other words, contextualization is only effective when needed and counterproductive when not needed (Katz & Te'eni, 2007). However, message senders are not always effective communicators, and are not always aware of the difference in perspectives with their recipients and therefore may use contextualization inappropriately.

In order to contextualize appropriately, a speaker needs to be engaged in an additional communication behavior, perspective taking, which is metaphorically depicted as the act of stepping into the shoes of the addressee. In task-oriented situations, one's ability to orientate to the perspective of the other person enables him to assimilate and integrate information using the other's frame of reference and leads to higher MU (Tan, 1992). Perspective taking is a cognitive skill that varies among individuals and requires cognitive effort (Dickey et al., 2007). In addition, people tend to rely on their own perspective when communicating because it requires less cognitive effort (Horton & Keysar, 1996; Keysar et al., 2000), or overestimate the degree to which others' perspectives mirror their own (Krauss & Fussell, 1991). It was found that cognitive load has a detrimental influence, as it disrupts monitoring and adjustments and leads to rather standard messages that are not adapted to the perspectives of the addressees (Roßnagel, 2000; Horton & Keysar, 1996).

In customer service situations, customer service representative (CSR) may use fixed, predefined messages to present a generic corporate image to those outside the organization (Adria & Chowdhury, 2004). This makes it difficult for strangers to develop shared understanding of context, which is crucial for communication effectiveness (Dickey et al., 2007). In addition, customers are sometimes unable to take a CSR's perspective because the CSR refers to things outside the customers' experiences. In such cases, sessions can break down and end without resolution.

Contextualization in e-mail Communication

We looked at previous work in CMC that stress the need for reinventing e-mail, and put our focus on contextualization as a central component for enhancing effective communication. We concentrate on two existing features from previous work, embedded links and visualization of message threads and added additional features (introduced in the design section).

Contextualizing with embedded links

Knowledge organization deals with issues of how to best store knowledge so that it can be retrieved when relevant. Users need to get to the right knowledge at the right time, and must be aware of the relevant

knowledge that is available to them at each task. The idea of tying knowledge to action is aroused from the fact that workers do not have the time to actively seek organizational knowledge, and therefore it would be far more effective if the knowledge could find them (Schwartz, & Te'eni, 2000).

KMail, a knowledge-enhanced e-mail designed to enhance collaboration, is a remarkable example for a tool that ties organizational memories (OM) effectively to organizational actions using contextualization (Schwartz, & Te'eni, 2000). KMail is a URL-based OM that enables the linking of knowledge to ongoing communication to achieve successful communication by helping users to appropriately adapt to communication by assessing perspective differences.

Contextualization with message threads (conversational trees)

Collaborative tasks are not discrete but iterative. As a task evolves, users have to combine task related information in incoming messages with prior relevant information. Prior messages are important because they contain context that is critical for interpreting the current message (Whittaker, 2005). Messages should be viewed as elements of a conversation rather than as independent or solitary. An e-mail conversation, also known as a *thread*, is typically defined as the tree of related messages that arises from the use of the reply operation (Venolia & Neustaedter, 2003). This interconnectedness of e-mails is not fully exploited in conventional e-mail clients. Conversation threads in e-mail allow users to see a greater context of the messages they are reading, remind users that a conversation is in progress, recording the state of a discussion, and collating related messages automatically (Kerr, 2003). A full visualization of a message thread clearly displays a message along with all its previous related messages and therefore provides better context for understanding the meaning of the current message. Therefore we treat threading as a form of contextualization, since it adds layers of information about the communication's history.

Threading is useful for both recipient and author. At the recipient's side, contextual information reduces the likelihood of misunderstanding the meaning of messages. For both, contextualization by thread visualization reduces cognitive demands on memory by eliminating the need to recall past issues and other conversational elements. At the author's side, threading serves as reference of the common ground achieved in the conversation until the current point, and allows him to expend less effort in building the current message. The author assumes that the recipient already knows or has access to previous information and therefore can choose not to contextualize, sending only the core message and drawing the recipient's attention to relevant context whenever necessary. This allows a relatively parsimonious (economical) communication pattern, requiring less message exchanges and enabling the creation of shorter messages, because most of the information needed is already presented in the thread.

Innovative ideas that go beyond the limited context preservation by threading widely used in e-mail programs can be found in the literature. Examples are: an advanced email prototype with a complex branching reply tree (Venolia & Neustaedter, 2003), an integrated e-mail client with visual separators in the Inbox list using "pivoting" and threads (Kerr, 2003, Kerr & Wilcox, 2004), and a combination of a tree based model with a timeline model to produce useful tracking of conversations (Rohall et al., 2001).

2. ARTIGIANI AS A CASE STUDY OF CMC DIFFICULTIES

The current study is about designing effective CMC to enhance good communication. Our objectives were to first evaluate communication processes between CSRs and their business clients, with a special attention to communication breakdowns to find the types of contextual information that help resolve breakdowns and miscommunications, and then find possible ways to enhance effective CMC and finally implemented our ideas in the design of an e-mail prototype. We examined communication processes in an Israeli company named Artigiani, as a case study of an organization with massive email message exchanges. Artigiani specializes in designing and manufacturing affixing (metal fixtures or accessories such as handles, hooks and hangers).

Case Study Steps

To evaluate the existing communication in Artigiani, we conducted the following activities in a time range of about two months: observations; one-to-one interviews; and collection and text analysis of 60 e-mail messages.

Consequently, we roughly distinguish between two purposes for contextualizing:

- Task management: Contextualization for improving the worker's ability to effectively manage his organizational activities and tasks, and to improve related decision making.
- Communication: Contextualization for improving CMC, i.e. achieving a high level of MU and minimal occurrences of communication breakdowns.

Findings

The first meeting between a customer service representative (CSR) and a customer is face to face; the following communication is usually via e-mail. Although CSRs are in contact with customers and business clients via telephone and face to face encounters, there is a massive activity of e-mail message exchange. E-mail is the preferable communication channel to handle various organizational activities (e.g. negotiating with suppliers, orderings products, quoting, scheduling the supply and installation of products, etc.), especially because of its ability to document and maintain written proofs. We were interested in the exchanging of messages between CSRs and customers, and also with professionals such as carpenters, contractors, architects, interior designers, and suppliers. Inasmuch profitability of businesses depends on maintaining current customers and attracting new ones; customer service is an important part of every business organization. Customers are satisfied when they receive personal and prompt service. The likelihood of a business to lose customers due to bad experiences with CSR reinforces the goal of achieving good communication between them. Although important, this study is not about developing and refining effective customer service skills, but is about designing effective CMC to enhance good communication between CSRs and business clients.

We now briefly describe the difficulties of task management and communication in Artigiani.

CSR's Task Management Difficulties

CSR's in Artigiani spend much time in managing of pending tasks. They are involved in various parallel activities related to customer service and handling orders, such as management and documentary of customer files, responding to telephone calls, monitoring orders, negotiating with suppliers, quoting, scheduling the supply and installation of products and so forth. CSRs are in great pressure to respond quickly to e-mails, and the activity of managing their tasks is experienced as a stressful one, because of the high volume of incoming messages. They are constantly involved in deciding about priorities of activities, and in addition they tend to lose important items when they need them (such as previous message exchanges, and documents that they wish to attach to outgoing messages). They are required to manage ongoing activities over time and need to handle numerous schedules and reminders. The time range for an order is thirty days in average, and during this range communication regarding an order or client is not continuous. However, CSRs need to quickly associate items, events, files or messages to them. This makes the task of managing orders and treating clients and customers cognitively demanding.

For the sake of tracking and managing orders, information is filed into physical office folders. The process of collecting and filing is inconvenient, tedious, and requires the investment of time and consistency. Thus, workers tend to neglect this activity and as a result information can be lost. In addition to arranging information in physical folders, CSRs constantly arrange files in their metaphorical desktop folders on their computers and in their e-mail folders. Mentally retrieving the location of needed information is cognitively demanding on the long term memory, and constantly searching for information in e-mail folders is tedious and time consuming. It is clear that CSRs in Artigiani have problems of effectively maintaining and using various types of knowledge, thus the value of the information is lost. CSRs do not have a clear visualization of all the parties involved in a conversation, nor do they have easy access to the contents exchange in the conversation by each member. Clearly, difficulties to reach information in a timely manner affect work quality, especially the quality of customer service. Because e-mail communication is a-synchronic in its nature and not continuous, it is difficult to keep track of orders and to effectively handle them.

An e-mail system that supports easy access to contextual information items that are related to pending tasks can be of great help for managing the overwhelming high volume of incoming messages and activities.

Communication Difficulties

Observations, interviews and text analysis of e-mail messages revealed that the main activities of CSRs are handling orders facing customers and suppliers, stock checking, price quoting, and answering technical questions. We discovered that the vast majority of miscommunications occur in communication between

CSRs and customers, and that the main source of communication breakdowns is the differences between the perspectives of CSRs and customers, derived especially from the lack of technical background and jargon at the customers' side. While communication between CSRs and professional contacts such as designers and carpenters is more parsimonious, CSRs need to include a mass of contextual information in the message when communicating with customers. Often, it is necessary for CSRs to communicate with customers via telephone over cases in which communicators fail to overcome breakdowns that emerge in e-mails exchanges. In some cases, communication failures were so severe, that they damaged the ability to effectively treat an order, and the whole deal was canceled by the customer. Cases as such undoubtedly harm the organization's profitability.

Text analysis of email messages demonstrate CSRs' tendency to use egocentric and standard expressions when communicating with clients. Keeping in mind that contextualization requires cognitive effort and is time consuming; we claim that the aforementioned cognitive overload of CSRs influences their little tendency to contextualize.

3. DESIGN

In this section we present our prototype of an e-mail user interface designed for CSRs in Artigiani.

Our e-mail design reflects an attempt to follow an avenue for reinventing e-mail, which was suggested after a survey of a vast body of work accumulated over the past 3 decades in the e-mail literature. The survey retrieved three perspectives that need to be assembled simultaneously to support activities in the design of future e-mail clients: *individual*, *communicative*, and *socio-organizational* (Ducheneaut & Watts, 2005). We will refer to the three perspectives when we describe our e-mail features.

Contextualization must rely on organizational knowledge for two components: 1) Knowledge to provide additional context layers around action; 2) Knowledge to identify conditions in which to contextualize messages (Schwartz & Te'eni, 2000). Accordingly, our e-mail design roughly distinguishes between two purposes for contextualizing; supporting task management and enhancing effective communication:

- **Task management:** Contextualization for improving the user's ability to effectively manage his organizational activities and tasks.

We dealt with design issues of how to best implement the idea of tying knowledge to action; in other words, how to best organize and display knowledge so users can easily get to the right knowledge at the right time at each task. This purpose is closely tied to the Ducheneaut & Watts (2005) *individual* level reflected in the e-mail as file cabinet metaphor, in which e-mail design extends human information processing capabilities.

- **Effective communication:** Contextualization for achieving a high level of MU and minimal communication breakdowns.

We dealt with two questions regarding contextualization:

- **When?** We designed an e-mail prototype that would help users to identify the conditions in which contextualization is necessary and encourage them to do so.
- **What?** We designed an e-mail prototype that would help senders to identify what types of information is required for the receivers to understand the message. Metaphorically, senders should be able to easily build the contextual bridge above the cognitive distance between them and the receivers.

We present two screens (Figures 1-2) that show the main features that are designed to achieve effective task management and effective communication. For convenience, we separated between these two different purposes, but it is important to note that some features support both.

Task management: knowledge to provide the additional context layers around action

Figure 1 presents a screen layout from our e-mail prototype with an incoming message from a customer. The layout is divided into four panes: 1) incoming messages (inbox list); 2) message content; 3) OM related to the message; 4) thread view. When a message is selected in the inbox list (pane 1), different contextual information of that message appears in the three remaining panes.

Incoming messages (inbox list)

The incoming message pane resembles current e-mail programs. Messages are separated according to arrival dates, and basic information of each message is displayed (arrival time, sender and subject).

Three icons may appear next to messages: an icon of a message thread for messages that belong to a message thread, the familiar attachment icon, and flag icons that express urgency. The latter meets the need for effectively managing pending tasks and task prioritizing. The system parses the text of incoming messages and flags selected messages as most urgent, when identifying urgent expressions and punctuation marks (e.g. "critical", "urgent", "ASAP", "quickly", etc.) or when identifying content that is considered high priority (e.g. activities such as orders). Flags and priorities are considered as a design component of the *communicative* level in the Ducheneaut & Watts (2005) framework.

Organizational memory (OM) for tying context layers to action

Our prototype borrowed the main feature of kMail, which is the creation of OM views. The idea of tying OM to e-mail messages resembles the "contextual data" design component, related to the *socio-organizational* level in the Ducheneaut & Watts (2005) framework. We elaborated Schwartz and Te'eni's (2000) idea of associating OM views to outgoing messages, by proposing OM views also for incoming messages. For example, in Figure1, an incoming message from a customer was parsed, and the words "item number 126" were associated with a memory item of a figure of a door handle, and therefore were hyperlinked to an OM view. Implementing the idea of tying knowledge to action, this addition helps CSRs manage the numerous pending tasks which arrive with incoming messages. Though we differentiated between effective task management and effective communication, OM supports both. In addition to helping CSRs to better handle their tasks, the probability for MU is raised by the fact that incoming messages are associated by hyperlinks to the relevant information needed for the CSR to understand their meaning.

Message threads

Thread visualizations are associated with the *communicative* level in the Ducheneaut & Watts (2005) framework. Following previous work, we designed graphical representation of message threads to highlight all parties involved in a conversation, and to have an easy access to the contents exchange in the conversation by each member. We used different colors for different professional groups (CSRs, carpenters, contractors, architects, interior designers, suppliers and customers). To produce a useful tracking of conversations, our threads are located on a timetable, following the work of Rohall et al. (2001). In figure 1, at the 4th pane, for each message on a thread we inserted a button to access the sender's profile for more details. This encourages the user to take the contact's perspective before replying or making relevant decisions. In designing message threading, we adopted from a list of key qualities characteristics that are most relevant and useful for effectively managing CMC and organizational activities at Artigiani: chronology, relationships, compactness and attribute highlighting (Kerr, 2003).

The preliminary phase of text analysis of a message's helped us expose important attributes that are extremely useful for quickly finding particular messages or assessing the state of a thread. Users can effectively locate all messages that were sent by a particular person; sent on a particular time range (day, week, month); or ascribe to a certain milestone (distinguished stages such as orderings, production and supply). Organizing information by categorization of the main milestones of customer care in Artigiani is an important feature for lowering the cognitive complexity sensed by CSRs. We used colours to group and distinguish between certain messages, contacts, and milestones, for a quick and simple identification. Using identical colors to group elements helps reduce cognitive load. Highlighting attributes by coloring nodes and locating threads on a timetable spare the need to click on messages on a thread to see who communicated, when, and at what stage.

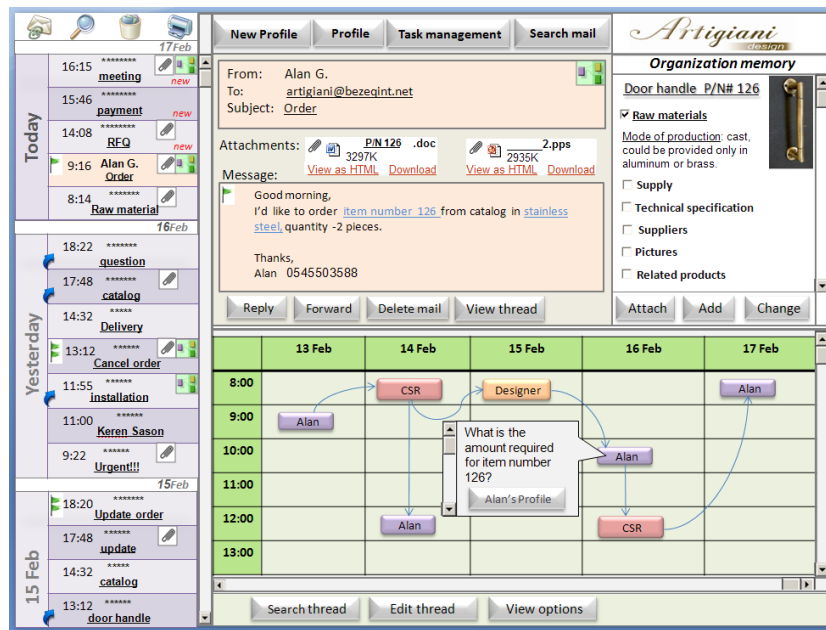


Figure 1: Contextualization with Embedded Links and Threading Visualization

Effective communication: knowledge to identify when and what to contextualize

As aforementioned, contextualization is only effective when needed and counterproductive when not needed. We are also aware of the fact that message senders are not always effective communicators and are not always aware of the difference in perspectives with their recipients. Therefore, our prototype includes two main elements that are aimed to ensure appropriate contextualization.

Organizational memory (OM) for effective communication

Whenever a CSR composes a message, the system will retrieve all the relevant information from the OM and will offer hypertext links to the OM for the CSR to confirm validate or modify before message transmission. At the recipient's side, the message will arrive with hyperlinks to relevant OM views. As kMail, there is use of knowledge about senders and receivers to match their profiles and estimate their distance. Embedded links in outgoing messages are automatically created based on the distance detected. When calculations of sender-receiver distance find similar profiles, MU can be achieved with a relatively economical message exchange, with few embedded links, if any. Embedded links to OM not only encourages contextualization when necessary, but also helps users to contextualize what is necessary.

Profile Cards

"Profiles" can offer in-depth information about each individual an e-mail user is corresponding with, to enrich the understanding of whom they are dealing with (Tyler & Tang, 2003). We implemented profiles cards to minimize the distance between communicators. An example is shown in figure 2. User's can create contextual information about contacts, and then use them as an important reference in order to dispel ambiguity around their perspectives when composing messages to them. Unlike embedded links, which are system generated and therefore formed automatically, profiles enable the user to actively seek for relevant information about contacts, and then to consciously decide on to whom to contextualize what. In addition to basic customer information, profile cards contain the customer's "categories of interest". The CSR can use this information effectively as common ground for a smooth and efficient communication, and for providing customer-centered service; for example, he may identify the preferred design style of the customer and offer him complementary products. Also, profile card contains attachments to all the files that were gathered for this contact.

Transition between views presenting different layers of context

Users can quickly transfer between different layers of context by manipulating the display characteristics. As shown in figure 2, a user can choose between a graphical or textual display of information, switch resolutions of detail from a daily to an annual view, through weekly and monthly views, and also choose to present a specific time range. A user can request to see more "drill down" presentations to access documents that belong to different milestones (for example, regarding an order, CSRs can see all documents that were saved: quotes, orders, manager approvals, manufacturing, etc.) Sorting documents by themes that are derived from critical organizational activities (milestones), is in line with the notion of "Thematic components" that connect *communicative* and *socio-organizational* levels (Ducheneaut & Bellotti, 2003; Ducheneaut & Watts, 2005) and with "Workflow systems" that are appropriate for organizational tasks that have a predictable structure (Whittaker, 2005). Users can transfer between views that display threads of e-mail conversations, specific messages and e-mail attachments. In figure 2, a CSR chose to display all messages exchanged with a customer on a thread, highlighted by the milestones they belong to.

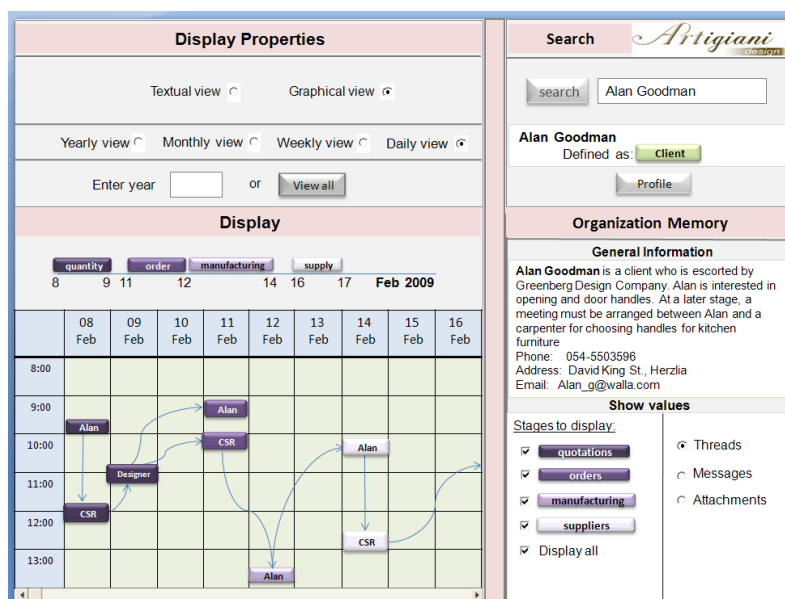


Figure 2: Contextualization of Contacts (Customers)

4. CONCLUSIONS

We focused on gaining a better sense of the various contexts relevant for communication and task management to design an effective e-mail prototype. Our first objectives were to evaluate communication processes between CSRs and their business clients, and to find the types of contextual information that help resolve breakdowns and miscommunications. Then, we examined possible ways to enhance effective CMC and finally we implemented our ideas in the design of an e-mail prototype. Since we were interested in receiving initial feedback from potential users prior to establishing a working prototype, our prototype is in an initial stage and therefore not yet a functional one. An additional limitation to our prototype derived from the first; is that we did not implement a threading algorithm (such as the algorithms existing in Netscape Mail; Fischer & Moody, 2001; Kerr, 2003) or message parsing for creating embedded links (Schwartz & Te'eni, 2000).

We presented the prototype to potential users and received very positive feedback. CSRs stated that the e-mail is most relevant for their daily work and were particularly excited about presenting conversations visually and about the embedded links to OM. They expressed their enthusiasm from the ability to do things faster and more conveniently and from the attractiveness of the design.

Our ideas are not limited only to the realm of customer service, but can be implemented to tasks and e-mail exchanges of other organizational roles and areas, such as purchasing and manufacturing. Our e-mail prototype follows an avenue for reinventing e-mail, which was derived from a vast body of work accumulated over the past 30 years in e-mail literature (Ducheneaut & Watts, 2005). Prototype features that we implemented, such as profiles, thread visualization and embedded links to OM connect components from

three levels at which e-mail operates: the individual; communicative; and socio-organizational, respectively. We believe that a multi level approach will support a variety of organizational tasks performed using e-mail.

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INTRANET AND ITS INFLUENCE ON THE ABSORPTIVE CAPACITY OF ORGANIZATIONS

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Abstract: *The role of absorptive capacity in the knowledge management process has been in focus of vast research. Absorptive capacity reflects the potential of an organization to identify, adopt and apply (exploit) knowledge for its commercial needs. However, absorption capacity depends on the related knowledge an organization already has, so it is important that an organization identifies what it knows and what absorptive capacity can be built on. Organizations are increasingly using intranet as a knowledge management tool, since it can store and distribute important knowledge to customers, processes, technologies, trainings, etc. But not all information and knowledge equally support development of absorptive capacity. In relation to this, there are three important questions that organizations need to answer. With respect to absorptive capacity management, which knowledge and information and how many of them should be stored in an intranet? Who should have access to the intranet? Who should be given the possibility to modify the content? This paper provides analysis and recommendations for organizations in defining their optimal intranet content for absorptive capacity development.*

Keywords: *absorptive capacity, intranet, knowledge management, tacit knowledge, organization.*

1. ABSORPTIVE CAPACITY

Absorptive capacity refers to individual or organization's ability to identify, assimilate and exploit knowledge. It is a dynamic phenomenon, whose characteristics influence knowledge base in the organization and should be taken as an integral part for the knowledge management strategy development. The concept of absorptive capacity was defined by Cohen and Levinthal (1989), who emphasized its influence on a firm's ability to innovate. Modern organizations are in constant need of obtaining new knowledge in order to enhance effectiveness of their activities, upgrade products, create new opportunities for competitive edge, reinforce their knowledge base and predict future market development. Knowledge is embedded in products, methods, practices, experiences, skills, ideas, etc, and it can come from internal and external sources. Internal knowledge sources primarily include scientific research, new product development, new processes, skills development, experiences and organizational structure, while external sources include external scientific research, other firms' products and processes, lead-users, inter-organizational networks and other (Argote, McEvily, Reagans, 2003). In order to be able to effectively use knowledge from any source, organization should work on continuous absorptive capacity development. Putting efforts into eliminating barriers of knowledge flow from the external environment into the organization, but also within the organization itself, should result in higher probability of identifying potentially valuable knowledge.

It is important to identify and absorb every information, which could leverage competitive position of a firm. Capacity for absorbing relevant knowledge determines potential of an organization to react on new market demands, adjust to new environment, to use information and be ahead of competitors. When it comes to the knowledge from external knowledge flows, the first prerequisite is that those flows need to be available. This means, that the firms who search for external knowledge flows will benefit more if they are located in the environments with more research & development and innovative activities. Fact is that firms cannot benefit from external knowledge flows merely by being exposed to them (Cohen and Levinthal, 1989, 1990). Instead, they have to develop the ability to recognize the value of new external knowledge, and then assimilate and utilize such knowledge for commercial ends. For succeeding in this, firms need to develop similar cognitive structures, common skills and shared languages as those in the environment (Escribano, Fosfuri, Tribo, 2008). Communication culture and knowledge sharing climate play an important role in this process. The higher level the absorptive capacity is developed, the firm would be more efficient in managing external knowledge flows and stimulating innovative outcomes. Escribano, Fosfuri and Tribo propose absorptive capacity has an impact on innovation performance only when there are external knowledge flows that can be identified, integrated and exploited.

Absorptive capacity depends on existing knowledge depth in the organization and its prior knowledge, having in mind that the learning process might rely on already established learning routine. This means that new knowledge could be more easily absorbed in case it is related to the knowledge already learned by the organization. Organizations should therefore work on establishing wide knowledge base, comprising various experiences and fields of expertise. By establishing wide knowledge base, organization would become more sensitive to outside information and knowledge, which can ultimately result in making new knowledge from the environment more attractable. This is particularly important having in mind technology changes, which are influential driver of absorptive capacity development. Rapid changes in technology force firms to develop their absorptive capacity in order to respond to shortened technological cycles. In addition, companies may be able to predict the nature of future technological advances with more accuracy. Understanding new technological trends and taking advantage of emerging opportunities enable company to estimate future market behavior and new demands, and helps in reorganizing resources for future needs. For that to happen, organization has to support dynamic knowledge flow and remove all potential obstacles that would reduce its sensitivity to external information. Development of the organizational potential for finding relevant new knowledge and its efficient utilization for commercial ends depends on the possibility of the organization to adjust to abrupt changes in the environment and to adopt new information and communication technologies which can provide benefits in this process. Delivery of such technologies provide better results when the climate is such, that it fosters knowledge exchange and minimizes distortion of knowledge during its transfer (Wellman, 2009). However, another important aspect to be considered is whether the employees are capable enough to understand the importance of a particular knowledge, where it could be primarily used and who could benefit of it the most. Skilled workforce with wider knowledge base in an environment, which stimulates continuous knowledge absorption and sharing, offers greater possibility to adopt new technologies or, perhaps, new use of certain existing technology in the organization.

Zahra and George divide absorptive capacity into potential and realized absorptive capacity (Zahra, George 2002). Potential absorptive capacity (PAC) is related to acquisition and assimilation of knowledge, while realized absorptive capacity (RAC) is related to transformation and exploitation of knowledge. Going into more depth, PAC enables a firm's receptiveness to external knowledge, while RAC reflects a firm's capacity to leverage absorbed knowledge and transform it into innovation outcome. Zahra and George also identify two channels that support PAC accumulation: interaction with external knowledge sources (licensing, R&D collaborations, etc.) and experience with knowledge search. While developing its potential for absorbing external knowledge, organization has to strive towards maximized efficiency of its realization. Efficiency in use of knowledge can be increased by managing forms of knowledge by its origin (knowledge stock/new knowledge), designing channels for knowledge deployment and developing learning processes within the organizational structure. Information technology (IT) system can help organization in managing knowledge flows and knowledge use.

2. IT KNOWLEDGE MANAGEMENT STRUCTURE

Developing channels and routines is not enough for efficient knowledge capturing and use. What also matters is the speed of the process, because of overall "race for knowledge" and subsequent commercialization. An adequate IT knowledge management structure plays an important role in maintaining appropriate speed in the knowledge transfer process. Therefore, channels, processes and routines development should be supported with IT structure which would have enough capacity for handling efficient knowledge transfer. Apart from that, another important issue is the capacity of institutionalization, meaning that effectiveness of utilization of channels and routines for knowledge transfer will be challenged if the organization does not have will or means to make such IT system a key element for knowledge sharing. This might result in knowledge spillovers, distortion of knowledge or even loss of knowledge (Wellman, 2009). IT knowledge management structure can enhance internal knowledge channels flow with adequate databases of knowledge experts (or "old pros") and also with databases of best practices. Retrieving this kind of information will support a quest for particular knowledge within organization. It is clear that IT management plays an important role in information sharing.

Intranet

Virtual place to store this kind of information and knowledge is intranet, being one of crucial elements of the organizational IT system. Intranet is an internal IT system or network, which can include various information and knowledge considered less or more relevant to the organization, which can be retrieved, modified, used or deleted. It normally provides users with the possibility to add new information or knowledge. Intranet offers

new ways to communicate data, information and knowledge (Kim, 2003, p. 66). Mphidi and Snyman emphasize existence of strong awareness of the value of the intranet as a knowledge management tool (Mphidi and Snyman, 2004). By presenting findings from Siemens' IT system ShareNet, Ciabuschi proposes that there is a positive relation between deploying an IT system for knowledge sharing and direct interaction between corporate units (Ciabuschi, 2003). If we consider its role in handling information within the organization, intranet can be regarded both as an information and strategic management tool in the context of knowledge management. Great portion of information, such as news, statistics, business plans, research reports, forms and personal stories can be stored and distributed in a short time to a large number of people (Mansel-Lewis, 1997). Knowledge management has revolutionized intranet as a knowledge base, giving it the goal of providing knowledge, not just information or data, which means that it had a task of communicating both explicit and tacit resources to the user. However, not all information and especially knowledge can be stored and retrieved in its original way. Relevance of content alteration in such actions has been subject to debates (see Yahklef, 2002, p. 3, and Wellman, 2009, p. 106). The more the knowledge is tacit, the greater is the likelihood that it may be distorted in the storage and retrieval process. Polanyi argues that the rational effort to make tacit knowledge explicit in IT networks is challenged by the notion that tacit knowledge held in people's heads is hard to formalize completely (see Polanyi, 1967). Wellman adds that huge human effort is needed in order to transfer tacit knowledge in an effective way (e.g. by communities of practice, teamwork, process experts (Wellman, 2009). However, if an organization puts effort in finding the best solution for recording particular knowledge in a way that it can be easily retrieved, understood and applied, distortion tendency can be minimized. In respect to tacit knowledge, organizations tend to minimize the distortion of knowledge by codification or conceptualization. Wellman used a case study to present this process. In order to preserve tacit characteristics of knowledge in its storage and retrieval process, company stored its knowledge on a variety of multimedia applications which were made available to all of its engineers. High-level process maps were used for systems overview, while video clips were used to present particular process steps.

Storing knowledge in the intranet

Some of the important questions to be posed when considering intranet content are:

- *What knowledge should be stored?*
- *Whose knowledge should be kept?*
- *How can we avoid losing critical context of knowledge kept?*
- *Is there enough objectivity?*
- *Is the knowledge stored for the best retrieval?*
- *Did we identify who should retrieve it?*

Knowledge can sometimes provide more fuss than create order. Organization has to have in mind that its structure includes different influences and various individual perspectives, which can facilitate knowledge transfer process in such a way, that it would make some job more difficult, thus reflecting the effectiveness of entire organization. Also, Edenius and Borgerson compare uncontrolled loading and structuring of information on an intranet with a chaotic situation in a room where one can get all information at the same time (see Edenius, Borgerson, 2003). This situation would also make it very difficult to find important stuff on the intranet in a reasonable time. Particular knowledge is not always being recorded accurately and the critical context may be lost, due to different interpretations, simplification attempts or inadequate intranet capacity. This may result in awkward transfer with bad consequences. Also, organizations need to consider the time factor. This means that what was once absorbed and put on an intranet may be modified after some time, because of a tendency of an organization to modify its beliefs, where organizational memory tends to be aligned with them (Wellman, 2009). At the end, it is important that the application of knowledge is accurate and appropriate. Organization should consider the abovementioned aspects when making somebody responsible for administrating and putting content on the intranet.

Utilization of the intranet as a knowledge base

It is very important to establish such organizational culture which encourages employees to use intranet as a knowledge base. This is where organizational leaders play an important role. It is the leaders who should send the signal throughout organization that the retrieval of information and knowledge from the intranet, as well as "refinement" of intranet with the new content, provide employees with better insight into knowledge and information relevance, ease their work, increase their chances of being innovative and thus receive compensation for it, but also upgrade capability of organization to cope with new challenges in the environment. In this way, use of intranet could be institutionalized in an organization. When having

institutionalized learning in focus, Vera and Crossan divide leaders into transformational and transactional (Vera and Crossan, 2004). Transactional leaders reinforce institutionalized learning having their focus on control, routines, standardization and efficiency, while transformational leaders tend to challenge institutionalized learning being inspirational and stimulating. If we have use of intranet in focus, it is advisable to strike a balance between these characteristics, so that employees are inspired and stimulated to adopt and apply knowledge available in an environment where the use of intranet is standardized in order to maximize efficiency of institutionalization.

Although some factors, such as ignorance, can be tackled by institutionalizing appropriate culture, use of intranet as a knowledge providing tool may be hampered with the work overload faced by employees. Too much daily work may move employees away from using intranet during their work activities. In such situation where this can not be avoided, organizations tend to additionally motivate people to devote themselves to upgrade intranet with their knowledge and expertise by facilitating specific performance-based reward systems. In relation to this, Kim and Lee propose that the level of performance-based reward system is positively associated with employee knowledge acquisition and application capability (Kim and Lee, 2010). Several researchers (Argote and Epple, 1990; O'Dell and Grayson, 1998; Yahya and Goh, 2002) have noted the utility of incentive systems for motivating employees to generate new knowledge, to share existing one, and to help employees in other divisions or departments. General notion is that performance-based reward systems should increase involvement of all employees in knowledge base utilization. At the end, utilization of intranet should be reviewed periodically. For this purpose, organization should delegate a person which would be responsible for monitoring of intranet and reporting trends to the management.

3. TOWARDS OPTIMAL INTRANET CONTENT FOR ABSORPTIVE CAPACITY

After defining absorptive capacity and intranet with its potential as a knowledge management mechanism, focus should now turn to the development of an intranet content which should enable development of the absorptive capacity of an organization. Absorptive capacity is affected by employees' knowledge of technology, product and other development in the organization. In relation to this, when searching on the intranet, it is advisable that employees are able to retrieve reports which are related to organization's research and innovation strength. For this purpose, intranet may include idea bases, data on intellectual property rights of the organization, research reports and other. But organizational sections should also be aware of characteristics of the environment of the organization. In relation to this, intranet may include relevant information on suppliers, research institutions, competitors, customers and other important external parties which the organization may find important. Within this content, contracts, cooperation agreements and research and development projects which the organization has with the abovementioned external parties should also be recorded. Considering creation of legal and administrative framework for establishment of absorptive capacity mechanism, intranet should also include information on relevant legislation, internal processes, templates and similar.

Another important aspect for knowledge dissemination in the organization is that employees should be able to learn about changes, trends and other news with as less time delay as possible. Meera emphasized that important modes of knowledge dissemination include website, annual reports, newsletters, educational and informational events and similar (Meera, 2009). Intranet should also enable interactive discussion tools, such as forums, chat rooms and establishment of discussion groups (e.g. for particular communities of practice). Some authors suggest that these are commonly employed tools for tacit knowledge dissemination (Ganesh, 2009 and Senapathi, 2011). Forums may include both internal discussion platform accessible for organization's employees only and a platform for discussion with external parties (e.g. suppliers or research institutes). Chat groups are usually formed by listing chat rooms by name, location, number of people, topic of discussion, and so on (Senapathi, 2011).

If we recall that tacit knowledge makes most of the organizational knowledge, important issue is how this can be stored on an intranet. Wellman notes that besides textual content, information and knowledge on an intranet may also be formalized in video simulation, audio clips and other. It does not necessarily avoid the distortion of critical context in the transfer or codification process, but the distortion should be minimized. The issue of codification of tacit knowledge can also be tackled with online training modules available on the intranet. Video presentations of particular activity on the job that can be reviewed multiple times increases possibility of knowledge reuse in the original and proper form. Wellman also emphasized the importance of „old pros“, or experienced knowledge experts, whose skills and experience may form the critical knowledge base, which an organization should not allow to lose. Organizations should motivate these „old pros“ in order

to make them spread their knowledge to their colleagues in a most possible way that this knowledge keeps the original form. Therefore, it is suggested here that training modules should include textual, video and audio supported forms of training given by experienced knowledge experts.

It is up to organization to decide which groups of employees should have access to its intranet. It may decide to keep particular sections of intranet (or its entirety) restricted only to certain employees, in order to keep them strictly confidential. Another question to be considered is who should be given a possibility to modify the content on the intranet. Many modifications of the content may make a mess and confusion on what is relevant. Curry and Stancich point that relevance of information in the intranet should be „right“ (Curry and Stancich, 2000). Based on this, it is argued that the abovementioned content should provide a wide framework and guideline to organizations, but final content should be developed based on many factors which influence each particular organization – nature of knowledge which exists in the environment, organizational competitiveness factors, skills and knowledge of human resources and other. Following table includes proposed content and forms of information and knowledge on the intranet, which support development of absorptive capacity in an organization.

Table 1: Proposed content of an intranet with forms of information or knowledge, which supports absorptive capacity of an organization:

Element of the content	Form of information or knowledge
- information on products and technologies of the organization	text
- information on management of the organization	text
- reports on market analysis	text
- reports on past and current research of the organization	text
- data on customers of the organization	text
- data on competition	text
- data on suppliers of the organization	text
- information on business support institutions with which the organization cooperates	text
- information on academic and research institutes with which the organization cooperates	text
- history of relations with external parties	text
- best practice cases	text, video, audio
- information on how to avoid pitfalls	text, video, audio
- procedures, standards, regulations, business methods and other documents in relation to internal processes in the organization	text, video
- information on intellectual property rights of the organization	text
- organization's newsletters and other education and information publications	text
- idea base	text
- internal discussion platform (forums, chat rooms, blogs)	text, video, audio
- platform for discussion with external parties (e.g. suppliers)	text, video, audio
- on-line training modules	text, video, audio
- templates of organization's document forms	text
- news	text

As previously discussed, at knowledge which is often more tacit, than explicit, forms other than text support preservation of the knowledge context in retrieval process. It should be, however, noted that video or audio forms are not required for the content whose nature is rather explicit, such as templates or reports. Assessment of knowledge nature should be carried out prior to reaching decision on what form should it include in an intranet.

When it comes to the utilization of intranet for learning, Wellman suggests that the utilization metrics may include number of times information is entered into the system, the overall increase in volume of information available, the number of queries made seeking information, the percentage of the population entering or seeking information, the frequency of inquiries and other (Wellman, 2009). Here it is suggested that this can be used for the purpose of intranet as a knowledge management and knowledge absorption tool.

4. CONCLUSION

Absorptive capacity greatly depends on prior related knowledge that organization possess. However, appropriate communication climate and network are needed for the efforts for institutionalization of knowledge flows to be fruitful. For establishing knowledge flow in an organization, it is essential to develop an intranet system which supports establishment of channels and routines for knowledge sharing. Utilization of intranet as knowledge base system is another aspect to be considered. Organization can employ a mechanism for measuring activities in this regard. Such mechanism would take into account various metrics based on the use of intranet by employees, which has been discussed above. It is also advisable for organizational leaders to streamline appropriate discipline if the organization wants to make an intranet success. When it comes to knowledge absorption, communication climate in organization matters. Establishment of "knowledge channels" is efficient in organizations where climate is open and supportive with performance-based rewards.

Purpose of intranet as a mechanism which supports absorption of new knowledge is to store what the organization has learnt and to provide tools so that new knowledge can be used where it is useful. However, form of knowledge is of great importance, especially when it comes to the nature of knowledge - is it tacit or explicit. Therefore, an organization should carefully plan and implement forms of information and knowledge on an intranet, so that it could be retrieved, understood and shared with as less distortion and loss of context as possible.

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KNOWLEDGE-BASED ECONOMY DEVELOPMENT AND COMPETITIVENESS OF EUROPEAN COUNTRIES

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Summary: *Knowledge-based economy creates a new frame for competitiveness of economy, where only innovative companies that invest in human capital can survive. The strategy Europe 2020 is designed in order to enable development of knowledge-based economy in all EU members and increase their competitiveness on global level. Countries of Southeastern Europe are at various stages of accession to the EU. The goal of the work is to show how far the countries of Southeastern Europe have reached in the development of knowledge society by comparison, both with leading countries of the EU and at global level. Comparative analysis is conducted on the basis of the methodology of the World Bank (KAM 2012), Global Index of Competitiveness and Global Innovation Index.*

Key words: *knowledge-based economy, competitiveness, innovations, Lisbon Strategy, indexes of knowledge-based economy development*

1. INTRODUCTION

Certain trends are present in the period of globalization to which countries must adapt themselves if they want to survive and keep competitiveness. Competitiveness of the European economies is improved by implementation of various economic measures. Market globalization and information-communication technologies significantly influenced creation of many possibilities, but also challenges and risks. Information-communication technologies and knowledge have become an important factor of economic changes and comprising part of social and economic structure and development of every country. Economic activities have been increased in sectors that intensively use knowledge and technology and in that way they increase productivity and employment. Developed countries have a goal to build knowledge-based economy. The European Union devised in 2000 so-called *Lisbon Strategy* and in 2010 the new strategy – *Strategy of Europe 2020*. Success in knowledge-based economy depends on ability to implement innovations. Researches [Prusak, Matson, 2006] identified the following characteristics of knowledge-based economies: physical distance is no more obstacle for economic development, development of communications, education, successful implementation of projects, and openness of national economy.

By implementation of Lisbon Strategy provisions and construction of knowledge-based economy and information society, the European economy has increased employment and economic growth. However, economic crisis has influenced a delay in accomplishing and achieving better economic performances in the world economy. Nevertheless, the EU has brought a new plan for overcoming the economic crisis and further implementation of knowledge-based economy construction that will influence accomplishment of higher level of the European economy development.

2. LISBON STRATEGY

Consequences of economic crisis are relatively high rate of unemployment, decrease of economic growth and increase of public debt. However, the EU has managed to stabilize the financial system and to adopt a recovery plan by increasing aggregate demand and regaining confidence in this system. This has been achieved by fiscal and monetary stimulative politics, i.e. by public investing in infrastructure, innovations, new skills and knowledge of labor and energy efficiency. Economic conditions have been improving gradually, but the recovery is rather slow. Rapid and frequent changes are present in the world economy; therefore, the European economy should primarily conquer globalization, limited resources and climate changes. The EU can accomplish the adaptation to changes and further progress only if all the members act collectively, correspondingly and together. Due to that, the European Commission set a *new strategy* in March 2010 – *Strategy of Europe 2020*, which has the target to take out the European economy from economic crisis and

prepare the EU for decades that follow. Besides, it is also the continuation of the Lisbon Strategy. According to this strategy, the EU should get out from the crisis and accomplish a smart, sustainable and inclusive growth and economy that would increase the level of employment, productivity and social cohesion. In order to achieve this, strong and successful state governance is necessary. The strategy Europe 2020 has set the three priorities: 1) *smart growth*, i.e. development of economy based on knowledge and innovations; within the smart growth there are three initiatives: *Innovation Union* (creating conditions for financing researches and innovations), *Youth on the move* (improving performances of education system and increasing the international reputation of the European higher education), *a digital agenda for Europe* (high-speed Internet and benefits of digital unique market for households and companies); 2) *sustainable growth*, i.e. promoting more efficient resources, more “green” and more competitive economy; this growth is based on the two initiatives: *efficient resources of Europe* (it refers to the climate, energy and mobility, promotion of renewable resources and energy efficiency) and *industry of politics for the period of globalization* (competitiveness and improving business climate, especially for small and middle-size companies); 3) *inclusive growth*, full employment in the economy that influences social and territorial cohesion. There are two initiatives for accomplishing this type of growth: *an agenda for new skills and jobs* (modernization of labor market for labor mobility and development of skills) and the *European platform against poverty* (social and territorial cohesion). [EBRD, 2009]

The new European strategy 2020 sets introduction of the new scheme of so-called monitoring of states and connecting programs of fiscal stabilization, with greater investments in science and education. The basic targets of the EU for the year 2020 are ambitious but achievable. The suggestion of the European Commission is that there should be five targets, which will be also the basic national aims, which are: employment, research and innovations, climate changes and energy, education and struggle against poverty. The EU has set the specific objectives and obligations, like: increasing employment rate of the population aged 20 - 64 from the current 69% to 75% and increasing investments in research and innovation from 1.9% of the EU's GDP to 3%. The target is also to decrease energy consumption by 20%. Emission of carbon dioxide and other harmful gases should be reduced by 20% regarding to 1990. Participation of energy from renewable sources should be increased by 20% of the total consumption. Great attention in the new strategy is given to education and applied science. It is predicted that population who complete higher education should make 40% instead of the current 30%. One of the targets is reduction of poverty from 80 to 60 million poor people. Because of the objectives defined by the new strategy, their authors have called it the plan for “smart, green and all-inclusive growth”. In order to achieve these targets, the reports and evaluations of the “Europe 2020” and Pact for stability and growth will be performed simultaneously for the reason of harmonizing the means and targets. [Jednak, Kragulj, 2010].

3. EUROPEAN PARTNERSHIPS FOR INNOVATIONS

Hence, the European Commission in the Strategy Europe 2020 and within the key initiative Innovation Union has announced establishing of European partnership for innovations. This partnership will test the new approach to research and innovations in the EU.

Firstly, it will be based on challenges, focusing to social benefits and rapid modernization of connected sectors and markets. This means that it will go further than technology focus existing instruments have, like Joint Technology Initiatives (JTI). Secondly, it will be active within the whole chain of research and innovation. Partnerships will gather all relevant partners at European, national and regional level in order to: (a) intensify efforts in the area of research and development, (b) coordinate investments into test and pilot projects, (c) anticipate and boost preparation of all regulations and standards, and (d) mobilize demand, especially by better coordination of public procurements and providing that all discoveries come out at the market very fast. Thirdly, it will harmonize, simplify and better coordinate existing instruments and initiatives and complement where necessary. This should make easier the cooperation of partners and provide faster accomplishing of better results comparing to the existing practice. From this point of view, it will be based on the existing instruments and activities. When meaningful (e.g. through joint programs, main markets, joint programs for public procurements of products that are not yet in the market and those that already are and analysis of regulations), it will integrate them to a unique frame of politics. Flexibility is important; there will be no single frame for everything.

Partnerships should be established only in those areas and only for those activities where intervention of state is clearly justified and where they will faster and more efficient accomplish the targets, together with activities in the area of research and development at European, national and regional level and with

measures on the side of demand. It is necessary to accomplish the following mutually interconnected conditions in order to be able to fulfill their promises:

- (1) Focus on a concrete social challenge that they are facing throughout the EU, with clear, ambitious and measurable goals whose accomplishment before 2020 will bring significant benefits for citizens and complete society and when there is a new potential for European companies.
- (2) Serious engagement of politics and interested parties: partnerships will have to mobilize key players and direct them to accomplishment of clearly defined goal until 2020, with support of significant long-term engagement. They will also provide platforms for opened innovations and engagement of citizens, including awards for researches. The Commission itself tends to play the key role in establishing partnerships.
- (3) A clear benefit for the EU: activities at the level of the EU should increase efficiency and accomplish great size effects through critical mass (e.g. simplification and rationalization, association and more efficient use of deficient public resources through e.g. harmonization of public procurement programs or research programs between member states, better quality solutions, interoperability and faster use).
- (4) Clear focusing on results, effects and influences: partnerships should be directed to results and therefore they should not be universal in domains. Solutions for social challenges should be divided into smaller "working packages", where different interested parties associated by mutual interests should define their own action plans with activities, holders and deadlines. Targets, intermediate targets and results should be defined in advance.
- (5) Suitable financial support: although one of the purposes of partnership for innovations is to provide the most efficient use of deficient financial resources by avoiding expensive doubling, there is no doubt that most of the challenges will require additional financial assets. Everyone will have to contribute. The Commission intends to increase additionally the level of financing assets within the budget of the EU. It will enable financing of the first partnerships within the existing budget period and estimation of their financial needs during the preparation of proposals for the next budget period. [European Commission, 2010]

4. WORLD BANK METHODOLOGY

International institutions, like OECD, World Bank, the United Nations and the European Union have developed their own methodologies and indicators that show how much have countries developed their economies. OECD uses so-called *Science and Technology Indicators (STI) Scoreboards*. These indicators are directed to humane and social developing indicators. The European Union based its methodology on measuring development based on systematic, strategic and planned processes. It uses so-called *European Innovation Scoreboards and Lisbon 2000 Indicators* as indicators. The United Nations base their indicators on information-communication technologies like: *ICT Index, Intellectual Property, e-Readiness*. World Bank has developed certain knowledge indexes with their basis in index of education, innovation and ICT and in economic-institutional regime. These are the two indexes: index KEI (*Knowledge Economy Index*) that is calculated by taking into account all four indexes, and index of knowledge, i.e. KI (*Knowledge Index*) that is calculated on basis of the first three indexes. [Rahimic, Kozo, 2009] Also other indicators display development of economy. These are: investments in research and development, investments in highly educated capital (researchers and doctor degree holders), capacities and quality of educational system (expenses of education and learning throughout the whole life), e-government (procurement of new equipment and modernization of public services), labor productivity, use of information-communication technologies, etc. [Cook, Leydesdorff, 2006] in this work indicators of the World Bank and the World Economic Forum will be shown. Table 1 shows knowledge indexes. These indexes are taken over from the base of the World Bank. Ranking of 158 states was performed on basis of these two indexes. Comparison of the chosen states was performed and ranking according to the indexes. Indexes of innovation, education, information-communication technologies and economic-institutional regimes are given in this table. These two indexes are calculated on basis of these indexes. The year 2000 was taken as the basis year and all the newest data are compared with it. These data are according to *KAM 2012*, in their base presented as *recent* (the newest data). There are certain differences in some indexes regarding these two years. Sweden is the best ranked state according to these indexes. This state applies knowledge in its economy.

Table 1: KEI and KI, the Index of knowledge according to the methodology of the World Bank in 2000 and 2012

Country	Rank KEI	KEI		KI		Economic Incentive and Institutional Regime		Innovation		Education		ICT	
		2012	2000	2012	2000	2012	2000	2012	2000	2012	2000	2012	2000
Sweden	1	9.43	9.65	9.38	9.73	9.58	9.42	9.74	9.72	8.92	9.67	9.49	9.79
Denmark	3	9.16	9.32	9	9.38	9.63	9.15	9.49	9.52	8.63	8.99	8.88	9.63
Germany	8	8.9	8.84	8.89	9.35	9.1	9.02	9.11	9.09	8.2	8.25	9.17	8.99
Switzerland	10	8.87	9.28	8.83	8.78	9.54	9.7	9.86	9.9	6.9	7.56	9.2	9.95
United States	12	8.77	9.28	8.65	9.14	8.41	9.07	9.46	9.55	8.7	9.04	8.51	9.47
France	24	8.21	8.53	8.36	8.55	7.76	8.49	8.66	8.75	8.26	8.54	8.16	8.35
Croatia	39	7.29	6.59	7.27	6.97	7.35	5.46	7.66	7.62	6.15	5.94	8	7.34
Romania	44	6.82	5.66	6.63	5.73	7.39	5.46	6.14	5.24	7.55	6.37	6.19	5.56
Bulgaria	45	6.8	5.89	6.61	n/a	7.35	4.25	6.94	5.76	6.25	7.31	6.66	6.24
Serbia	49	6.02	n/a	6.61	6.44	4.23	1.17	6.47	4.69	5.98	6.86	7.39	n/a
Macedonia, FYR	57	5.65	4.76	5.63	5.15	5.73	3.62	4.99	4.35	5.15	5.54	6.74	5.55
Bosnia and Herzegovina	70	5.12	n/a	4.97	n/a	5.55	3.79	4.38	3.29	5.77	n/a	4.77	5.16
Albania	82	4.53	3.52	4.48	3.87	4.69	2.47	3.37	2.98	4.81	5.54	5.26	3.11

Source: info.worldbank.org/etools/kam2/KAM_page8.asp

Comparing these two years, certain indexes are little increased, while some states even have a drop regarding the previous period (Switzerland, USA, Germany and France). States of the Southeastern Europe increased their knowledge indexes. The worst ranked state is Albania, while the best-ranked state is Croatia that is in the 39th place out of 158. States of the Southeastern Europe should continue with different reforms. The question is if they can accomplish simultaneous improving of traditional factors (capital, labor and technology) and knowledge. Some of the states have that possibility. The decision will depend on the government policy of these states.

5. GLOBAL INDEX OF COMPETITIVENESS

The World Economic Forum has been studying competitiveness for almost three decades. *The Global Competitiveness Report* represents an annual report that every year (since 1979) investigates great number of factors that enable states to achieve and sustain a stable economic growth and long-term prosperity. Business leaders use these reports for years as indicators of identification of obstacles for improving competitiveness, with a goal to stimulate discussion on strategies that would help in overcoming these obstacles. [World Economic Forum, 2012]

By permanent analysis of methodology for evaluation of competitiveness, new factors were incorporated in time and the methodology has evolved in this way. *The World Economic Forum* in 2004 introduced the *Global Competitiveness Index* (GCI), a universal index for measuring competitiveness at national level, which takes into account both microeconomic and macroeconomic aspects of national competitiveness. Competitiveness is defined for the needs of this index as *set of institutions, guidelines and factors that determine the level of productivity of a country*. The level of productivity, in turn, represents a sustainable level of progress that the economy of the given country can provide. In other words, countries with more competitive economies have a tendency to provide higher income levels to their citizens. Level of productivity determines ability and efficiency of returning assets invested in the economy. Since the ability and efficiency of returning invested assets represent one of the fundamental indicators of the economic prosperity level, more competitive economies form the economies that will probably develop faster, in short-term or long-term view. The concept of competitiveness includes also static and dynamic components: although the productivity of a country is clearly determined by its ability to sustain a high level of income, efficiency of returning invested assets is also one of the central indicators and represents one of the key factors that explain potential economic growth. GCI uses all characteristics to give a well-balanced average of many different components, where each represents an aspect of complex reality that is called competitiveness. All these components are grouped into 12 pillars that are called *the 12 Pillars of Competitiveness*. These pillars are grouped in sub-indexes: "Basic requirements", "Efficiency enhancers", "Innovation and sophistication factors", which are organized as follows:

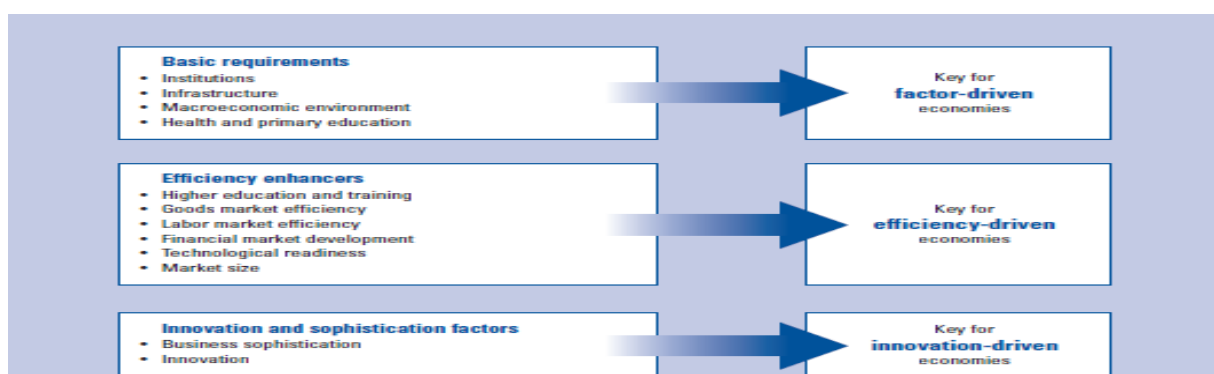


Figure 3: The 12 pillars of competitiveness, Source <http://reports.weforum.org/global-competitiveness-2011-2012>

Influence of each pillar on competitiveness differs from one country to another, depending on the stage of economic development. Three stages of economic development are distinguished: “Factors-driven stage”, “Efficiency-driven stage” and “Innovation-driven stage”. These stages are taken into account when calculating indexes, giving different weights to pillars. According to the Report of the World Economic Forum for 2011/2012, regarding the GCI Serbia is in the 95th place out of 142 countries for which comparison was performed. Among the countries of the region, Bosnia and Herzegovina is the only country that is worse placed in the 100th place. If we refer to the Innovation sub-index, Serbia is in the 118th place and B&H in the 108th place. Other countries of the region: Bulgaria, Croatia, Romania and Macedonia take the 74th – 78th place regarding the Competitiveness index. The best-placed economy regarding this index is the economy of Montenegro. In addition, all countries are much worse placed if the factors influencing innovations and business sophistication are considered. The leading economy regarding the competitiveness is the economy of Switzerland, which is also the leader in innovation. Scandinavian countries follow, then Germany, USA and Japan.

On basis of the factors that influence productivity of economy and GDP achieved in that country, the countries are allocated according to the stage of development (Table 2). Except for Croatia, all the countries of the region are in the phase 2 – the Efficiency-driven stage. Croatia is in the transitional phase to the innovation-driven economy.

Table 2: Sub-Index weights and income thresholds for stages of development

	STAGES OF DEVELOPMENT				
	Stage 1: Factor-driven	Transition from stage 1 to stage 2	Stage 2: Efficiency-driven	Transition from stage 2 to stage 3	Stage 3: Innovation-driven
GDP per capita (US\$) thresholds*	<2,000	2,000–2,999	3,000–8,999	9,000–17,000	>17,000
Weight for basic requirements subindex	60%	40–60%	40%	20–40%	20%
Weight for efficiency enhancers subindex	35%	35–50%	50%	50%	50%
Weight for innovation and sophistication factors subindex	5%	5–10%	10%	10–30%	30%

Source <http://reports.weforum.org/global-competitiveness-2011-2012>

6. GLOBAL INNOVATION INDEX

Global Innovation Index ranks countries according to the parameters like “Institutions and their business policy”, “Humane capital”, “Infrastructure”, “Technological sophistication”, “Business markets”, etc. The index has been recorded since 2007 and ranks 130 countries according to more than 90 indicators considering different aspects of innovation. GII is based on the following basic principles:

(1) There is a difference between input and output when measuring innovations in economy. Inputs represent factors that contribute to enhancing innovations, while outputs show results of innovations within the economy.

(2) Global Innovation Index monitors five input factors: institutions and their business policy, humane capital, general and IT infrastructure, market sophistication and business sophistication.

(3) GII shows three output factors that make the results of economy innovation: development of knowledge, competence and making wealth. [INSEAD, 2011]

Table 3: Global Innovation Index in 2011

Global Innovation Index		
Rank	Country	Score
1	Switzerland	63.82
2	Sweden	62.12
7	United States of America	56.57
12	Germany	54.89
22	France	49.25
42	Bulgaria	38.42
44	Croatia	37.98
50	Romania	36.83
55	Serbia	36.31
65	Turkey	34.11
67	Macedonia (FYR)	33.47
76	Bosnia and Herzegovina	30.84
80	Albania	30.45

Source: www.globalinnovationindex.org/gii/main/analysis/rankings.cfm

GII data for 2011 are given in the Table 3. On basis of these data, we may conclude that Switzerland and Sweden are the most innovative economies of the world. Regarding the countries of the region according to GII 2011 the most innovative is the economy of Bulgaria, whole the worst placed is the economy of Albania (80th place out of 130 countries). This index is especially suitable for comparison of inputs and outputs in innovations through its sub-indexes.

Table 4: Sub-Index of Innovation input and innovation output in 2011

Innovation Input Sub-Index			Innovation Output Sub-Index		
Rank	Country	Score	Rank	Country	Score
3	Switzerland	66.07	1	Sweden	59.4
5	Sweden	64.85	2	Switzerland	58.2
11	United States of America	62.84	4	Germany	50.74
21	Germany	59.04	5	United States of America	50.3
23	France	55.61	21	France	42.9
45	Croatia	45	38	Serbia	33.53
47	Bulgaria	44.2	43	Bulgaria	32.64
54	Bosnia and Herzegovina	42.1	47	Romania	31.86
55	Romania	41.8	48	Croatia	30.96
61	Macedonia (FYR)	40.37	53	Turkey	30.25
71	Serbia	39.09	68	Macedonia (FYR)	26.57
78	Albania	38.29	95	Albania	22.62
80	Turkey	37.96	111	Bosnia and Herzegovina	19.58

Source: www.globalinnovationindex.org/gii/main/analysis/rankings.cfm

On basis of the data from the Table 4, we can see that Switzerland and Sweden have the greatest investment in innovations and the greatest innovation output, which speaks about efficiency of innovations in these countries. Regarding the countries of the region, Croatia invest the most in innovations, although it is placed a little bit worse regarding the innovation outputs. Albania is among the last countries both regarding the investment in innovation and regarding the innovation outputs. The case of Serbia is interesting, since it takes the 71st place regarding the investment in innovation and in 38th place regarding the innovation output. Serbia has the greatest innovation output comparing with the countries of the region. This illustrates a high efficiency of innovations, but also the need for much greater investment in innovations than before.

7. CONCLUSION

Although the competitiveness appears to be the key problem, factors that define it are not completely cleared. Tim [Tim, 2007] points out that many discussions on competitiveness are based on macroeconomic, social and political circumstances that create a successful economy. It is clear that optimal monetary and fiscal policy, together with efficient social system and existence of a series of democratic institutions, contribute to accomplishment of competitive advantages of a country. Not all these conditions, although necessary, are enough. They only determine environment in which companies create value. Knowledge-

based economy creates a new frame for competitiveness of economy, where only the companies that innovate and invest in humane capital can survive.

Comparing all four indexes, we can conclude that Switzerland and Sweden are innovation leaders and that they are the most competitive knowledge-based economies. Countries of the Southeastern Europe are significantly behind regarding the development of knowledge-based economy with reference to the developed countries of the EU. Progress of these countries regarding the innovations and active implementation of knowledge is slow and significant resources must be engaged in order to get these countries closer to the most competitive world economies.

The countries of the Southeastern Europe should use their natural sources, knowledge and technologies. Technological progress may be accomplished by implementation of available and potential knowledge of developed economies, more efficient business techniques may be implemented in all areas of the economy and the society. Efficient transfer and implementation of knowledge enable increase of growth and economy development. International organizations have developed different economic models that improve economic performances. These organizations have great experience and provide different types of help, consultations and financing forms. Different economic development and growth models are based on analyses of efficient allocations of the existing resources in the given economy, with changes of social and institutional structures. The important and necessary structural changes for accomplishing growth and development are: increase of industrialization, reducing participation of agriculture in total production, changes in the structure of export, increased level of implementation of humane capital and knowledge and undertaking basic institutional changes.

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KNOWLEDGE: A BASIS FOR CREATING COMPETITIVE ADVANTAGE FOR CONTEMPORARY FIRMS AND ECONOMIES - THE CASE OF THE REPUBLIC OF MACEDONIA

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Abstract: *Competitiveness determines the productivity level of an economy, whereas the productivity level determines the sustainable prosperity level of an economy. Competitiveness rests on the essence of contemporary firms and economies' success. When a firm or economy achieves a competitive advantage, it actually possesses something which others lack, and does something that others cannot do or do not know how to do it. Therefore, the aim of this paper is to provide answers to the following two questions: 1) Why should contemporary firms and economies invest in new knowledge, i.e. in creating core competencies? and 2) What is the competitiveness level of the Macedonian firms and economy? In order to obtain the answers to these questions, we will make use of some theoretical experiences, supported by a comparative empirical analysis which, in essence, is based on the composite indicators - Knowledge Index and Global Competitiveness Index.*

Keywords: *Competitiveness of Macedonian firms and economy, knowledge, competitiveness, core competencies, Knowledge Index, Global Competitiveness Index.*

1. INTRODUCTION

Competitiveness is defined as a set of institutions, policy and factors which determine the productivity level of a country, whereas the productivity level determines the sustainable prosperity level of an economy.¹

Contemporary firms which operate in the global surroundings and which are bolstered by the latest information technological devices, most frequently, make use of knowledge as a major means of achieving a competitive advantage. The speed at which knowledge is processed, as well as the speed at which market performance strategies are developed, in compliance with the received information, determine the successfulness of firms' performance. Their success is also dependant on employees' readiness for life-long learning and training.

In a situation in which markets undergo considerable changes, technologies are rapidly upgraded and the number of competitors constantly rises, successful firms have to absorb and create new knowledge; then to disseminate it throughout the organization and to swiftly materialize it in a form of innovative products. At the same time, firms should also differentiate between two types of knowledge, i.e. specific and organizational knowledge.

The specific knowledge enables a firm to be different from its competitors. This type of knowledge generates a competitive advantage, for it is unique for each firm and it is harder to copy it from the competition.² Firms compete in this way evidently by creating distinct and unique products which are necessary for satisfying customers' fickle demands.³

The organizational knowledge is a technical type of knowledge concerning operations. It could also be in the form of organizational systems and routines. A greater competitive advantage could be created when the organizational knowledge is unique and it is adjusted to the firm's operations and it is of paramount

¹ Sala-i-Martin, X. Blanke, J. Drzeniek Hanouz, M. Geiger, T. Mia, I. and Paua, F. (2007). *The Global Competitiveness Index: Measuring the Productive Potentials of Nations*, The Global Competitiveness Report 2007-2008. Hampshire. Palgrave Macmillan, pp. 3-50.

² Black, J. A. Boal, K. B. (1994). Strategic resources: Traits, configurations and paths to sustainable competitive advantage. *Strategic Management Journal*, 15, pp. 131-148.

³ Teece, D. J. (2000). *Managing Intellectual Capital*, Oxford University Press, p. 29.

importance for one market, or several markets which are simultaneously provided with services. Davenport and Prusak in their paper "Working knowledge: How Organizations Manage What They Know"⁴, also underline that knowledge could make a sustainable competitive advantage of firms possible, exactly as a result of the fact that it is hard to copy. They explain that competitors, in the course of time, will manage to attain the same quality and price, but the firm which is rich in knowledge and qualitatively manages knowledge, could set a new level of quality and price during the same period of time.

In order to understand the specific nature of knowledge as an economic good, it is necessary to look into its features which differentiate it from the conventional goods. Thus, knowledge is: a) a hard-to-control good, i.e. it is an indispensable good, b) a non-competitive good, c) a cumulative good.

a) Knowledge could hardly be made exclusive, i.e. could hardly be individually controlled. It is a fluid and transferable good. Knowledge could be kept in secrecy, but once it is made public, it immediately gets out of control. The degree of exclusiveness of knowledge vigorously determines the manner of unveiling and allocating knowledge, and consequently, the intensity of deviation from the perfect competition. If one particular type of knowledge is completely un-exclusive, there will be no vested interest in its unveiling, so research and development in these areas must stem from another initiative (for instance, from state subsidizing). However, when knowledge is exclusive, the generators of this new knowledge could license the right to using the knowledge for a positive price (price greater than zero), and then hope they will make a profit due to their research and development efforts.

Controlling its knowledge on the part of a firm is much more difficult than controlling its capital goods, since in the case of knowledge as an economic good there are plenty of possibilities for outflow or spill-over. Certain analyses and research in this area, indicate that information on managers' decisions related to research and development become available to competitors in about 6 months on average, whereas technical details in one year's time.⁵

b) Knowledge is characterized by non-competition.⁶ The indirect implication of this fundamental feature of knowledge is that the generation and allocation of knowledge could not be controlled entirely by competitive market forces. At the same time, the marginal expense of a non-competitive good is equal (or close) to zero. Hence, the price for hiring knowledge from competitive markets is zero. But then, the creation of knowledge will not be triggered by the wish for vested economic interest. Accordingly, knowledge is either hired above its marginal cost, or its unveiling is not motivated by market forces. Therefore, a slight deviation of the competitive model is necessary.

Knowledge as a non-competitive good is being produced only once, and it has two dimensions: individual and collective. Firstly, the same knowledge can be used an unlimited number of times, free of charge (the individual dimension). Secondly, an unlimited number of users could use the same knowledge, without excluding anyone (the collective dimension). Thus, on the one hand, the same knowledge which is needed to generate m output units, will also be used to generate $m+1$ output units. On the other hand, the same knowledge used by n people, could also be used by $n+1$ person.

c) In the area of science and technology, very frequently, knowledge is cumulative and progressive. This means that knowledge externalities do not only increase customers' satisfaction, but also the accumulation of knowledge and collective progress (that is simply an opportunity for someone 'to stand on the shoulders of giants').

More precisely, knowledge as an expandable good which can be used an unlimited number of times, is not only a consumers' good, but also an intellectual input which can be used to create new products and consequently be

⁴ Davenport, T.H. & Prusak, L. (2000). Working knowledge: How Organizations Manage What They Know, Harvard Business School Press, Boston, p. 17.

⁵ Foray, D. (2006). The Economics of Knowledge, Massachusetts Institute of Technology, p. 92.

⁶ Knowledge usage by one entity does not restrict its usage by another entity.

⁷ "Thanks to the Giants" (lat. nanos gigantum humeris insidentes), is a metaphor which highlights the fact that the one who creates scientific values builds his deeds on his predecessors' achievements, as Isaac Newton did, for instance, when it comes to Johannes Kepler and his laws on planets' movement around the Sun - "If I have seen farther than others, it is because I was standing on the shoulders of giants!" This is important to be emphasised especially in the context of research and development externalities when the expressions: 'standing on shoulders' and 'stepping on toes' describe their positive and negative effects, respectively (see: Mankiw, G. (2002). Macroeconomics, fifth edition, TSI Graphics, p. 225).

used unrestrictedly.⁸ In the new knowledge-based economy, there are many types of strictly cumulative knowledge, such as databases (e.g. the international DNA database). These types of knowledge are in opposition to non-cumulative knowledge (the consumer good) such as songs, entertainment shows or the galleries of photos which are available on the Internet.

From a strategic point of view, the key to firms' corporate success is the development of a unique competitive advantage. However, the building of a competitive advantage is not a means to an end. The foundation for contemporary firms' success is based on building a sustainable competitive advantage. In the long run, a firm acquires a sustainable competitive advantage through its ability to develop a set of core competencies, which will ensure a better approach to satisfying customers/clients' needs in comparison with its competitors.

The core competencies could be defined as collective knowledge within an organization, especially with respect to how various production abilities should be coordinated and how diverse technological flows should be integrated. Namely, this is an accumulative diverse type of knowledge which contributes to achieving competitive success in operations. The core competencies make sense providing they make an access to new markets possible, they meet clients' specific needs and are hard to copy. They are the unique set of abilities which a firm develops in the key areas of its operations (such as, for instance: high quality, services intended for the customers, innovations, team building, flexibility etc.), which should assist the firm in overrunning competitors in the competitive race. These core competencies are normally important skills, abilities and experiences which the firm acquired and developed in the course of time. Customarily, firms develop core competencies in no more than five or six areas. Subsequently, these core competencies become the core of the firm's competitive advantage and usually they persist in the course of time. Markets, clients and competitors could change, but core competencies of firms remain intact in the long run. In order for them to be efficient, from a strategic point of view, firms should make sure that their competitors find it hard to copy those competencies and should ensure considerable benefits for their customers/clients.

Methodological background

In order to examine the competitive ability of the Macedonian firms and economy, from the perspective of knowledge accumulation, we make use of two composite indicators: Knowledge Index (KI)⁹ and Global Competitiveness Index (GCI)¹⁰.

As a source of KI, we use the database of The World Bank Institute (WBI), whereas the rest of the data, mostly derive from The Global Competitiveness Report of The World Economic Forum.

The competitiveness level of the Macedonian economy, is compared with economies which belong to the second and third stage of development¹¹. The group of economies in the second stage of development is made up of: the Czech Republic, Hungary, Bulgaria, Romania and the Slovak Republic, whereas the group of economies in the third stage of development consists of: Finland, Sweden, Germany and Switzerland.

The accumulated level of knowledge (measured in KI), depending on the development stage, is analyzed at two points in time - 2009/10 and 1995, whereas the level of the competitive ability of economies (measured in GCI) - in 2011/2012. GCI trend has been analyzed for the period from 2005/06 to 2011/12.

⁸ Thomas Jefferson wrote: "It is a fact that one idea leads to another, the other idea leads to a third one etc. in the course of time, until someone combines all of them together and generates something which is normally called an invention" (see: Foray, D. (2006). *The Economics of Knowledge*, p. 94).

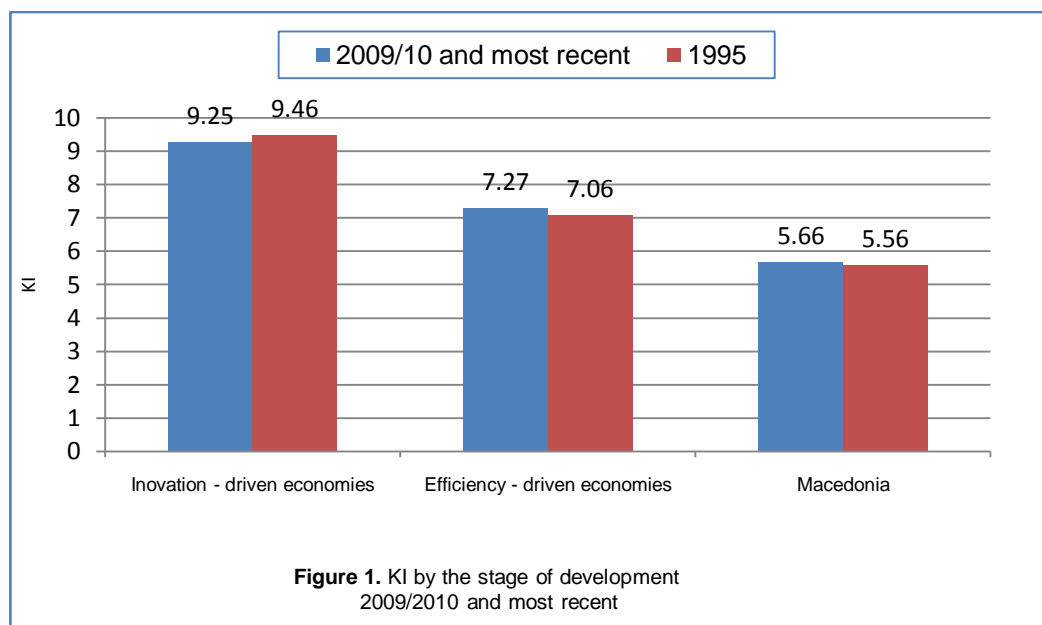
⁹ For further reference on the structure and calculation of KI see 'The World Bank Institute (WBI), Knowledge for Development'.

¹⁰ For further references on the structure, weights and calculation of the index see 'The Global Competitiveness Report 2011-2012, World Economic Forum'.

¹¹ According to The Global Competitiveness Report 2011-2012, World Economic Forum.

2. KNOWLEDGE - DETERMINANT OF COMPETITIVENESS OF MACEDONIAN FIRMS AND ECONOMY

Following the logic used in The Global Competitiveness Report of the World Economic Forum, in relation with the classification of economies according to their stage of development¹², in addition we provide a presentation of an attempt to compare the performances of the knowledge competitiveness of the Macedonian firms and economy with the performances of the knowledge competitiveness of firms and economies which belong to the second and third stage of development. To that end, the average values of KI and GCI have been used for separate groups of economies.



Source: The World Bank Institute (WBI)

As to the potential of the country to create, absorb and diffuse knowledge, measured in KI, Macedonia is considerably lagging behind compared to the average of both efficiency-driven and innovation-driven economies. In the period from 1995 to 2009/10, the Macedonian economy managed to increase its KI by 0.1 index point, whereas in the same period, the remaining economies which belong to the second and third stage of development, on average, managed to increase their KI by 0.21 and 0.19 index points, respectively (Figure 1).

Table 1. KI components by the stage of development (2009/10 and most recent and 1995)

Economies	Innovation		Education		ICT	
	2009/2010 and most recent	1995	2009/2010 and most recent	1995	2009/2010 and most recent	1995
Inovation – driven economies	9.56	9.53	8.77	9.33	9.38	9.52
Efficiency – driven economies	7.01	6.80	7.47	7.19	7.33	7.19
Macedonia	4.67	4.43	5.42	5.23	6.88	7.00

Source: The World Bank Institute (WBI)

¹² See: The Global Competitiveness Report 2011-2012, World Economic Forum.

Bearing in mind the structure of KI, Macedonia marks its greatest lagging behind in the 'innovation' variable (4.89 index points below the average of the innovation-driven economies and 2.34 index points below the average of the efficiency-based economies), which reflects a low level of development of the innovative system of the country, which results in a small number of registered patents on the part of both firms and individuals. The 'education' variable marks a growing tendency, first and foremost, owing to the increased rate of enrolment in the secondary and tertiary education, whereas, as far as the decline in the 'information technologies and communications' variable is concerned, no logical conclusion can be drawn (Table 1).

Even though Macedonia is still far off from the competitive performances of the innovation-based economies, yet during the past couple of years it exhibits a slight tendency of convergence towards the efficiency-driven economies - in the period from 2005/06 to 2011/2012, GCI grew by 0.79 index points. In the same period, the growth in the average GCI of the innovation-based economies reaches 0.02 index points, whereas the growth in the average GCI of the efficiency-driven economies reaches 0.14 index points (Figure 2).

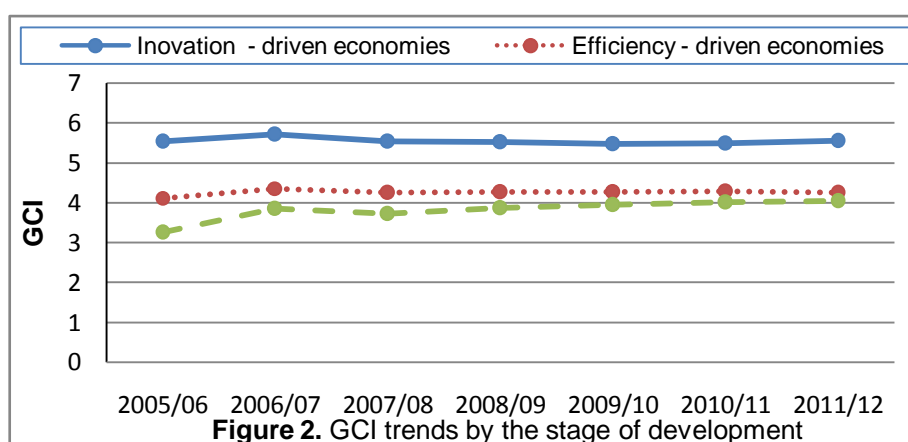
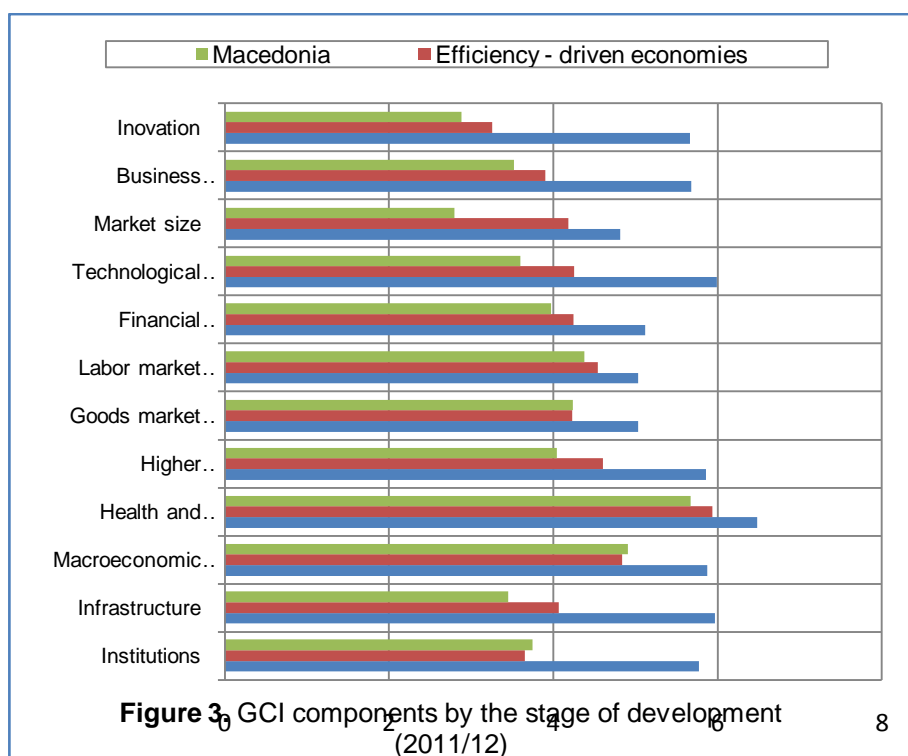


Figure 2. GCI trends by the stage of development

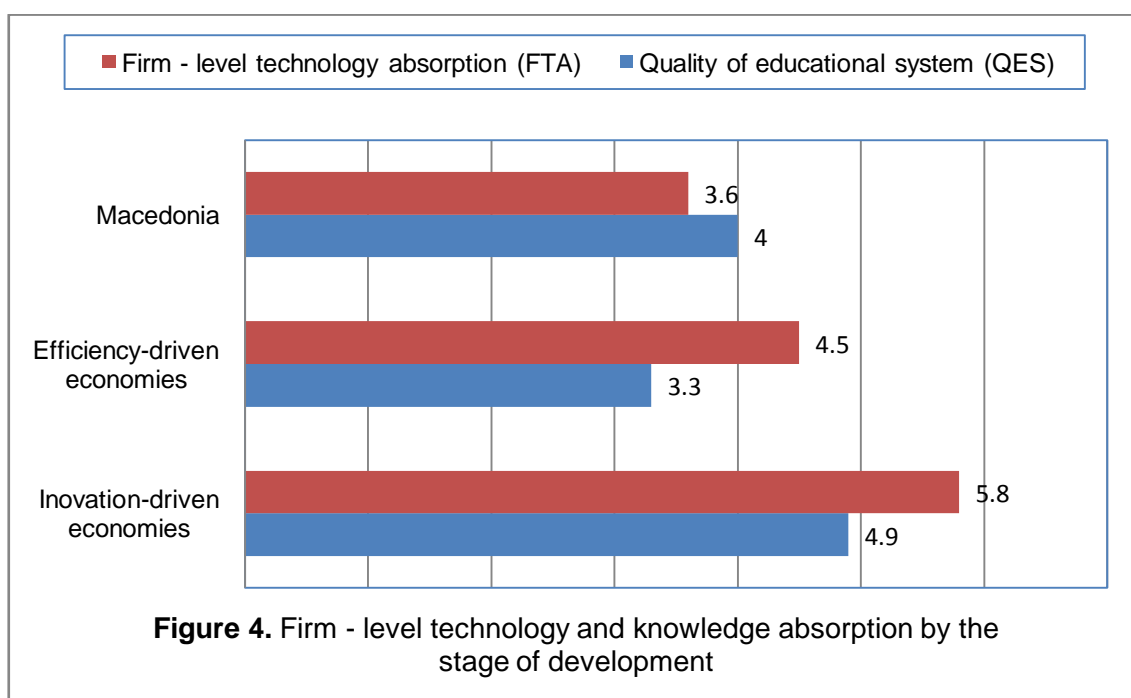
Source: The Global Competitiveness Report 2011-2012, World Economic Forum.

More precisely, as to the main determinants (pillars) of competitiveness, which stem from GCI, it could be concluded that the Macedonian economy marks certain deficiencies with respect to: infrastructure, higher education and training, technological readiness, market size, business sophistication and innovations. As far as the remaining determinants are concerned, the Macedonian economy reaches average values typical of the efficiency-driven economies (Figure 3).

Furthermore, the problem with the ability for absorption of new knowledge and technologies on the part of the Macedonian firms, seems to be one of the most serious problems when it comes to the level of the competitiveness of the Macedonian firms. Thus, the relations between the new technologies absorption capacity of the firms and new knowledge absorption ability of the employees (presented through the quality of the education system), indicates that: 1) Firms' capacity for absorption of new technologies is lower than the ability for absorption of new knowledge on the part of their employees; 2) Firms' capacity for absorption of new technologies exhibits a significant negative deviation from the average of the efficiency-based economies; 3) Employees' ability for absorption of new knowledge is greater than the average of the efficiency-driven economies; 4) Firms and employees' abilities for absorption of new technologies and knowledge is significantly lower than the average of the innovation-driven economies (Figure 4).



Source: The Global Competitiveness Report 2011-2012, World Economic Forum.



Source: The Global Competitiveness Report 2011-2012, World Economic Forum.

3. CONCLUSION

Knowledge and the remaining intellectual resources are rather unique in firms which are characterized with high level of knowledge, dynamic technology and short life cycle of products. At the same time, continually advancing and increasing knowledge is an imperative for the firms, since their competitive advantage depends on it. To what extent a firm could set 'barriers' to its competitors, depends on the knowledge

specificity and the competencies developed on the basis of that knowledge, as well as on its differentiation and deficiency.

Thanks to the competencies at its disposal, a firm achieves a competitive advantage. Each competitive advantage is connected to a competence, but not every competence ensures a competitive advantage. An organization with a high level of ability for absorption of new knowledge and technologies is required to develop products which imply superiority over competitors.

As to the competitiveness of the Macedonian economy, observed from the aspect of its potential to create, absorb and diffuse knowledge, it could be stated that for the period from 1995 to 2009/10, the economy shows unsatisfactory results in comparison with both the innovation-based and the remaining efficiency-based economies. Thus, for the period from 1995 to 2009/10, the Macedonian economy managed to increase the knowledge index (KI) by 0.1 index point, which is significantly below the average of the innovation-based economies, but also below the remaining efficiency-based economies (0.21 and 0.19 index points, respectively). At the same time, considering the structure of KI, the economy lags behind most in the 'innovation' variable, which results from the small number of registered patents by both firms and individuals. The 'education' variable shows a growing tendency, whereas, regarding the declining tendency of the 'information technologies and communications' variable, no logical explanation can be provided, especially if we take into consideration the continuous growth in the number of users of computer, the Internet and mobile telephones in the analyzed period.

GCI trend for the Macedonian economy, for the period from 2005/06 to 2011/12, indicates a slight tendency of convergence towards the efficiency-based economies, and its growth reaches 0.79 index points (which is by 0.77 index points more compared to the growth in the average GCI of the innovation-based economies, and 0.65 index points more than the growth in the average GCI of the efficiency-based economies, for the same period).

Taking into consideration the structure (pillars) of GCI, it could be stated that in comparison with the efficiency-based economies, the Macedonian economy displays deficiencies in the following determinants of competitiveness: infrastructure, high education and training, technological readiness, market size, business sophistication and innovations.

In that context, the following conclusions regarding Macedonia can be drawn: 1) The capacity for absorption of new technologies on the part of the firms is lower than the firms' capacity for absorption of new knowledge on the part of their employees; 2) Firms' capacity for absorption of new technologies exhibits a significant negative deviation from the average of the efficiency-based economies; 3) The ability for knowledge absorption on the part of the employees in the firms is greater than the average of the efficiency-based economies; 4) Firms and employees' capacity for absorption of new technologies and knowledge is significantly lower than the average of the innovation-based economies.

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CORRELATION BETWEEN MANAGEMENT KNOWLEDGE AND EXPORT PERFORMANCE IN SERBIA AS A TRANSITION ECONOMY

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Abstract: *The authors of this article have demonstrated that a firm's intangible assets in forming knowledge and management skills significantly influence the level of export performance in a transition economy such as that of Serbia, concluding that firms that invest in management knowledge development will more easily adapt to new environments and take better advantage of opportunities that new markets present than firms that primarily rely on tangible assets. The conclusions of the two conducted exporter surveys in Serbia particularly indicate the growth constraint posed by low levels of marketing knowledge and investment in marketing activities, which is in part explained by limited access to finance and in part by low awareness of the range and application of marketing tools. The underlying recommendation is for exporting firms to consider investments in management knowledge, most specifically in market research and other marketing activities, to enhance their growth opportunities.*

Key words: *Serbia, exporters, strategic positioning, knowledge, marketing*

1. INTRODUCTION

Management knowledge and skills play a significant role in improving firm-level exporting performance and export readiness. This hypothesis is here tested based on the context of Serbia as a transition economy. Serbia's market reforms ensued after the change of democratic regime in 2000, ending a period of conflicts and economic sanctions that had rendered Serbia practically an autarchy in 1990s. Therefore, export experience, specific to Serbia as export base, here relates to the period 2001-2011, marked by development of new enterprises and attraction of foreign investment principally through privatization process and business climate reforms.

Two different research studies are presented in the article. The first research study analyzes Serbian exporters needs and it is relatively wide in scope, including 106 company representatives, where 96 completed the survey in entirety. The foremost goal of this study was to determine the preconditions for future development of exports. The second research study focused on exporters' strategic positioning and included 30 select company representatives, as a follow-up to the first study.

While the first study enables us to gain a broad understanding of the needs of Serbian exporters, the subsequent research provides a deeper insight in challenges experienced by exporters in strategic positioning. Both studies pay special attention to the issue of institutional support and examine the impact of knowledge in specific areas of management, marketing and legal matters. The presentation of research results is validated against theoretical findings about the importance of the knowledge factor in firms' export performance.

2. LINKING KNOWLEDGE TO EXPORT PERFORMANCE

To provide theoretical background and facilitate better understanding of the correlation between knowledge and firm's exporting performance, the authors have undertaken a relevant literature review. The review demonstrates several important findings.

For example, Mariola Ciszewska-Mlinarič and Franjo Mlinarič (2010) point out that: „Manager's knowledge and skills constitute firm specific intangible resources and [that] managers play a crucial role in influencing firm internationalization regardless of its size. Yet in smaller and younger firms the skills and knowledge of the management team, are likely to be even more important and influential on the firm's internationalization and performance than in larger firms” (p.242). They claim that knowledge based resources and capabilities exert an influence on the internationalization process of the firm. Similarly, Autio, Sapienza and Almeida

have discovered that knowledge intensity is associated with faster international growth (Autio E, Sapienza H.J, Almeida J.G., 2000, p.909). Finally, Hadley and Wilson confirmed that knowledge relating to international trade is closely related to the firm's actual practice in internationalization (Hadley, Wilson, 2003, p. 697).

Mariola Ciszewska-Mlinarič and Franjo Mlinarič conducted research in Slovenia on the sample of 241 small and medium sized enterprises from five industries. The main goal of this particular research was to prove that knowledge is linked to the level of firm's internationalization. They analyzed the impact of the management team's internationalization knowledge, including: the management team's ability to promptly identify business opportunities, the management team's experience in international marketing planning and implementation, the management team's ability to easily modify marketing mix elements for foreign markets, the management team's ability to easily modify marketing mix elements for foreign markets the management team's level of export procedure knowledge, the management's team's ability to develop international strategy and its general experience in internationalization. The study proved the hypothesis that managerial attitude and trade knowledge are related to the level of the firm's internationalization (Mariola Ciszewska-Mlinarič, Franjo Mlinarič, 2010, p.250).

Authors Autio, Sapienza and Almeida in 2000 conducted a study whose premise was that knowledge about international markets and operations and the efficacy by which such knowledge is acquired, represents an important determinant of international sales growth for entrepreneurial firms. Knowledge and learning can be expected to have an impact on international growth in that internationalizing firms must acquire, share and apply new knowledge in order to compete and grow in markets in which they have had little or no previous experience. The adoption of new knowledge involves not merely the learning of the new body of knowledge, but unlearning of the old ways of doing business. When a firm internationalizes it must acquire completely new knowledge, including experiential knowledge of specific foreign business practices and institutional norms as well as general experiential knowledge of how to deal with foreign competition. Cohen and Levinthal explained that the greater the effort put into absorbing new knowledge the more effective later retrieval will be (Cohen, Levinthal, 1990, p.131). Firms focusing on knowledge creation and exploitation as a source of competitive advantage are more likely to develop the learning skills useful for adaption and successful growth in new environments than firms that are more dependent on tangible resources. Knowledge-intensive firms can exploit international growth opportunities more flexibly through combination of knowledge and fixed assets than can firms dependent on fixed assets alone. Thus, knowledge-intensive firms are less constrained by distance or national boundaries. The more knowledge-intensive an international firm is, the more likely it is to develop the learning capacities necessary for rapid adaptation to a foreign environment and to identify opportunities for continued or accelerated foreign expansion. A dynamic environment may render such capacities particularly salient. Autio et al tested the importance of knowledge in Finnish electronics industry on the sample of 77 firms. The respondents were presidents and vice presidents of companies. The results confirmed the hypothesis that knowledge-related factors positively impact international sales growth of high-technology firms (Autio E, Sapienza H.J, Almeida J.G., 2000, p.911, 913, 918).

Raluca Mogos Descotes and Bjorn Walliser also studied how knowledge affects a firm's performance and its readiness to respond to changes in external environment. The main goal of their research was to examine firm's absorptive capacity, defined as firm's capacity to exploit knowledge for commercial ends. The absorptive capacity may also be defined as dynamic capability that influences the firm's ability to create and deploy the knowledge necessary to build, modify or renew organizational capabilities, in line with shifting market conditions. Absorptive capacity suggests that market knowledge must be converted into action for firms to respond to their environments and learn. Firm's knowledge base guides its effective action. The impact of knowledge acquisition on small and medium size enterprises (SME) responsiveness capacity has also been empirically confirmed. Descotes and Walliser propose that SMEs' export knowledge acquisition has a positive impact on their export responsiveness capacity. The absorptive capacity theory (AC theory) suggests that after knowledge has been acquired, it must be assimilated if it is to enhance future use (Raluca Mogos Descotes, Bjorn Walliser, 2011, p.5; Cohen, Levinthal, 1990, p.128). The efficiency of firm's response to the environment is a well-established determinant of organizational success. SMEs are generally likely to be more innovative, more customer-oriented and more flexible than larger firms, which enables them to achieve quicker response time and be more responsive overall. However, responsive actions designed to address foreign market shifts require continuous adjustments of the export strategy to foreign clients' demands as well as to foreign market-related constraints. In this sense, responsiveness can be behavioral change that translates learning into action. (Raluca Mogos Descotes, Bjorn Walliser, 2011, p. 2,4,5,6). In a dynamic, ever changing and turbulent environment, knowledge-based assets and especially tacit knowledge-based assets as competences are perceived as the most significant factor affecting the

firm's performance level. Organizational competences increase organizational flexibility and reactivity through better resource allocation and the development and sharing of knowledge. Firms with superior international competences likely enjoy more success in export markets. For manufacturing SMEs, international marketing competences should have strong effects on performance. To obtain empirical confirmation for this proposition, Descotes and Walliser surveyed 107 French SMEs that operated in the steel industry. In those firms, export accounted for an average of 40.49% of total turnover. Regarding the level of export knowledge acquisition, SMEs generally were above average and their export responsiveness levels were slightly above average. Firms' export sales increased by 19.2% over the previous three years and companies registered an average increase of 17.24% of export sales profits in that period. Research showed that 40.5% firms' international performance is explained by their positional advantage in terms of international marketing competences. If firms have this positional advantage in form of foreign market-related marketing competences, it drives SMEs to be more successful in international arena. (Raluca Mogos Descotes, Bjorn Walliser, 2011, p.7, 13).

While the literature review confirmed a strong correlation between management knowledge and export performance, the authors of this article wanted to test the level of correlation in a different setting - Serbia as transition economy with just over ten years of exporting experience, following a long period of socialist economy and then a decade of conflicts and economic sanctions.

3. ANALYSIS OF SERBIAN EXPORTERS' NEEDS AND STRATEGIC POSITIONING

Analysis of Serbian exporters' needs

A survey of Serbian exporters and potential exporters was conducted in March and April 2011, primarily by using an online survey tool, SurveyMonkey. A total of 106 company representatives participated and 96 completed the survey in entirety. The survey results were checked against direct interviews with several company and cluster representatives, all of who remain unanimous to ensure impartiality. This analysis thus pertains to over 100 relevant opinions of current and future exporters and it focuses on exporters' needs and the prospective role of a new exporters' association in Serbia.¹³

Companies participating in the survey had the following features:

88.5% were already exporting; they come from a variety of sectors, with agribusiness and ICT being most represented, followed by metals, electronics and wood processing industry (Figure 1). More than 90% had an annual turnover of less than 10 million Euros, were small and medium size companies, and they were about evenly represented by micro, small and medium size companies.

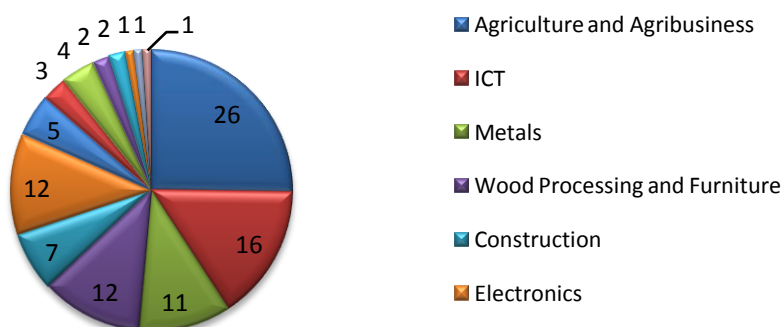


Figure 1: Type of business sector

When asked about exporting services and assistance they would like to receive, the majority of companies considered almost all the listed services to be useful and of interest, although business linkages and market research stood out with over 70% demanding these services to improve their performance.

¹³ The survey results have been analyzed in wider scope, with the aim of identifying measures to improve Serbian export results; see Ana S. Trbović, "Serbian Exporters Needs Analysis to Support Competitiveness and Export Growth," *Ekonomika preduzeća*, 2011. This article uses select survey results to investigate the impact of knowledge factor in exporting performance.

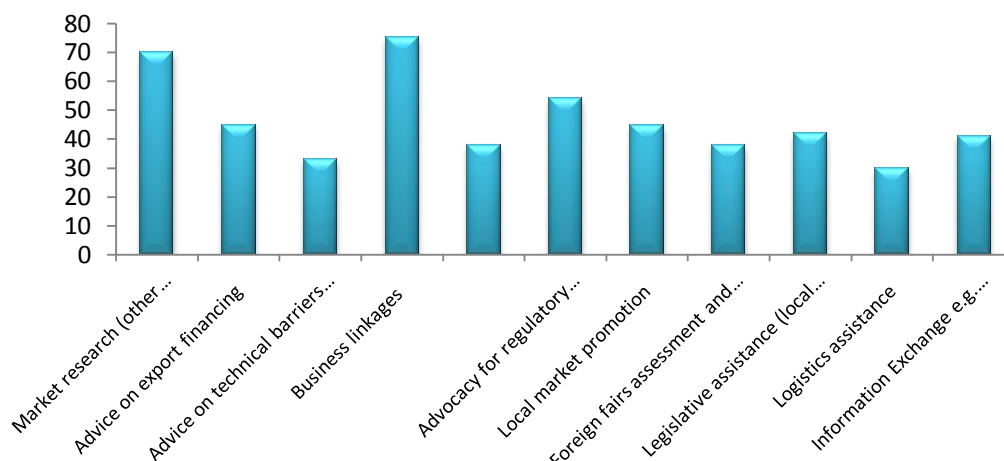


Figure 2: Exporting services demanded by exporters

Similar private sector interest is expressed with regards to training topics; the majority wants to learn about creating linkages while other topics receive less but significant interest i.e. about 30-40% would attend almost all trainings, with only 8.6% declaring no interest in trainings (Figure 3). In individual comments, companies acknowledged a need for trainings in logistics/customs procedures, product certification and marketing. This result demonstrates not only that companies are fully aware of the importance of knowledge but also that they are yearning to obtain that knowledge and improve their skills.

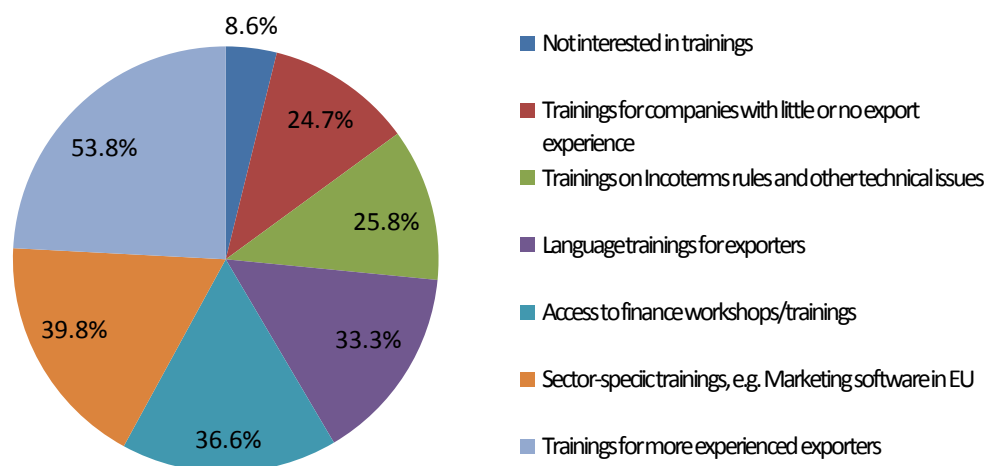


Figure 3: Exporters' interest in training topics

Just about half of the respondents outsource professional services, mainly legal, accounting and ICT followed by marketing and payroll, with several companies also noting design and logistics. This finding confirms that outsourcing represents an area where more awareness is required to enhance economic efficiency, including efficiency gain that is based on enlarging the base of knowledge required to build a more competitive exporting product. The second follow-up study additionally focused on the level of management knowledge in exporting firms.

Analysis of Serbian exporters' strategic positioning

The main goal of the secondary research was to identify the principle obstacles endured by Serbian exporters during strategic international positioning. The questionnaire was distributed to 80 exporting firms, and 30 completed this new survey. While this is a moderately sized sample, the responses correlate with the first

survey and represent a focus research study. In this study, it was crucial to obtain answers to the following questions: How do you establish contacts with potential buyers? How do you conduct market research? What was the biggest problem when you started exporting? How much money do you spend on international marketing? Do you have an export office? These questions aimed to determine the way human resources were used by exporters without directly asking that question, which would have resulted in a socially acceptable response that would not be useful in research.

The goal of first two questions was to determine firm representativeness by type of sector and number of employees.

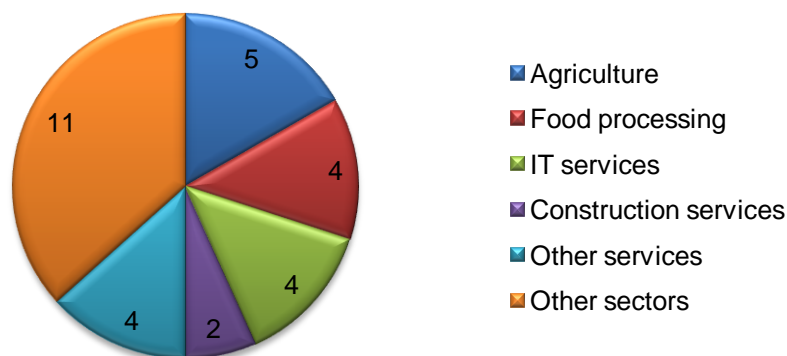


Figure 4: Type of business sector

The responses showed a diversity of exporting products and services. A total of 11 of 30 surveyed firms export products such as: tires, cables and conductors for industrial production, electric boilers, metal and plastic packaging, furniture, buses and energy equipment. Agriculture sector is represented by 5 firms from this sample, exporting frozen fruit and honey. Firms from the food processing branch produce and export juice, jam and marmalade. In the services sector, 10 firms export IT, construction and other type of services. This research question allowed us to determine which exporting products found a way to foreign markets and customers. Additional qualitative analysis showed firms with finished products to be more successful in entering and expanding in foreign markets. Firms with more primary agriculture products are successful at the moment, but if they do not develop more diversified products, their success may not be maintained.

In this particular sample, the small firms are dominant with 47% sample share, followed by medium sized firms with 23%, and jointly 70% of total number of surveyed firms. Statistical analysis of Serbian exports confirms dominance of small and medium size companies, but this prevalence is less significant when analyzing the volume of exports where several large companies still have an important lead in some sectors.

Data collected in the two presented research studies data show that small and medium sized firms have potential for improved export strategic positioning and export growth. These firms require additional support in the following priority areas: access to finance, export insurance, market research, and business linkages.

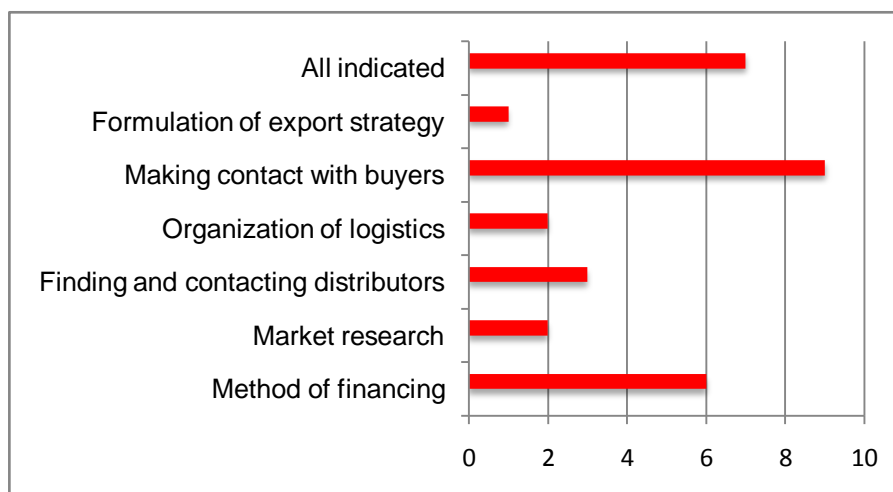


Figure5: Obstacles to starting exporting business

As illustrated by figure 5, exporters consider that establishing contacts with buyers and access to finance present greatest challenges when starting an exporting business. Establishing contacts with buyers is complicated because exporters do not know where to find potential buyers. Notably, the first research study also clearly identifies business linkages as an area where exporters demand most support.

It is not certain whether exporters are fully aware of the significance of marketing in foreign markets, including more effective fair participation and brand creation, in forming relationships with potential buyers. Only investments in these activities can render a firm and its product or service more visible in the international arena and ensure new contacts with buyers. However, 23% surveyed Serbian firms reported financing constraints, which, together with other featured problems regarding logistics or difficulty in conducting market research, implies limited funding availability for marketing and related education despite obvious need. From this we can conclude that starting an export business is a multifaceted, exigent activity.

Questions: "Who conducted the market research?" and "How much money does your firm spend on international marketing?" were crucial for our analysis. Responses led us to conclude that Serbian exporters need more training and expert advice in area of market research and more awareness as to how targeted marketing activities can have positive impact on firm's export results.

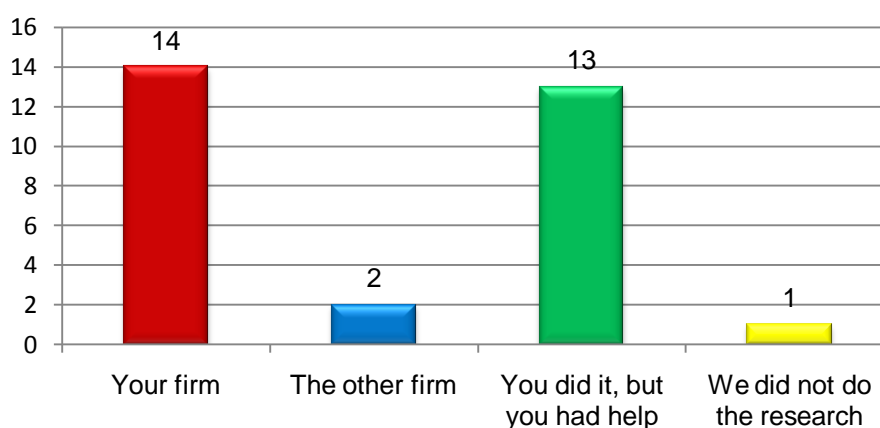


Figure 6: Responses to "Who conducted the market research?"

Our research revealed that firms in most cases conducted market research on their own (14 firms), 13 firms engaged additional marketing experts, 2 firms hired a marketing firm to perform market research and 1 firm did not perform any market research. Internet and various databases and sector publications are generally a good first source of information about foreign markets. Exporters can also obtain valuable information through personal contacts. Figure 6 shows that 13 firms decided to hire an expert for market research to

ensure quality of information. Firms that are positioning themselves for exports should be made better aware of importance and value of market research. It is important for firms to be well informed about perspectives on foreign markets, entry options, market trends, competition, potential customers and distributors. Firms that already export should continue to research potential markets and thereby identify new export opportunities. Market information allows exporting firms to better organize their activities on international markets. Again, although the samples were different in two conducted researches, in both of the studies exporters indicate market research as the sphere where they need help and more knowledge.

Another important issue in exporting lies in the complex relationship between exporters and intermediaries. Our research showed that exporters considered making contacts with potential intermediaries and concluding an agreement on doing business to be the biggest hurdles in exporting, once an export product is developed. From figure 7 we also see that firms consider definition of payment method as another source of potential problems.

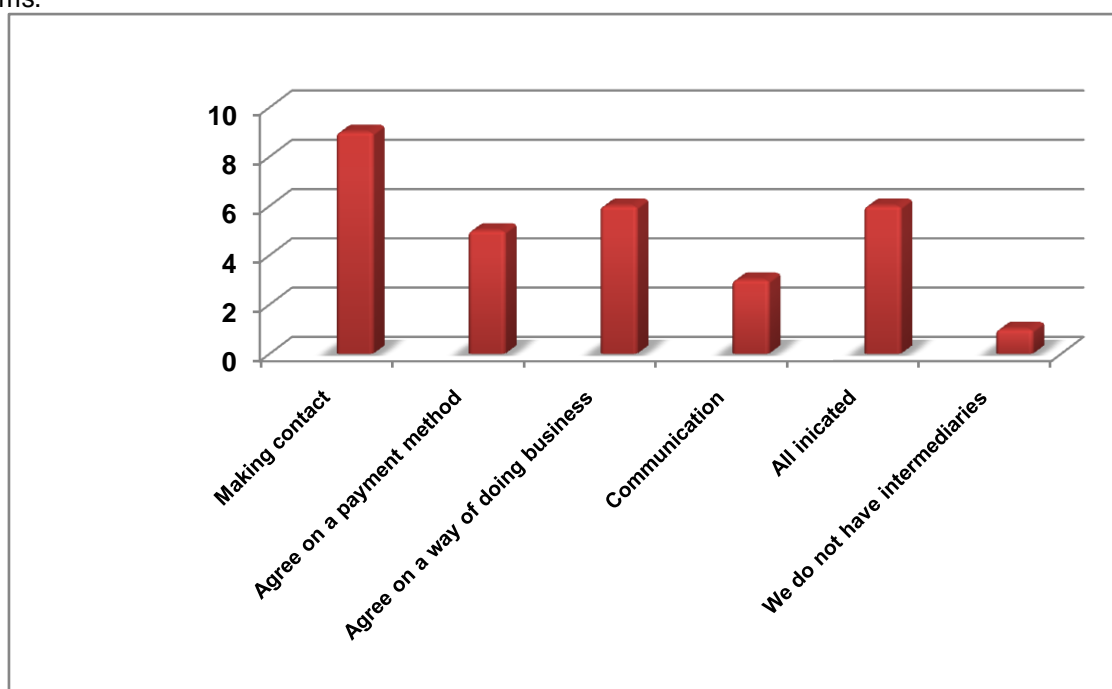


Figure 7: Problems in relations with intermediaries

Exporters need support and assistance in making contacts with potential intermediaries. Firstly, however, they need to be aware of the business linkages process, types of intermediaries, and how various foreign markets distribute imported products in a certain market and product segment. This requires specialized management knowledge that is partially acquired in academic studies and honed in practice.

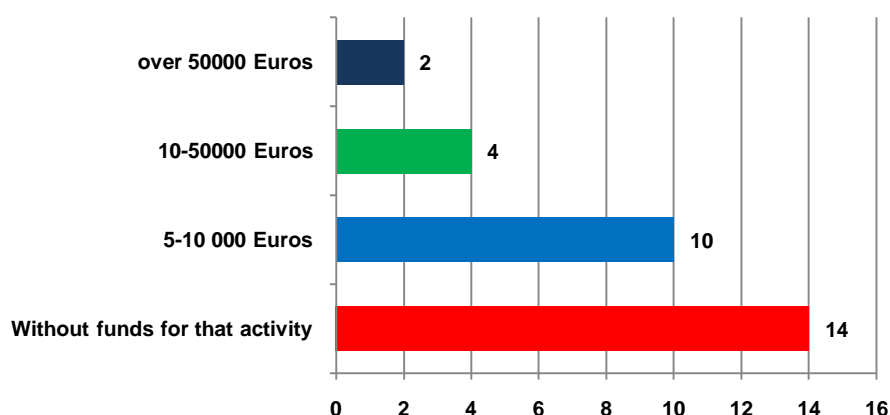


Figure8: Expenditure on international marketing on annual basis (in Euros)

In Figure 8 we can see that almost half of interviewed firms do not spend any money on international marketing activities (market research is here excluded). Ten firms spend from 5 to 10,000 Euros and only 6 firms spend over 10,000 Euros annually. It is very important for firms to understand that well-organized marketing activities can have a positive influence on recognition of firms and products in new markets and consequently positive effect on attraction of new customers and investors. Firms should be informed about marketing costs and best ways that they can be managed within available budgets. Again, this knowledge is obtained in part in academic studies and in part it is learning by doing – and most certainly, by outsourcing some of the marketing activities to specialized experts.

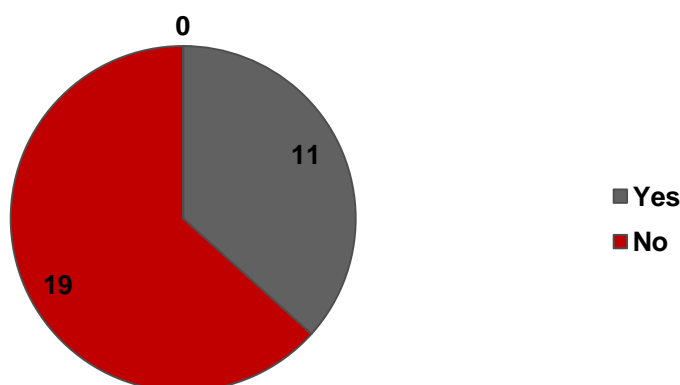


Figure 9: Number of companies with export office

It is of even greater concern that 63.3% or almost two thirds of surveyed exporters do not have an export office (unit). They probably consider an export office unnecessary or too expensive. Interestingly, firms that have an export office are both small and large-sized, which means that size of firm is not crucial for forming an export office. It is necessary for firms to understand that if they organize export office, they will have a unit, which will be dedicated to export business only. Another advantage is that the company would have a manager whose main role would be to organize export operations. Exporting business is complex and exporters will sooner or later have to dedicate time to understand the functions of a separate export office (unit) and how it can be helpful to their business. Export managers who would be responsible for marketing, sales and logistics, would help the company to better organize its operations, which could have a very positive effect on firms' exporting performance.

4. CONCLUSION

The authors of this article have demonstrated that firm's intangible assets in form of knowledge and management skills significantly influence the level of export performance in a transition economy such as that of Serbia, concluding that firms that invest in management knowledge development will more easily adapt to new environments and take better advantage of opportunities that new markets present than firms that primarily rely on tangible assets. The conclusions of the two conducted exporter surveys in Serbia particularly indicate the growth constraint posed by low levels of marketing knowledge and investment in marketing activities, which is in part explained by limited access to finance and in part by low awareness of range and application of marketing tools. The underlying recommendation is for exporting firms to consider investments in management knowledge, and most specifically in market research and other marketing activities, to enhance their growth opportunities.

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USING WIKIS AS KNOWLEDGE MANAGEMENT TOOLS FOR KNOWLEDGE SHARING AND INNOVATION IN THE TIMES OF ECONOMIC CRISIS

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Abstract: *This paper deals with wikis and how they are used in the process of knowledge management in organizations. We explain what wikis are, their major features, advantages and disadvantages. Then we describe how wikis are used in an enterprise and which knowledge management instruments they can support. Paper is a literary research of the current state of practice of using wikis as knowledge management systems interesting for anyone who wants to know more about the use of wikis as knowledge management tools.*

Keywords: *wiki, semantic wikis, knowledge management, knowledge management systems, semantic web, collaboration, innovation*

1. INTRODUCTION

In the times of economic crisis, when companies strive to minimize their expenses, one of the common saving strategies is cutting all unnecessary costs (Papaoikonomou, et al., 2012). Proprietary enterprise knowledge management systems from renowned software vendors usually come with a very high price so it is no surprise that investments in expensive software tools are usually postponed for better times. This is especially true for east European region. According to (Kattel, 2006) Eastern Europe will have to wait quite a few years before recovering from 2008 global financial crisis.

On the other hand neglecting strategic goals such as knowledge management initiatives can lead to severe consequences later on as many organizations are forced to downsize. Downsizing is not the only problem in some companies there is a large employee turnover. (Poole, & Grudin, 2010) doing research in a large software company were surprised to find out that 14%, 619 out of 4444 people whom they identified as wiki users and attempted to survey, have already left the company. With knowledge workers leaving the company there is a real threat of losing valuable knowledge.

In larger firms knowledge managers are faced with what seems to be impossible task maximizing knowledge retention and minimizing the knowledge management budget. In smaller firms according to (Papaoikonomou, et al., 2012) to survive crisis entrepreneurs have to make strategic alliances for sharing resources, knowledge and innovation. A study of Web 2.0 use in 245 manufacturing SMEs found that two most important challenges that these firms will be facing in the near term are total product cost cutting and knowledge as a success factor (Voigt, Fuchs-Kittowski, Hüttemann, Klafft, & Gohr, 2011).

Solution to these problems may be in use of the free open source alternatives instead of expensive proprietary software. One of the most popular knowledge management tools for knowledge sharing and collaboration are wikis.

2. WIKIS

According to (Hester, 2011) wiki technology can be best described as a concept of websites maintained by users who have system access. (Zaidan, & Bax, 2011) describe wikis as Web 2.0 information systems which can be used for:

- maintenance of knowledge networks
- construction of knowledge communities
- cooperation in construction of knowledge
- knowledge management

(Meenan, King, Toland, Daly, & Nagy, 2010) note that wikis are tool for knowledge management that requires no detailed technical knowledge of complex Web programming techniques for users who wish to post information to the Web site.(Bhatti, Baile, & Yasin, 2011) see wikis as a tool deployed for collaboration among employees and capturing their knowledge.

Major difference between wikis and standard content management systems is that in wikis everyone can add, edit and modify any page on the website(Cress,& Kimmerle, 2008). In standard content management system (CMS) only small number of users has the ability to publish articles while others can only read content they make.

Furthermore advanced CMS systems have inbuilt workflow capabilities to automatize process of content approval. In wikis there is no formal article approval system everyone who visits the wiki website can write new articles, edit or modify old ones. To prevent vandalism wikis track all changes made to the article and have recovery and roll-back functions to bring things to original state in the case of mistakes or vandalism(Hester, 2011). Wikis track the history of changes so it is easy to find out who made each change. It can be said that every user who makes some kind of change in the wiki leaves some kind of an “informational footprint” and can be held responsible for his actions (Glassman, & Kang, 2011).

Largest and most popular wiki is Wikipedia. Wikipedia is wiki encyclopedia completely open for anyone to add, edit or modify its contents. Although there are no guarantees for reliability or accuracy that doesn't stop Wikipedia to be most popular encyclopedia and to completely outshine all competition as(Albors, et al.,2008) noted with Wikipedia “who is going to use the authoritative encyclopedias” (p.197).

Wikis are not only for internet they can also be implemented in intranets (Cress, et al., 2008) when used in enterprise intranets they are called enterprise wikis. (Hester, 2011) notes that use of wikis in organizations is growing at a dramatic rate and claims that they are best suited for knowledge that is dynamic, ad-hoc and decentralized.

(Wang, & Wei, 2011) name community participation as most important factor that influences knowledge sharing in virtual wiki communities. They define community participation as voluntary participation in social activities, held or enabled by virtual community, because of shared interests and needs.

According to (Zaidan, et al., 2011)(Meenan, et al., 2010) term wiki is originally from Hawaiian language and means quick.First wiki was created by Ward Cunningham in 1995 and was called WikiWikiWeb. Currently most popular wiki software is MediaWiki the software that is used by Wikipedia (Zaidan, et al., 2011).MediaWiki is free open source software released under GPL license.

According to (Nakanishi, Zettsu, Kidawara, & Kiyoki, 2009) wikis come in many forms often specialized for a particular use or having a specialfeature. QwikWebis WikiWikiWeb extension that integrates wikis with mailing lists, LBWiki is a location based wiki that allows users to create wiki pages via GPS co-ordinates, DistriWiki is a P2P wiki for distributed environment, AniAniWeb is personal home page wiki software,SmallWiki is an object-oriented wiki and ThinkSpace wiki is a specific educational tool. WikiTrails or PmWiki how it is now called provides tracking and trail generation for easy navigation. ShyWiki is a spatial text wiki consisting of notes and graphically represented links used for brainstorming and idea exchange.

According to (Grace, 2009) main advantages of wikis are ease of use, centralized repository, mechanisms for preventing vandalism, collaboration between organizations, solving information overload caused by emailing numerous drafts and building a trusting culture.

Major challenges in running wiki sites are security, categorization of information, data migration, training, navigation and risk of leaving some content unreachable(Grace, 2009)(Alquier, McCormick, & Jaeger, 2009).

Semantic wikis extend traditional wikis semantically so that they can be more readable for the machines (Zaidan, & Bax, 2011). Semantic wikis allow:

- classification and annotation for the links
- dynamic presentation of contents
- richer navigation, metadata
- data in triplets
- semantic searching

- embedded queries

One of the most popular semantic wikis is Semantic MediaWiki an extension to MediaWiki. Semantic MediaWiki is free software published under GPL license. SemanticMediaWiki adds capability of structuring data to the MediaWiki (Alquier, et al., 2009). There are other semantic wikis like SMW+, Platypus Wiki, Semper Wiki, IkeWiki, SAVVY wiki, Sweet Wiki that supports social tagging, Ace wiki and many more (Nakanishi, et al., 2009).

3. WIKIS INKNOWLEDGE MANAGEMENT AND INNOVATION

Organizations use wikis for many different purposes, from using Wikipedia and other public wikis through external wikis for interaction with partners and customers to intranet wikis that support group communication and collaboration (Grudin, & Poole, 2010).

Wikis used in organizations can be divided in three types (Poole, & Grudin, 2010):

- single-contributor wikis
- group or project wikis
- company-wide wikis

Single contributor wikis are those that have only one contributor they are used for personal information management or as easily edited web pages. Group or project wikis are used as a team or project collaboration tool. Company-wide wikis so called "pedias" are used as company encyclopedias.

Peinl (2011) compiles a list of eleven knowledge management instruments:

- market monitoring
- knowledge discovery in databases
- personal experience management
- idea and proposal management
- skill and competence management
- communities management
- collaboration support
- semantic content management
- technology-enhanced learning
- team experience management
- knowledge-based process reengineering

Each of these instruments consists of number of measures. It can be said that each of this eleven instruments is in fact a category of knowledge management measures.

Instrument of market monitoring is the systematic gathering and analysis of knowledge gathered about market, customers, competition, partners and suppliers. This instrument can be also called competitive intelligence instrument. Wikis can be used to create repositories for storing and maintaining gathered knowledge and also collaboration in creating reports.

Instrument of knowledge discovery is the systematic processing of relational data like sales numbers, market data etc. Measures include various market analyses, hiring of data analysts and the use of data analysis software. So far there are no wikis that can do such analyses.

Instrument of personal experience management is about documenting personal experience and new ideas. It includes measures like weblogs, note taking etc. Wikis can be used for personal weblogs and note taking. (Poole, & Grudin, 2010) report single contributor wikis to be very common in organizations they surveyed.

Idea and proposal management involves measures like establishing processes for evaluating and rewarding ideas, supporting idea generation with software etc. Semantic wikis can be customized to support innovation process and idea exchange. One wiki that has such capabilities is Wiki-I (Monticolo, Morel, Boly, & Iahoud, 2012). Wiki-I has a knowledge layer that is based on Idea ontology (Monticolo, et al., 2012) that provides an integrated conceptual model for sharing information related to an innovative idea and a query processor for

building queries with SPARQL language. For example same term “Hood” can be annotated to have type “technology”, “organization” or “process”.

Skill and competence management instrument is about recording employees' competences, planning of their advancement, assessing the target achievement etc. Measures include job descriptions, planning and executing training, creating employee profiles that show skills and experiences and many more. Wikis can be used to support competence management. Creation of all documents can be done using wikis and also wikis can be used to create employee profiles. Semantic wikis can be used to create ontologies for easier navigation, finding experts and for making aggregate automatically updated lists of experts using semantic queries. For example in semantic wiki it is possible to display results of a semantic query as the contents of a page. If that query is something like “show me all experts in software engineering” this page will contain a list of software engineering experts that changes automatically whenever someone anywhere in the wiki is tagged or untagged as a software engineering expert.

Community management is aimed at supporting informal associations between employees to foster exchange of experience, ideas and knowledge. Measures include virtual discussion rooms, communities of practice, organizing informal meetings and similar activities. Both semantic wikis and ordinary wikis can be used for making and managing communities. (Hutchison, & Colwell, 2012) explain how wikis are used to make an online professional learning community for mentoring new teachers. Sheehy in (Sheehy, 2008) describes how wikis are used to facilitate community of practice for school teachers.

Collaboration support consists of support of knowledge work in teams, groups or whole departments by supporting communication, coordination and cooperation. Measures include meetings for knowledge exchange, templates and guidelines for project planning as well as usage of groupware, social software and collaboration software like wikis. Wikis are initially created as collaboration software so supporting collaboration is what they are best at. Collaboration in wikis is not limited to simple tasks, they can also be used for very specific tasks requiring high level of expertise such as knowledge engineering (Baumeister, Reutelshoefer, & F. Puppe., 2011).

Instrument of semantic content management consists of measures like providing pre-structured templates, semi-automatic annotation of documents, text retrieval, training employees in technical writing etc. Wikis with semantic extensions can be used for most of these tasks. (Alquier, et al., 2009) describe use of Simple MediaWiki extension called Semantic Forms which is used to provide pre-structured template for editing wiki pages. Wikis can also be used to annotate documents semantically.

Technology-enhanced learning is aimed at supplying frequently used knowledge, didactically prepared, so that it can be reusable and to maximize learning effects. Measures include collaborative learning management systems, deployment of learning material on demand or in the workplace and similar activities. Although wikis are not able to fully replace LMS they are good enough substitution for many of the knowledge management applications. (Kimmerle, Moskaliuk, & Cress, 2009) describe five main characteristics of learning in wikis. They are:

- community of learners
- use of a shared digital artifact
- learning processes are self-regulated
- emphasis on a jointly created artifact
- community builds new knowledge

Team experience management instrument is comprised of systematic collection, assessment and application of experiences gained on projects or process cycles. Measures include debriefings, lessons learned, good or best practices, process reviews etc. Wikis can be used to store specific knowledge related to projects and processes. This is actually one of the most common uses of wikis 71% of people who responded to (Poole, & Grudin, 2010) survey indicated they used wikis for discussion of special interests, documentation of product features and orientation of new workers.

Knowledge-based process reengineering is comprised of continuous analysis of processes, their redesign and implementation from knowledge perspective. Measures include business process modeling and management and also creating handbooks that describe processes and structures, exceptions, experiences and reasons for decisions. Wikis can be used for creating such handbooks and sharing experiences.

4. CONCLUSION

Wikis have come a long way since 1995 and WikiWikiWeb simple collaboration software. Analysis in this paper has shown that wikis can, to some extent, help with ten out of eleven knowledge management instruments. Only instrument that semantic wikis can't cover is knowledge discovery in databases.

This makes free wiki software ideal software for knowledge management in the times of financial crisis. It is easy to use, easy to install, easy to administrate and completely free. Initial investment is very small especially if organization already has a server. For organizations with more specific needs there are specialized free semantic wikis that offer much more but are also much harder to learn.

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MANAGING CUSTOMER RELATIONSHIP

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Abstract: *The paper points out the key market changes in the first decades of the twenty-first century and their implications on business philosophy, concepts, principles and techniques of relationship marketing from the point of making strategic marketing decisions. In that context points are made to the important role of developing customer relationship management (CRM), highlighting the effectiveness of a combination of the CRM and the customer experience management (CEM) models. One of the important aspects of that relationship is reflected in the fact that CRM tells us what the customer has done, whereas CEM can tell us why he/she has done it. Consequently, CEM can vastly improve the power of CRM to predict future customer behaviour. Successful implementation of CRM concepts implies: excellent understanding of the field of activity and competition; knowledge of customers; market-oriented thinking; an integrated approach to managing channels of communication and sales; and finally, a database development. In this paper we have also presented the CRM value chain as a model which businesses can follow when developing and implementing their CRM strategies and the related CRM diamond model, based on strong theoretical principles and practical requirements of business.*

Keywords: *marketing, customer, relationship, management, CRM, organization, profit*

1. INTRODUCTION

In the last decades of past and the first years of this century there have been dramatic changes in the relevant (micro and macro - local, national and international) market environment of organizations (enterprise/company/corporation), which imposed the need to review existing business practices, business management philosophy, concepts, principles and techniques of marketing management.

Instead of organizing as per product and/or sales territories, successful organizations are organized in compliance with market segments. Successful organizations have adopted the maxim that they should retain the basic activities that constitute their core business, while some minor activities, which other individuals/organizations can perform better and cheaper, shall be procured from third parties (outsourcing). Successful organizations have also learned a valuable message by David Packard from Hewlett-Packard, who once said that marketing is too important to be left to the organizational unit for marketing. Consequently, these organizations have accepted the thesis that creating, communicating and delivering value to consumers, is not the responsibility of the personnel of the marketing organizational unit only, but of all other employees as well (organizational units of production, R&D, Accounting, Finance, HR Human Resource, IT Information Technologies, etc.). In particular, those from other organizational units who have more intense contact with customers /consumers/users.

Instead of an exclusive or excessive reliance on just one channel of communication/promotion - advertising in branding projects (product/service and/or corporate brand), advanced organizations use a combination of integrated marketing communications - a combination of communication channels (advertising, personal selling, sales promotion, etc.) in order to convey a consistent message to existing and potential customers and thus more effectively position brand image of product/corporation. Being aware of the fact that gaining a new customer can cost five times more than retaining existing customer on average, advanced organizations are not only calculating the profit from each transaction, but taking into account the expected lifetime customer value and, consequently, their market offer is shaped in order to achieve the maximum possible profit from the amount of repeated customers' purchases.

Instead of relying solely on financial results such as total revenue, expenses and profits, successful organizations are increasingly taking into account all other indicators of marketing/business performance - the amount and the change of market share, the level and change of the index of customer satisfaction, the rate of customer loyalty, lost rate and the rate of new customers and so forth - which significantly affect the present and expected financial results.

In organizations that have truly understood that the philosophy of marketing is so important in terms of hyper-competitive economy, the top management is not on top of the pyramid, and the clients are not on its bottom, rather than vice versa - at the highest hierarchical level – on top of the pyramid are the customers, in the central part are the employees who are in "contact" with clients, behind and below them are the middle managers to support employees' on the front line, while at the bottom of the pyramid are "the generals" or "top managers", who provide support to managers of intermediate level. Such a modified approach to management has caused the development of a new concept based on the customer, and managing of long-term relationships with customers.

2. RELATIONSHIP MARKETING AND CRM

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Philip Kotler in his recent work in the field of marketing management emphasizes that the art of marketing management and the ability of acquiring new and retaining existing customers. Organizations that start from the postulates of classical/traditional marketing theories focus on art for attracting new rather than to retain existing customers. Such organizations, which operate on the principle of "drills buckets" or "adding water to the bucket drills," assume that they will always be able to provide a sufficient number of new customers who will be able to replace outflow of the lost customers. Such organizations put more emphasis on the exercise of the transaction rather than on creating, nurturing and developing stronger relationships with the (profitable) customers. Consequently, these organizations focus their efforts placed on the resale and sales activities, neglecting the importance of after-sales activities focused on fostering relationships with customers.

Being aware of the empirical facts that "to get new customers can cost on average five times more than retaining existing customers" and "to reduce the rate of outflow of customers by 5% can increase profits by 25 - 85%, depending on the branches of activity," smart organizations recognize the importance of delivering superior value of satisfaction and retention of existing (profitable) customers.

In every organization there is abundance of customer data. Frequently, however, those data are scattered throughout the organization and deeply buried in the "partial" databases, documents "stored" in various organizational units of the company and retined within "minds" of employees who are, in different ways, in touch with customers. When, however, information about customers integrate properly, then they become a real "mine" from which then, the information "worth in gold" could be drawn to build strong relationships with customers and their loyalty makismiziranje.

CRM is a marketing concept/model/system/process that helps the organization to manage detailed information about individual customers and therefore carefully manage with all organization's "touch points" with customers (such as the consumer purchases, contact with vendors, visit the website, etc..) in order to maximize their loyalty. The financial services sector, including banks, insurance companies etc., has developed the concept of KAM (Key Account Management) to manage relationships with key (most valuable) customers of banks, insurance and other financial institutions.

By combining the right software and analytical tools, CRM helps organizations to integrate customers data from various sources, to conduct "deep" analysis and gain a comprehensive view of the organization's relationships with consumers. Using sophisticated analytical techniques of data mining (DM - Data Mining) from data organized in the form of so-called data warehouse (DW - Data Warehouse) CRM helps the organization to discover "real jewels" - the knowledge hidden in the raw data about customers and discover the most valuable/profitable customers to more effectively target and "cut out" offer "tailored" for customer special requirements. The basic structure of CRM, in fact, consists of three parts:

- Operational CRM - refers to supporting the business processes of "the first-line business operation of the company", such as marketing, sales, order management. The basic characteristic of operational CRM is the existence of a single, integrated database that contains information about each client.
- Analytical CRM - refers to supporting the analysis of customer data, including the activities of collection, storage, selection, processing, analysis and interpretation of that data. Goals may be different: modelling the behaviour of the client, design and implementation of specific campaigns (customer acquisition, retention of clients, cross-selling, up-selling, etc.) analysis of service quality, assessment of clients, the

division into segments and making customer profile, risk analysis, demand analysis, sales analysis, analysis of clients' departure and the like.

- Collaborative CRM - enables complete communication, coordination and cooperation with clients via phone, fax, Internet, mail, in person and so on.

Organizations that have experience in this system aplyement understood that CRM is not only the (or primarily) technology and software solution but also an integral part of the overall customer relationship strategy. CRM is all about the relationship and therefore, as pointed out by experts in this area, and focus then should on R (Relationship).

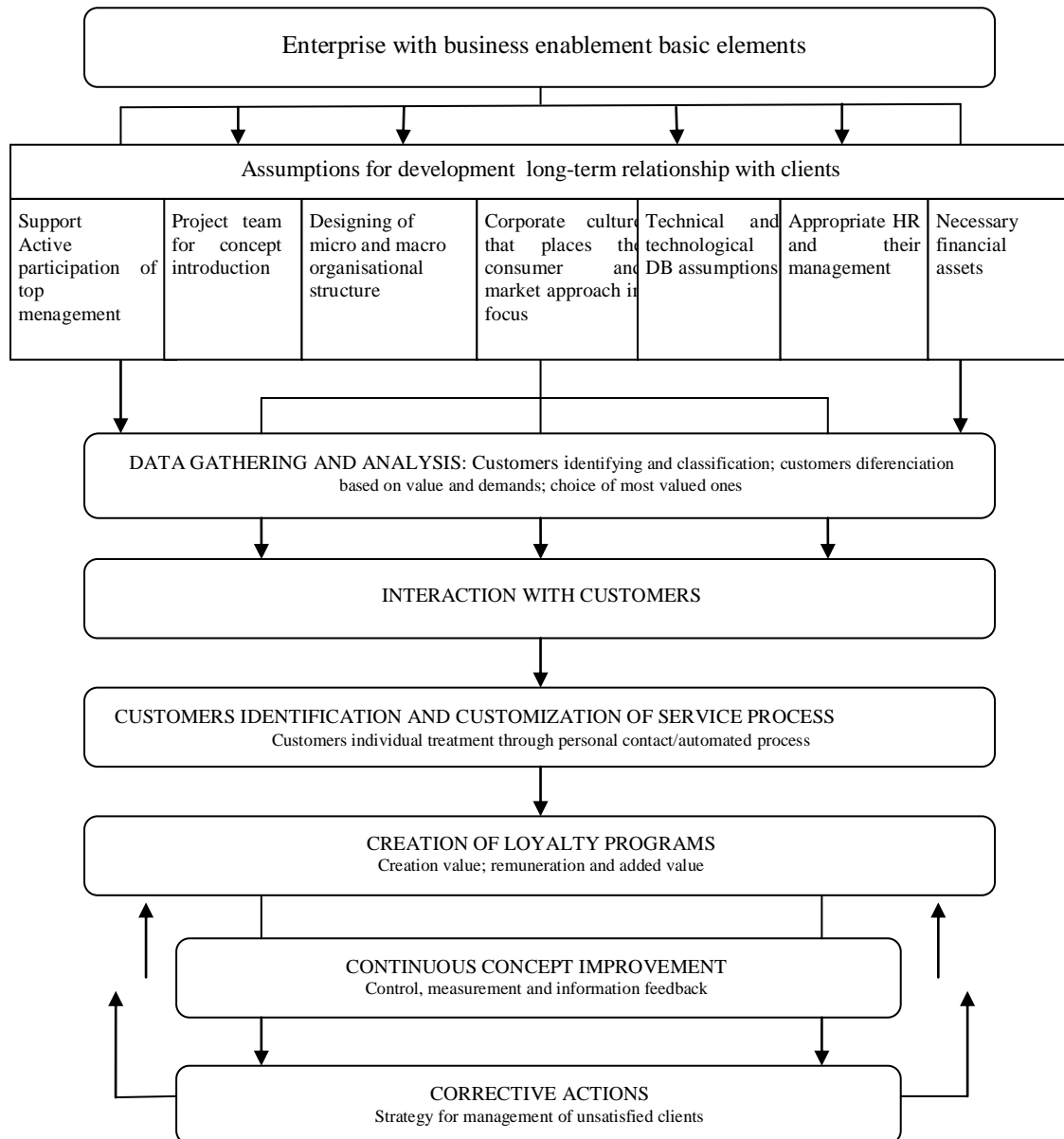


Figure 1: The conceptual framework of CRM

The key factor for success of company CRM concept is the anticipation of client's needs and expectations. It is therefore necessary to build a platform for communication with clients and analytics of relevant information collected from them. In the web site specialized statistical software packages allow monitoring and collecting responses to various questions, which may be stored in the appropriate database. In this way we can keep records of client habits and clients special interest.

Strategic Framework for CRM is the interaction of four inter-related functional business processes that are related to:

- Framing the company strategy (a development strategy is to be analyzed from two aspects: business strategy and customer);
- Creation of value/supply through customer perception and awareness of the value;
- Integration through multiple channels (so called multi-channel management, which includes sales force, output information, telephone, direct marketing, e-commerce, mobile commerce, etc.);
- Evaluating the success of the campaign with the analysis of the results after performed monitoring.

Prerequisites of successful implementation of CRM concepts are: excellent understanding of field of activity and competition; knowledge of customers, market way of thinking, operation of the company as a whole - an integrated approach to managing the channels of communication and sales, as well as database development. These assumptions form the basis of a conceptual framework for developing CRM strategy shown in Figure 1.

3. CRM VALUE CHAIN AND CRM DIAMOND MODEL

The main effects of introducing the concept of CRM are: more effective segmentation of target groups, faster response to market changes, longer customer retention. Other effect could be:

- Analytical forecast of market trends
- Analysis of the profitability of individual customers
- Ability to direct offer to highly profitable customers
- Improving the quality of service and sales opportunities
- Shorter sales cycle and higher profitability of the sale process
- Synchronization and analytical processing of information gathered from various sources
- More intensive development of competitive advantage and company reputation as a strong business partner.

Customer relationships management as a process includes: defining bid value, segmentation, targeting and positioning, operations and delivery systems, measurement and feedback, external and internal market which is shown in figure 2.

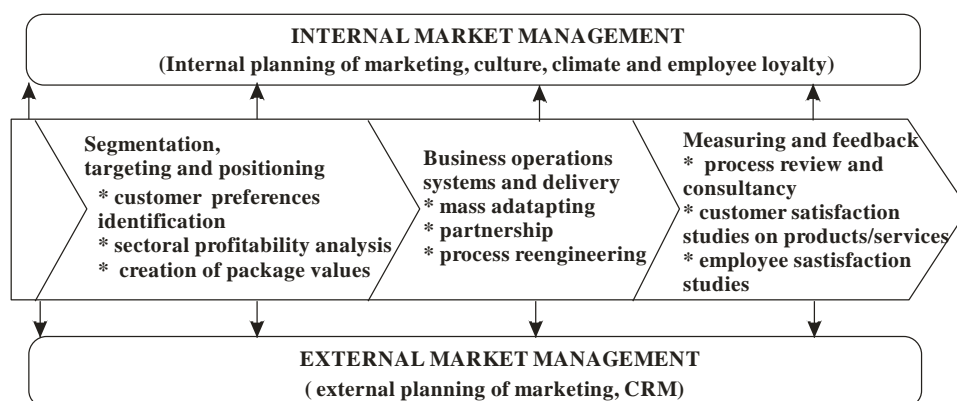


Figure 2: CRM chain (Adapted on Lovreta *et al.*, 2010).

Such a process requires strategic approach in its implementation. One of the most adequate strategic approach to organizational design is given into a Diamond framework, presented on figure 3, in which are organized the basic elements of a successful CRM strategy. It focuses on vision, activities and basic business activities as key factors of successful implementation of CRM in a business environment.

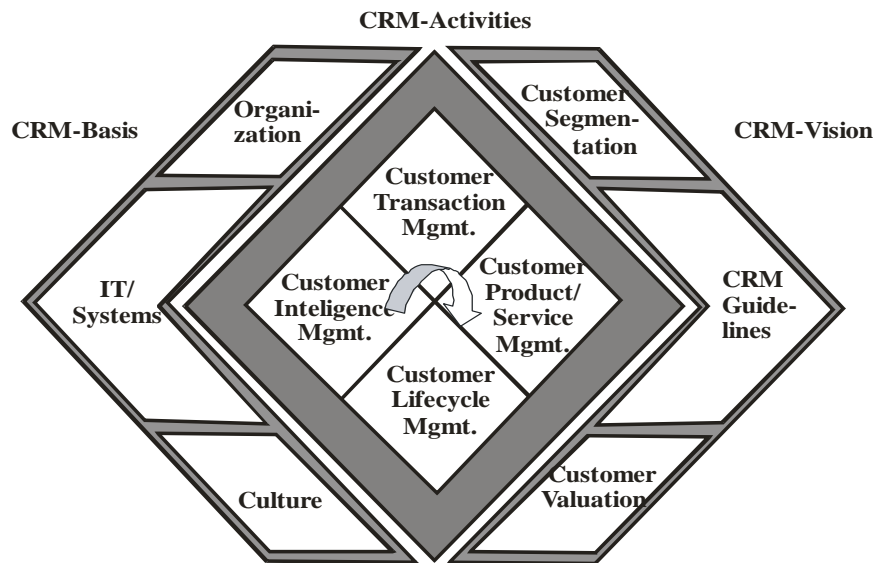


Figure 3: CRM diamond (Mack et al., 2005).

The CRM value chain as a model which businesses can follow when developing and implementing their CRM strategies and related CRM diamond model are grounded on strong theoretical principles and the practical requirements of business.

The main purpose of the CRM value chain process is to ensure that the company builds long-term mutually-beneficial relationships with its strategically-significant customers. Not all customers are strategically significant. Indeed some customers are simply too expensive to acquire and service: they buy little and infrequently; they pay late or default; they make extraordinary demands on customer service and sales resources; they demand expensive, short-run, customized output.

CRM value chain indicates to primary and secondary activities in building long term relationships with customers, in order to achieve higher level of their satisfaction as the basis for long-term loyalty.

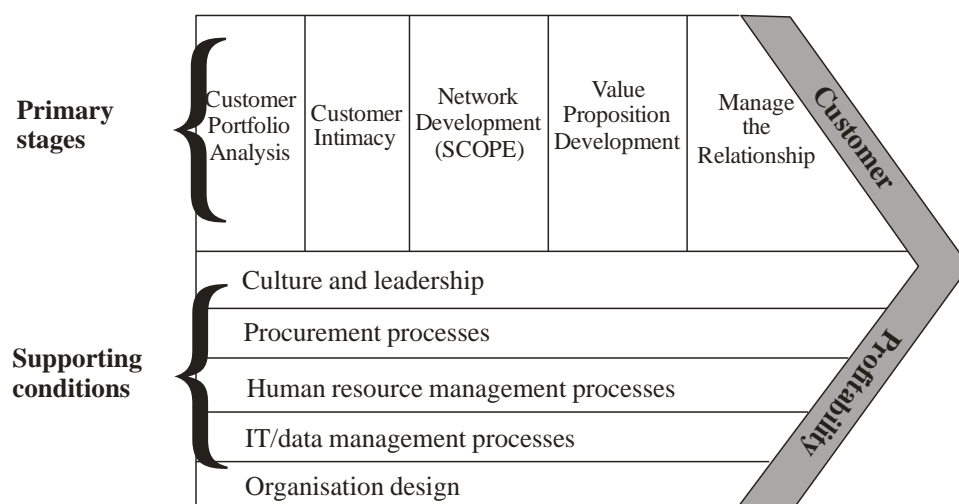


Figure 4: CRM value chain

CRM value chain includes five primary activities:

1. Consumer Portfolio analysis: an analysis of the customer database aiming to offer different products to them.

2. Understanding the consumer: activities on understanding individual or groups of consumers and building database accessible to all stakeholders whose decisions and activities may affect the attitudes and behaviour of consumers.
3. Networking: building a strong network of relationships with employees, suppliers, partners and investors who understand the requirements of target consumers. Central role in the model is given to consumers, which is surrounded by other elements: suppliers, owners, investors, employees, and other partners. Management and coordination, according to these elements, can ensure the structuring, communication and delivery of preferred products to consumers.
4. Development of products/services value: development of proposals which create value for both consumers and the company.
5. Managing relationships with customers: with a focus on structures and processes.

Supporting activities are aiming at: culture and leadership, procurement processes, Human Resources, data management process and company organizational design.

4. CUSTOMER CRM TO CEM

To overcome the perceived problems managing relationships with customers, a growing number of companies employ managers who follow the experience and customer satisfaction. Therefore, some authors suggest that instead of "relation" the usage of the term "experience". They identified three levels of customer experience: experience of the brand, the experience related to transaction and experience of the relationship. The more represented opinion in the recent years is that the understanding of the broader concept of customer experience becomes crucial for understanding the reasons why are customers withdrawing from certain relationships.

Several authors underscored the importance of personality brands that will allow customers to "live the brand" and to "experience the brand." Therefore, interpersonal relationships and relating to brands contribute to the experience of customer-related product. Hypothetically, these two elements can be mutually complemented by deficiencies of interpersonal relationships and for that reason to be offset by benefits from for the use of attitude towards the brand. Customer experience can be an intellectual integrator within which you can find compromises (trade-off). One consequence of focusing on experience rather than on relationships is that a good experience can strengthen the emotional aspects of relationships that are traditionally associated with the brand personality, but can reduce the need for interpersonal relationships that are associated with customer relationship management.

An explicit connection between brands and relationships has been recognized only recently. In the initial stages of theory of customer relationship management, proponents of this theory have often argued that brands and relationships (relationship) are separated by two conceptual domains. Since then, many authors have conceived brands such relationships, where the brand infused personality, which allows it to form a relationship with the customer. This relationship can be developed from the similarity between the brand value and customer's image about itself, and takes place when there is a good balance between physical and psychological needs and the functional and symbolic brand value. The link between emotions related to interpersonal relations and brand is strongest in the context of service brands. In this case, customers have the opportunity to experience the brand through interaction with him and the services of employees in direct contact.

Initially, managers who dealt with the customer experience have emerged in sectors with high levels of emotional involvement of the customer. However, this concept was later expanded massively and to sectors with low levels of customer involvement. Managers who follow the experience and customer satisfaction should have developed skills mediation function and authority, to bring value to customers in the form of experience that meets their needs and expectations.

One comprising CRM and CEM discover following. Centre? In contrast, CEM deals with customer attitudes. How satisfied was the customer? How likely would he or she be to buy again? How willing would he be to recommend us to a friend or colleague? Consequently, CRM's focus is the past and the present. CEM's focus is the present and the future.

Gathering CRM data is relatively easy. We get it by monitoring and recording customer behaviour. Gathering CEM data is much harder because we have to elicit opinions, perceptions and other attitudes consistently across customers, which not all customers will provide. That usually implies conducting surveys. Many

researchers in this area pointed out that the combination of CRM and CEM can be extremely powerful. CRM tells us what the customer did. On the other hand, CEM can tell us why. If a customer switches to a competitor, only attitudinal feedback will tell us that it was because of dissatisfaction with product features, or speed of service, or ease-of-use, or courtesy. In particular, CEM can vastly improve the power of CRM to predict future customer behaviour.

As American author John Chisholm says, in large organizations, CEM systems act as corporate eyes and ears. They:

- Gather timely feedback from key stakeholders – including customers, prospects, partners, and employees on their satisfaction, intentions, and other attitudes towards, and about their experiences with, an enterprise;
- Make actionable that feedback through powerful analytics and reports, and instantly accessible to the right people at all levels of the enterprise through interactive dashboards, pushed reports, emailed alerts, and other means; and
- Enable enterprises to efficiently manage actions responding to feedback.

Optimal design of CEM systems involves considerations not just of IT and corporate strategy, but also of statistics, sampling, market research, and human behaviour. Well-designed CEM systems are especially important to large organizations, where the many divisions and departments could easily inundate customers with survey requests.

The benefits of such CEM systems have been firmly established. They inform the right individuals and teams when customers are dissatisfied and why, enabling those individuals and teams to respond immediately. CEM enables more effective rewards and recognition, thereby enhancing employee satisfaction and commitment. As a consequence of all of the above, CEM systems put organizations on paths of faster learning, faster process improvements, and faster gains in competitive advantage.

5. CONCLUSION

CRM is a set of activities which provide company growth through: more effective segmentation of target groups, analytical forecasting of market trends, faster response to market changes, profitability analysis of individual customers, ability to direct sales to highly profitable customers, improved quality of services and sales opportunities, longer customer retention, shorter sales cycles and higher profitability of the sale process, synchronization and analysis of information gathered from various sources, improved efficiency and flexibility of operations, intensive development of competitive advantage and company reputation as a strong business partner.

Requirements for creation of high quality CRM models are: customers satisfaction and loyalty; data protection, business intelligence tools, enterprise resource planning and creation of integrated business systems. CRM's focus is the past and the present. CEM's focus is the present and the future. CRM tells us what the customer did. CEM can tell us why. But, combination of CRM and CEM can be extremely powerful.

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MARKETING ORIENTATION AND BUSINESS PERFORMANCE OF PUBLIC ADMINISTRATION

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Abstract: *In democratic systems the administration is constantly meet with different challenges. Processes of administration transformation in line with the principles of the new public management bring a higher degree of orientation towards citizen as one of the most important stakeholder group, primarily in local governments work. It became evident that the administration should adopt the operation manner of the business systems on the market, expressed primarily through the application of marketing orientation. The paper describes the application of marketing in public administration and presents the tools for assessment of business performance in this area. The results of the research implemented in Serbia are shown and they identify the local government's commitment to customers and ways to measure their satisfaction.*

Keywords: *marketing, public administration, business performance, customer satisfaction*

1. INTRODUCTION

There are several key reasons for the existence of public sector in every society (Kotler & Lee, 2007): it defines the principles according to which the society functions; it delivers public services of general interest (e.g. police, education, health sector etc.); it performs public services that profit and non-profit organizations do not wish or cannot perform with the existing resources, which is, for example, the case with social assistance to those population groups that are in need.

Considering the fact that the citizens participate in financing public sector services, their expectations are justifiably high and this is why the organizations should continually invest in improvement of their performance in order to raise the level of citizens' trust and satisfaction and obtain their support.

Public administration is faced with a huge number of challenges in democratic societies. The public administration transformation process in line with the principles of the New Public Management resulted in its higher decentralization and active citizen participation (Livingstone et al., 2007; Vigoda-Gadot, 2004), especially in the area of local government. According to the New Public Management principles, citizens are the customers of public administration services, hence the terms are used as synonyms,

Academic research has already studied to great extent the necessity of adopting the market way of doing business in non-profit organizations (Andreasen & Kotler, 2003; Alexander & Weiner, 1998) regardless of the complexity of political and economic characteristics of the public sector and it was confirmed in practice. Special emphasis is put on adoption of marketing concept and understanding of customer/citizen (Day, 1994). The accustomed understanding of organization-oriented marketing in non-profit sector is identified as the main limitation to adoption of marketing concept of doing business that is entirely customer-oriented. This means that the non-profit organizations function under the assumption that their products and services are needed by their customers and that they would consume them regardless of whether or not they were created and delivered according to the customers' needs since the products/services had been predefined and cannot change according to market needs (Dolnicar & Lazarevski, 2009). However, the authors confirmed by their research that market orientation and marketing strategies and tools, especially in the area of communication, are also necessary for non-profit organizations (that include public sector organizations) and that they affect the efficiency and effectiveness of operation.

2. MARKETING ORIENTATION OF PUBLIC ADMINISTRATION

The importance of applying a marketing concept in the non-profit sector was studied by Kotler, Levy, Zaltman, Shapiro and others (Dolnicar & Lazarevski 2009) who managed to confirm and prove that in their research. However, in the beginning, the use of marketing mostly referred exclusively to promotion. Gradual and systematic adoption of the concept resulted in adoption of the philosophy according to which marketing begins and ends with the customer - it is customer-oriented (Gonzalez et al., 2002). Much research was done in order to investigate the degree of marketing application in the non-profit sector. A study by Dolnikara

and Lazarevska (2009) combines the literature and results achieved so far. Besides theoretical analysis, the authors conducted research that was supposed to examine the current situation of the application of marketing principles, methodologies and techniques in the non-profit sector organizations. However, practice in Great Britain, United States and Australia where the research was conducted still shows that marketing in the non-profit sector is primarily focused on sales and promotion and there is insufficient strategic approach to marketing. One of the important identified reasons for that is that most employees dealing with marketing activities lack education and training in this area. Thus, the general conclusion would be that there is a huge potential for improving the efficiency and effectiveness of operation in the non-profit sector by full application of marketing philosophy and concept.

Besides specific political and economic features of the public sector, observation of customers is not quite identical to that in the profit sector which makes the application of marketing concept all the harder. Namely, the principle "the customer is always right" and "his wishes should be complied with" cannot be unconditionally accepted in the public sector organizations. It could happen that customer or in this case, the citizen, is not right, and it is up to the organization to perform the best professional practice regardless of whether the citizen agrees to that or not at that moment (e.g. removal of illegally parked vehicles).

Majority of public sector organizations deliver services that are for the general wellbeing of society and are often of restrictive and limiting nature. In this case, the citizen is far from being satisfied with the service. Unlike private sector, organizations in the public sector do not depend on individual customer (Proctor, 2007). However, this does not mean that they should use their position and function of the organization while neglecting citizens' needs. The simple application of marketing principles is hindered by specific nature of services provided by certain organizations: services that are delivered regardless of whether they meet the needs of the citizens or not – social services, then free-of-charge services which the citizens better accept as they are, than not have them at all – primary education services, as well as the services that citizens actually do not want at all – customs and tax services.

In accordance with the specific nature of public sector services, one might say that the goal of marketing is to educate and inform the citizens and other stakeholders about things available or unavailable, about factors determining/limiting the manner of delivery of certain services, about best interests of general public etc. By establishing relations with the stakeholders and adequate communications, public sector organizations may gain understanding and satisfaction of their customers (Cicvarić Kostić, 2011). Of course, accomplishing this goal includes continuous efforts in improving the services and manner of their delivery while considering the opinions, proposals and suggestions of the stakeholders.

As for the public sector, it is increasingly taking over and applying best practice of the private sector (Kotler & Lee, 2007): total quality management; customer-oriented strategy; reengineering; business performance measurement; cost benefit analysis; engaging external resources and consultants; e-government etc. Apart from that, the marketing philosophy of public sector organizations' operation is evident in their every day activity, especially: service improvement, doing business in compliance with the law, improvement of citizens' living conditions, increasing the citizen satisfaction, provision of citizen support etc.

Management approach and marketing orientation stress the importance of establishing relations between the administration institutions and the citizens. The emphasis is on "understanding the perception of citizens/customers concerning the public administration work and level of organizations' awareness of public needs" (Vigoda, 2000).. Vigoda developed a model of public administration responsiveness to citizens' requests in which he identified the factors affecting the responsiveness and citizen satisfaction: quality of governance and management of organization; quality of employees; general impression from the contact with the employees; business and social orientation of the institution; eagerness and readiness for change; ethics; organization policy.

Flynn (1995) studied the request of the citizens for higher level of service quality and realized that the competition generally raised the citizens' expectation concerning any kind of service, including the public service. That emphasizes the importance of "client research that helps understand in which way they would like to deal with the administration organizations, their potential remarks, suggestions, proposals for service improvement etc..."

At the beginning of 1990-ies, public sector in most European countries adopted the new public management business philosophy that is client-focused and includes the application of marketing tools and strategic planning (Cousins, 1990), in order for organizations to successfully "sell" their "policies" to the citizens

(Proctor, 2007). Proctor (2007) identified four types of marketing that can be recognized in public sector organizations that differ according to their basic goals (table 1).

Table 1. Types of Marketing in Public Sector (Proctor, 2007)

Marketing Type	Characteristics	Goal
"Marketization"	Looking at public sector products and services in terms of commercial market competitiveness	Set the price and adjust the quality according to client demand
Promotion of organization's interest	Marketing is used only to promote organization's interest	Provide support of the market and society
"Local" marketing	Local self-government is using marketing to promote the areas under its competence	Provide support of the market and local community
Marketing as an instrument	An organization is using marketing only as an instrument to promote its political goals	Promote basic political goals

In any case, only complete adoption of marketing philosophy enables the public sector organizations to provide a whole range of services in education, health, recreation, utility services etc. that are addressing citizens' needs and to do that efficiently. If we consider the basic role of local authority, for example, it exists as the "voice of the citizens" it serves. Thus, the citizens expect the municipality to advocate their rights and protect them from possible adverse situations, like construction of a factory in an inhabited area of the municipality.

For marketing application in administration, it is important to emphasize the inclusion of all instruments of the mix, especially those relating to services:

- Participants in the service delivery process – they must be professional in the work they do; they have to be informed about the whole service delivery process in order to provide information to citizens; they have to be aware of their role in providing value to the citizens, to be kind and have developed communication skills;
- The process of service delivery – the procedures are customer-oriented so that the beneficiaries can finish the task that brought them to that organization in an efficient manner; the way they are treated; the manner of resolving complaints and
- Physical evidence in which service is provided – how the premises are arranged and marked, info material in the premises (leaflets, brochures, notice boards), web site.

From the aspect of relationship marketing the functioning of an organization is viewed as interaction of different stakeholders and organization, and that applies to public sector as well. Thus, the adoption of marketing concept is a good way to manage the relationship with stakeholders and meet their expectations, which is one of the key goals of doing business. The importance of communication, interaction, quality and value for the stakeholders are emphasized in the context of modern marketing theory and practice that introduce the concept of relationship marketing, stakeholders engagement etc. (Proctor, 2007).

Communications refer to full application, integration and management of all communications in the organization. Interactions in this context include the delivery of values to customers and other stakeholders by the employees of an organization. The authors of the paper have grouped the internal communications and relationship management under the term of internal marketing that aims to provide service quality and satisfaction of both external and internal customers. The importance of communications in internal marketing is considerable, to the extent that success of the internal marketing application depends on that since, in order for the employees to deliver the value, they must understand the value they are delivering, the way they are supposed to deliver it and how the value delivery would benefit them. Understanding of the stated factors includes the development of (internal) communications system. Development and application of internal marketing are important for all organizations of the non-profit and public sector (Cahill, 1995).

Local government exists in order to serve the society and it has to find the ways and means to meet the needs of citizens as customers and all stakeholders. Since administration institutions are traditionally bureaucratic, the changes executed in transition and their transformation open room for application of the internal marketing tools. Internal marketing aims to ensure that everything is customer-oriented through the manner in which the employees are performing their work, and building and maintaining the relationships

with citizens and stakeholders. Furthermore, the internal marketing's task is to achieve satisfaction, trust, dedication and loyalty of the employees in an organization. So, within the internal marketing concept, employees and customers are the most important stakeholders. In order to emphasize the importance of internal marketing, the literature refers to the employees as "internal customers" which leads to a conclusion that their needs and wishes should be observed as well and programs should be created to satisfy them (Proctor, 2007). Since internal marketing primarily includes informing the employees about the organization's mission and their role in achieving that mission, the basis of internal marketing consists of internal communications (formal and informal, written and oral). Besides communications, programs of internal marketing include trainings, acknowledgments, motivation of the employees etc.

3. BUSINESS PERFORMANCE ASSESSMENT IN PUBLIC ADMINISTRATION

Balanced Scorecard technique defined by Kaplan and Norton (1996) has been widely accepted and suitable for use in the corporate sector. Although its successful application in the public sector can be identified (Radnor & Lovell, 2003), Proctor (2007) underlines that its application in the public sector demands certain modifications, since all these organizations are above all responsible to state administration and then the other stakeholders, as well as that financial aspect of business is of primary importance in the private sector while that is not the case in the public sector. Modified technique for the application of business performance assessment for the public sector organizations (Figure 1) was presented by Moullin (2007).

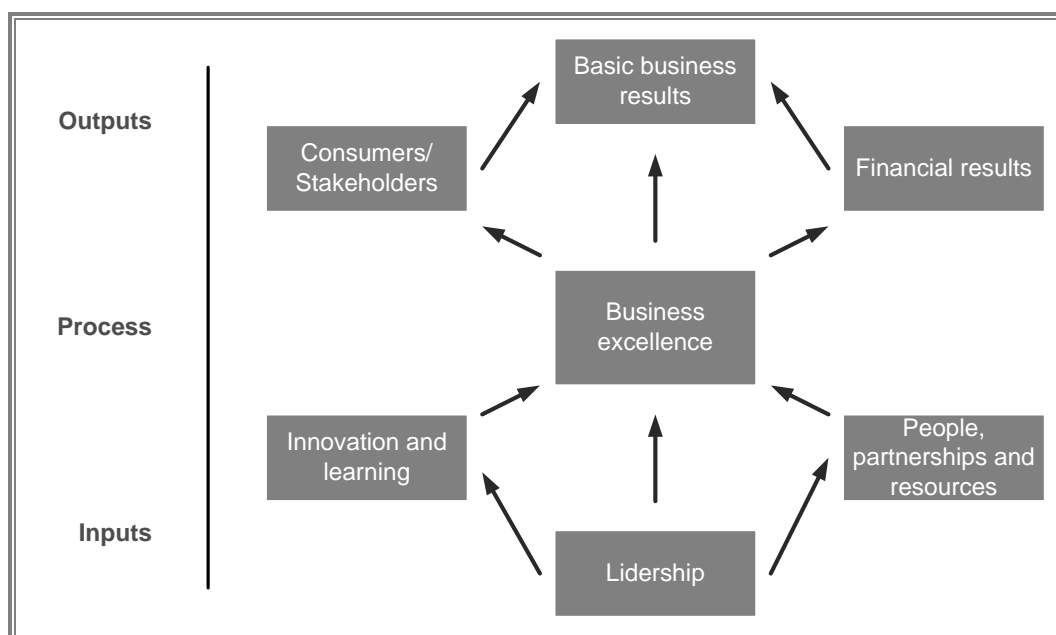


Figure 1. Business performance assessment for the public sector organizations (Moullin, 2007)

It should be stressed that communications pervade every phase and every degree of assessment shown in the Figure. Therefore, they have an extremely big role and importance in the entire model. Integrated communications concept also represents one of the key elements in creating and delivering the value to the stakeholders. All messages sent by organizations, all channels and places of communication, are united under the term integrated communications and they are directed to establishment of a dialogue with stakeholders. Often, in designing the communication program, choice of instruments, defining the message, choice of communication channel etc., the models describing the phases undergone by customers in the process of deciding about purchase, are used as the basis (AIDA, DAGMAR, hierarchy of effect model etc). As for the public sector services, they are characterized by low citizen participation in their creation, so that communication programs in this case need to include all phases of customer buying behaviour from cognitive degree, through affective degree to behaviour.

Service quality measurement is one of the basic indicators that should be included in the measurement of public sector business performance. Other indicators are speed of service delivery, speed of resolution of complaints, how well-informed and kind the employees providing services to end users are, how well-equipped the premises of the organization are etc. One of the most frequently used instruments for measuring service quality is the so called SERVQUAL that includes measuring the difference between the

expectation and perception of users in the area of communication, both employees communication and the whole set of external communications. A technique often used in practice is the so called “mystery shopper”. Also the portfolio models for assessment of service value for the stakeholders are used, like BCG matrix, then matrix of competitive advantage and market attractiveness etc.

Faculty of Administration of the University of Ljubljana developed a model including the system of budgetary indicators for measuring the local government success. The model includes 75 indicators for measuring successfulness that can be classified in four groups: synthetic indicators, indicators related to municipal revenue, indicators related to municipal expenditures and time series of the main indicators. The developed model indicates successfulness of the public sector (planning, goals, and results). The system of budgetary indicators within the model is available at <http://www.fu.uni-lj.si/SIB/vhod-ang.htm> and it offers methodology for the development of similar models.

The model of balanced scorecard for the local government and state bodies includes planning and monitoring of all areas in which public administration organizations function. The model is a complete framework for establishment of the indicator system, and the indicators for measuring marketing success may be integrated in a comprehensive structure of organization's work.

The research conducted in Serbia and presented in chapter 4 showed that local governments most frequently use questionnaires and comment boxes in order to measure their success in the customer satisfaction segment.

3.1. CUSTOMER SATISFACTION

Customer satisfaction, as one of the most fundamental marketing concepts, may be defined as the overall performance assessment of various attributes constituting a product/service (Johnston, 1995). Customer satisfaction may be used as an instrument for measuring the improvement of quality and overall business (Filipović et al, 2010).

Customer satisfaction concept has been studied in literature to great extent and research showed that the attributes assessed by the customers based on which they achieve their satisfaction are as follows: expectations, perceived quality of product/service, confirmation of expected quality level (Anderson & Sullivan, 1993), then image, expected quality of equipment and people providing the service, as well as the expected value (Kristensen et al, 1999).

In order to accomplish customer satisfaction, the organizations develop customer satisfaction programs. It would be wrong to assume that satisfaction programs are solely data collection from the customers. The programs include creation and implementation of action plans based on the information obtained from the customer. Satisfaction programs are formed in several stages. Their successful implementation (Douglas, 2003) requires the following:

- Support from the top management;
- Making the satisfaction concept the focus of business;
- Integrating the work of business functions and forming of multi-functional teams;
- Accountability of employees that are in direct contact with the beneficiaries for the customer satisfaction program implementation;
- Measuring the satisfaction of customers which includes both qualitative and quantitative methods;
- Evaluating customer satisfaction with competitive products/services;
- Well-elaborated communication plan;
- Good implementation plan in line with organization's goals.

The results of a research conducted among the managers of the state-owned health institutions in Serbia in 2006 showed that positive attitude of managers towards communication activities of the institution have positive effect on the patient satisfaction (Filipović et al, 2010). In the study, the attitude towards communication activities was examined through the approach the managers have to external stakeholders, primarily the media (proactive/reactive) and through institutionalization of the position/sector in charge of the communication activities (marketing, public relations). The study concludes that managers who understand and support marketing and public relation activities are also committed to managing the patient satisfaction programs, which leads to a positive image of the institution, loyalty of patients and increase of profit.

4. LOCAL GOVERNMENT'S ORIENTATION TOWARDS CUSTOMERS AND SATISFACTION MEASUREMENT

In order to determine the orientation of local government in Serbia toward customers and other stakeholders, as well as the tools used for customer satisfaction measurement, the research was carried out in 2010. The research was conducted in cooperation with: The Ministry of Economy and Regional Development of the Republic of Serbia, Statistical Office of the Republic of Serbia, and Standing Conference of Towns and Municipalities. The tool used for the research was questionnaire. The questionnaire was sent to respondents by Standing Conference of Towns and Municipalities representatives, through the network of people in charge, electronically with a cover letter in which the subject and goals of the research were explained. The questionnaire was sent to addresses of 167 municipalities in Serbia. After four iterations, the total number of gathered valid questionnaires was 109.

In identifying local government goals, employees have ranked them as it is shown in table 2 (they marked primary and secondary goal of their municipality in the proposed list of goals).

Table 2. The goals of local government

	Primary goal	(%)	Primary goal	(%)
I	Contribution to the development of local community	41.7	Informing the public about programs and activities	20
II	Increasing work efficiency through servicing a greater number of customers	17.7	Complying with work procedures and scrupulous performance of activities by the employees	14.7
III	Achieving customers' satisfaction	15.6	Achieving customers' satisfaction	14.7

Analysis of obtained results brings to conclusion that the local government is still more oriented towards its productivity and efficiency and one-way communication. Increasing the customer satisfaction is recognized as a less important goal compared to the previously stated, while building good relationships with individuals and groups from the surrounding is not even included in work objectives. This indicates an extremely low level of understanding and application of the concept of relationship marketing and stakeholder relations management which can be an important area for improvement of administration practice in Serbia.

The survey of citizen satisfaction with municipal services is most frequently done through questionnaires (34.3%) and comment boxes (32.1%). In 50.5% of cases, the municipalities do not conduct any kind of citizen satisfaction survey but in 92.7% of the cases they believe that citizens are satisfied with their service. This information shows that the employees are quite optimistic with regard to citizen satisfaction with their work. According to the results of the municipalities that emphasized they conduct satisfaction surveys, the citizens are mainly satisfied with municipal work (Figure 2) which should be compared to the citizen survey on the satisfaction with the local government work.

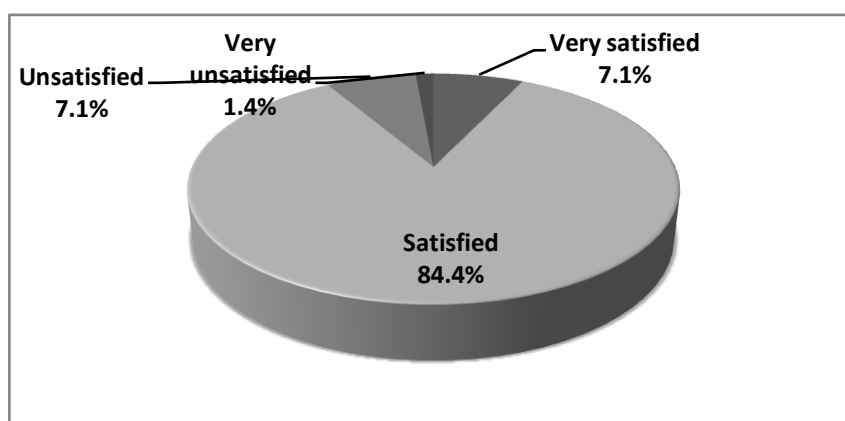


Figure 2. Citizens satisfaction according to research municipalities conduct

5. CONCLUSION

All organizations, including the public sector, are faced with new challenges, complex and turbulent environment, increased competition, development of Information and Communication Technologies, development of society in general etc. and they must respond to those challenges through the application of strategic management, innovation, business performance measurement and above all, value delivery to citizens and meeting their needs. Management approach and marketing orientation emphasize the importance of establishment of relationship between the management and the citizens. At the beginning of 1990-ies, administration in most European countries adopted the business philosophy based on the new public management principles. They put the focus on service beneficiaries and include the application of marketing tools and strategic planning. From the aspect of relationship marketing the functioning of organizations is viewed as interaction of different stakeholders and organization, and that applies to administration as well. Thus, the adoption of marketing concept is a good way to manage the relationship with stakeholders and meet their expectations, which is actually one of the key goals of doing business.

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APPLICATION OF NEUROSCIENTIFIC CONCEPT IN DEFINING AN EFFECTIVE MARKETING COMMUNICATION STRATEGY

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Abstract: *New trends that recognize the neuroscientific approach in marketing research are encouraging academic experts and specialists from practice to better understand consumer behavior, as well as the response to adequate marketing communication strategies towards a target group. The paper reviews the methods and techniques used in neuromarketing: Functional magnetic resonance imaging (fMRI), the method of Electroencephalography (EEG) and the Steady State Topography (SST) method. The majority of devices that are used in the field of neuroscience during exposure to different sensory stimuli measure brain activity, and based on standardized patterns of brain region activation, a general conclusion is derived regarding the reaction to the stimuli. The advantage of these measurements as compared to traditional marketing research methods, focus groups, surveys and observations, is that they provide direct information on attitudes which, in many cases for subjective reasons, a person is incapable of reproducing on their own. The paper focuses on the systematization of literature in the field of neuromarketing, as well as the application of results of neuroscientific research in the defining of a marketing communication strategy.*

Keywords: *Neuroscientific concept, Neuromarketing, Consumer behavior, Methods and techniques of human brain scanning, Marketing communications, Strategy.*

1. INTRODUCTION

Technological advance of society has significantly changed the individual and social profile of modern man, who is today faced with a great number of communication instruments that influence his attitudes and opinions on a daily basis. While the marketing strategists had for decades been focusing on positive reactions of potential customers and the creation of a positive brand image by advertising a product's comparative advantages against the competition, a new science was simultaneously developing, one that would relocate the field marketing and communications to a whole new level: the hidden level of the subconscious and emotions, which can be manipulated to achieve what was once unachievable. Traces of emotional manipulation can be found as far back as the war propaganda of Nazi Germany during World War II, when the public awareness of the then war-torn nations was systematically and in a planned fashion influenced using anti-Semitic messages. The fact that awakening of the senses and emotional reactions represents an instrument whose power to this day remains cognitively unlimited was known as early as last century by all subjects creating public opinion, but the scientific merit of the principle of subliminal influence was questioned given the level of development of neuroscience at the time. Great technical inventions in the field of neuroscience took place in the 21st century, when the door opened giving access to the processes occurring in the human brain, and information that may be of crucial importance in the process of forming an opinion about products, services, personalities, events, as well as other instances that depend directly on their image with the audience. Most of the devices used in the field of neuroscience operate on a simple principle: they measure brain activity during exposure to different sensory stimuli (visual, auditory, olfactory and tactile), and based on standardized patterns of brain region activation, a general conclusion is derived regarding the reaction to the stimuli. The advantage of these measurements in relation to standard methods such as focus groups, surveys and observations, is that they allow for direct insight into information regarding attitudes, which, in many cases for subjective reasons, a person is incapable of reproducing on their own.

The focus of the paper will be on the potential applications of these research results in the creation of an effective marketing communication strategy. The aim of this study was to identify the intersecting and (or) contact points of two scientific disciplines, and to discuss the possibilities for cooperation between two scientific disciplines: medical sciences (neurology, psychology and psychiatry) and marketing communications.

The creation process of a marketing communications strategy relies on numerous tools and concepts, of which the neuroscientific concept is only one of the possible approaches whose application is to this day considered a *new-age* approach. The concept of *effective* marketing strategy has changed in parallel with the intervals of current consumer generations, where the baby-boomer generation and generations X (eXcel) and Y had defined the principles of marketing strategies of their time, with their life attitudes, experiences, reactions and values. With years the marketing paradigm of targeting generations according to their characteristics and current age has matured, so in accordance with generalizations about the target groups, marketing communication strategies were created adaptively.

The neuroscientific approach, unlike the previously mentioned, strives to reach the hidden and hard to reach data that is sometimes recorded as nothing more than an impulse of brain activity, never to emerge to the conscious part of the mind, thus it cannot be cognitively reproduced. These data appear in the form of waves of brain activity that are measured by a variety of neurological devices (electroencephalogram, magnetic resonance imaging, eye movement tracker, etc.), and as such they represent a more objective insight into human cognition and thinking as compared to a reproduced verbalized word.

2. THE NEUROSCIENTIFIC CONCEPT. FIELD OF RESEARCH AND DEVELOPMENT

“Men ought to know that from nothing else but the brain come joys, delights, laughter and sports, and sorrows, griefs, despondency, and lamentations. And by this, in an especial manner, we acquire wisdom and knowledge, and see and hear, and know what are foul and what are fair, what are bad and what are good, what are sweet, and what unsavory... And by the same organ we become mad and delirious, and fears and terrors assail us... All these things we endure from the brain, when it is not healthy... In these ways I am of the opinion that the brain exercises the greatest power in the man.” (Hippocrates, On the Sacred Disease, 4th century BC)

It is human nature to strive for self-knowledge, thus it is not surprising that for thousands of years so many have dealt with the issues of human feelings, reactions, behaviors, as well as many other questions that to this day remain in the field of study of the scientific discipline called neuroscience. The job of neuroscience is to “explain behavior through the framework of activities of the human brain. In which manner does the brain control millions of individual nerve cells to produce behavior, and how are these cells influenced by the environment...? The final boundary of biological sciences - their ultimate challenge - is to understand the biological basis of consciousness and the mental processes which we perceive, behave, learn and remember” (Eric, 2000). The main object of study in neuroscience is the nervous system, and seeing as how this science is based on multidisciplinary research even though it is traditionally classified as a branch of biological science, its domain also reaches many modern scientific fields such as computer science, microbiology, neuropsychology, statistics, physics, psychology and medicine.

The roots of the idea of studying the human nervous system are tied to the period as far back as 7000 years ago: remains of human (hominid) skulls have been found with traces of cranial damage assumed to be the result of trephination, a process of drilling of the human skull (Bear, 2007). Trephination was performed in order to treat headaches and mental disorders.

The scientists of the 17th and 18th century were more devoted to the study of brain tissue structure, and they had noted a difference between the gray and white matter. Noticing the nerve connections in the white matter, they had properly concluded that these connections served to send information to the gray matter and receive its feedback. By the end of the 18th century, all parts of the human nervous system had been dissected, and its anatomy had been described in detail. With the discovery of the microscope the research had become far more precise, and during the 1890s Santiago Ramón y Cajal had established the doctrine of the neuron, as the cell that represents the basic unit of the nervous system. In the late 19th century, DuBois-Reymond, Müller and von Helmholtz discovered that neurons possess electric activity, while Paul Broca came to the conclusion by working with patients with different brain disorders, that different brain centers are responsible for different functions.

The 20th century brought about new scientific achievements in the field of neuroscience, and divided it according to the level of analysis into the following fields: Molecular neuroscience, Cellular neuroscience, Systems neuroscience, Behavioral neuroscience and Cognitive neuroscience.

The research that will be discussed in this paper was performed at the level of behavioral and cognitive neuroscience, with focus on the application of the results in the field of marketing communications. The

development of neurological diagnosis and a multidisciplinary approach to neuroscientific research have opened the knowledge from this field to many other fields that can benefit from it greatly. Due to this reason, the approach to marketing research has changed its course and direction, while a new branch of marketing has been created - neuromarketing.

3. NEUROMARKETING

Neuromarketing represents a new direction of marketing that relies on neuroscientific research, which through the use of neuroscientific methods reaches conclusions regarding primal desires, opinions, attitudes, tastes and preferences. While traditional marketing relies on traditional methods of gathering data, neuromarketing relies on the results of so-called “mechanical devices”, spoken about by Kotler. As far back as 1957, Vance Oakley Packard had published a book titled “The Hidden Persuaders”, in which he spoke about how companies are using motivational research and other psychological tactics in order to manipulate expectations and awaken the consumers’ desire for the consumption of their products.

However, it was not before the year 2002 that the term “neuromarketing” was first used by Ale Smidts (Erasmus University), while the first studies using the fMRI method were conducted by Gerry Zaltman at Harvard in 1999.

Neuromarketing is with certainty the only field of marketing that has in recent years experienced its greatest expansion, since it has radically changed the direction of research. It studies the “sensory-motor, cognitive, and affective responses to marketing stimulation. Researchers use technologies such as magnetic resonance imaging to measure changes in the activity of certain sections of the brain, electroencephalography (EEG) to measure activity in specific regional spectra of the brain’s responses and/or sensors to measure changes in physiological states (heart rate, respiration, galvanic skin resistance), all with an aim of finding out why customers make the decisions they do, as well as which part of the brain is telling them to do so. Neuromarketing is a marketing direction developed in America in the late eighties, which creates and sends out messages based on an analysis of how the brain reacts, and then tests them by applying functional magnetic resonance imaging and recording the brain’s reactions, contrary to the polygraph and the moment of truth.

The Australian company “Neuro Insight”, which deals with numerous marketing researches with application of the neuroscientific method, has outlined three key novelties of the neuroscientific concept as compared to other conventional methods of data collection for marketing purposes (NeuroInsight, 2009):

- Identification of the factors that people are not consciously aware of
- Collection of reactions and responses that people cannot or do not wish to describe in words
- Identification of particular moments during the communication process that represent a “trigger
- Simultaneous measuring and testing of multiple indicators
- Re-examination of the same respondents
- Overcoming cultural differences

As can be seen from the advantages stated by Neuro Insight, the basic characteristic of the application of neuroscientific methods in the process of creating an effective marketing communication is that they provide an insight into information that has until now been unattainable. It is information on the attitudes, preferences, appeals and reactions of consumers, which has not been obtained directly - through verbalization of the experience, but it has instead been collected at the place of its origin: in the very brain of the respondent. This is the reason why such information is considered to be more objective than the one obtained through classical research methods.

4. TECHNIQUES AND METHODS OF THE NEUROSCIENTIFIC APPROACH IN THE GATHERING OF REACTIONS, OPINIONS AND ATTITUDES OF CONSUMERS

Modern neurological diagnosis uses a number of technologically advanced instruments to research and record brain activity, in order to determine whether the nervous system of a person is functioning properly. While modern neurology and neurosurgery use neurodiagnostics to establish a diagnosis and contribute to the patients’ treatment, many researchers throughout the world have recognized the possibility for applying neurodiagnostics in another field as well: the field of marketing research. Neurodiagnostics are used in marketing research during various stages of creation of a marketing communication strategy: during the preparation phase, implementation phase and phase of evaluation.

In the preparation phase of the creation of a strategy, neuroscientific studies are used to gain an insight into consumer desires. Based on the desired effects that the marketing communication aims to achieve, in cooperation with neurologists, marketing experts map the brain centers in which an “emotion” occurs as a result of the received message. When we know the effect that we wish to achieve, a tactic for evoking activity of a specific brain region is developed, and a stimulus is created that is meant to initiate the reaction. The process of creating messages (stimuli) is a complex process that requires the engagement of a multidisciplinary team, which usually consists of a neurologist, a psychologist, a communicologist and a marketing expert.

The creation of a “pilot” version of the stimulus is followed by the testing phase: through the use of neurodiagnostics the effectiveness of the stimulus is measured, and any necessary corrections of the content of the message are made depending on the level of success of brain region activation. In other words, it is measured whether the message has brought about the desired effect in the respondents. In this phase, neurodiagnostics replaces the traditional methods of measuring the effectiveness of a marketing message. The evaluation phase is most often conducted in cases when the neuroscientific approach is not used during the preparation phase of a marketing communications strategy: companies then implement this type of research in order to identify their mistake and find out where the “noise” occurred in the receiving process of the message by the target consumer. In this phase, neurodiagnostics can provide an insight into the manner in which the consumers have actually received the message, which is often in contradiction with the goals defined by the sender. In all of the given phases of marketing research, many modern neurodiagnostics technologies are used that are aimed to provide insight into the manner in which the human brain reacts to marketing stimuli.

4.1. Functional magnetic resonance imaging

Functional magnetic resonance imaging (fMRI)¹ is one of the most modern medical methods of brain activity diagnosis, which measures the magnetic oscillations of hemoglobin, the component of red blood cells that carries oxygen via the blood to the cells. In other words, fMRI measures the flow of oxygen in the brain and identifies increased and decreased activity of brain regions, because depending on their activation, the flow of blood (and therefore oxygen) in them increases or decreases. FMRI, unlike a CT and PET scan, is not an invasive method because it involves no radiation, while the advantage is that it is highly detailed and can show very small changes in regions the size of only one millimeter. As opposed to EEG and MEG, fMRI registers activity inside the brain, while the two other techniques record activity on the cortical surface.

Martin Lindstrom conducted the largest systematic study in the field of neuromarketing by using precisely the fMRI technique. This multi-year study involved thousands of respondents throughout the world, two hundred experts, ten professors and doctors, an ethical committee, and a cost of \$ 7 million.

FMRI is a technology that only seemingly resembles classic magnetic resonance: it is a large-scale scanner in which a respondent is placed in the lying position over the entire length of their body. The respondent must lie completely still during the test, without any movements, because even the slightest movement of the body can make the results completely unreadable: the reason is because the scanner monitors millimeter changes in the flow of hemoglobin through the human brain, so a movement of the head of even a few millimeters can have an effect on the results.

The scanning procedure continues after the respondent is set into the initial position. The respondent can be stimulated by all kinds of stimuli (visual, auditory, tactile, and olfactory), but most of the studies are based on a combination of visual and auditory stimuli: photographs, sound recordings and video recordings. While a respondent is watching a video, for instance, a reaction occurs in his brain in the form of increased blood (hemoglobin) flow through the brain centers in which the activity is occurring. In other words, fMRI monitors which brain centers are affected by the stimulus (the video), while the data is then interpreted by a neurologist who gives an explanation of the changes in brain activity.

The interpretation of fMRI results and their proper use represent the most important step in the application process of the neuroscientific concept in the creation of a marketing strategy. Neuromarketing is a young

¹Hereinafter fMRI

scientific discipline, thus it is expected that collisions will occur during the defining and laying of foundations for future directions of development, because there is no unanimous agreement concerning the adoption of postulates on which the further science could be developed.

4.2. Electroencephalography (EEG)

Electroencephalography represents a special neurophysiological method that registers brain activity through electrodes placed on the surface of the human head (which is the most common form of use) or inside the brain tissue (which is used in preoperative preparation). The resulting diagram is known as an electroencephalogram (EEG)², which was earlier written out on paper by special pens sensitive to voltage changes, while today it can be more frequently found in the form of a digital drawing made by a computer. EEG records brain waves, which are according to their frequency divided into delta waves (activity up to 4 Hz), theta waves (4 to 8 Hz), alpha waves (8 to 12 Hz) and beta waves (over 12 Hz).

When it comes to EEG in marketing, its great advantage over the previously mentioned fMRI is its portability. A modern EEG device is very compact and can easily be transferred to the location of measurement, which means that the respondent does not have to be confined to a testing room and that the research can also be conducted at the point of sale. One of the first scientists who initiated the entire process of the portable EEG in neuromarketing was Dr. David Lewis, who has recently, with the company Neuroco from Great Britain, conducted a study in a local shopping center in the town Lakeside.

“Generally, every shopping center would like to know how its visitors react to the entire ambient - how they react to the orientation signalization, whether they feel rushed or that they can stand in front of a shop window and look all they want, without standing in anybody’s way. To be precise, they wish to know how a store window should look in order to capture the attention of the customer, and if we look at it from the perspective of each individual store, how do the customers respond to their arrangement”). (BelfastRound, 2007).

The use of neuroscientific methods in the creation of a marketing communications strategy no longer represents a secret. The method was mystified up until the year 2000, studies were conducted “under the radar”, and no company wanted to admit that it had resorted to a method whose ethics had been questioned on a daily basis, because information on the application of these methods at the beginning of this century had represented a threat to the long-built image of a company. Today’s situation is completely different: use of the neuroscientific approach in the product development process, creation of a campaign and positioning strategy is today only considered as a competitive advantage: a company that resorts to such methods is “modern, progressive, futuristic and values the opinions of its consumers”. This year is certain to bring change in terms of understanding of the neuroscientific approach in a marketing framework:

Forbes magazine published an article in November of 2009 called “Neuromarketing: Companies Use Neuroscience for Consumer Insights” (Forbes Org., 2008). In this article, the author Laurie Burkitt lists several examples of the use of EEG and fMRI methods among prestigious international companies:

Hyundai, one of the world’s major automobile manufacturers, speaks publicly about the use of EEG for reading the brain activity of potential consumers and buyers of the new models coming out in the year 2011. “We want to know what consumers think about a car before we start manufacturing thousands of them”, said Dean Macko, the brand manager at Hyundai Motor America. This study was conducted on 30 respondents (15 female and 15 male) who were equipped with an EEG device and had the task to only observe parts of the car, even the windshield, tires and the bumper. Their brain activity will show what brings them closer, and what it is that pushes them away from a decision on a potential purchase. This testing is performed by the company NeuroFocus, whose clients in addition to Hyundai are also Google and Walt Disney.

E-Bay has, based on tests conducted using neuroscientific methods, come to a conclusion that the users of their services place the security of their payments in second place: they are far more concerned with the speed of transactions, which has led E-Bay to change its approach to the consumer through a repositioning campaign.

² A diagram known as an electroencephalogram (EEG), which is obtained through application of the electroencephalography method, hereinafter referred to as EEG

All of the given examples clearly show an increasing trend of use of the neuroscientific concept in the planning of a marketing communication strategy, as an unavoidable method that provides insight into until now unobtainable data, which may be of crucial importance for the development of a new product, repositioning of an existing product, as well as any other activity on which the future success of a company directly depends.

4.3. The Steady State Topography Method (SST)

Another neuroscientific method, whose primary purpose of development and application was in the field of medical research of neurological disorders such as the attention deficit disorder and the hyperactivity disorder, is Steady State Topography, or SST for short.³ Professor Richard Silberstein from the Institute for Brain Science at the University of Melbourne has since the 1980s been working on the development of this method, while in early 2000, in cooperation with NeuroInsight, he introduced this technology into the domain of marketing.

SST recording is performed by placing a compact device in the form of a helmet on the head of the respondent, which contains a device for monitoring brain activity and eyeglasses showing the image, thus creating a stimulus in the form of a visually evoked potential of the brain of the respondent. This device is easily portable, while its advantage is that with the help of 64 electrodes it is able to register up to 13 brain responses in a second, making it sensitive to rapid changes in brain activity. For this reason, it is more suitable for dynamic stimuli. In addition, the setting up of this device does not require the application of gel, or sticking on electrodes, thus the studies are carried out much faster considering the short preparation time of the participants.

5. CONCLUSION

As can be seen from the review of relevant researches and neurodiagnostic methods, the neuroscientific concept has experienced major progress during the last decade, both in development as well as in the fields of its application. Until recently used only for medical research purposes, neuroscience opens the door to knowledge and information that can be of great benefits to other scientific fields as well: psychology, evolutionary history, genetics, biochemistry, pharmacology, informatics, computer neuroscience, statistics and many others, and among them of course marketing. Although marketing is viewed solely as a science whose ultimate goal is profit maximization, this perceptual illusion of the purpose of marketing is incorrect. Marketing Science has a wide area of applications, and marketing services do not exclusively focus on manufacturing and service-oriented companies. Marketing communications also find their application in projects such as philanthropic humanitarian activities such as “Live Aid”, an event for raising people’s awareness on diseases (such as cancer, HIV, diabetes), UNICEF’s humanitarian activities for helping children in threatened areas, as well as many other noble programs.

On the other hand, the lack of transparency of marketing research with application of the neuroscientific concept, as a result of the competitive advantage that companies gain through application of this approach, represents a major problem for the future development of this approach. The reason is the lack of sharing of information and conclusions that have been reached, because they represent amorphous competitive advantages based on which market dominance is achieved.

By reviewing the given studies and examples from practice, it can be concluded that the application of the neuroscientific concept in the creation of an effective marketing communication strategy requires the engagement of a multidisciplinary team. Each member of the team should make a contribution to the drawing of a correct conclusion on the basis of their expertise in the fields of neurology, psychology and marketing. Neuroscientific research results remain completely inapplicable and worthless if a systematic and careful analysis is not conducted, and if a conclusion on the indications is not drawn in the correct and logical manner.

The conclusions of neuroscientific research must then be properly implemented in the very strategy and tactics of an effective marketing communication. The process of research-conclusion-implementation is very complex and its final outcome depends on many factors of the process itself, as well as the success

³Hereinafter referred to as SST, which represents an abbreviation of the description of the technology

in maintaining continuity, which leads to the conclusion that small errors in the conclusion and implementation during any stage of the process itself can completely undermine its usefulness.

Although this paper declaratively highlights a number of advantages of the neuroscientific approach over the traditional methods in marketing research and the creation process of a marketing communications strategy, the application of these two different concepts is not mutually exclusive. Precisely due to the fact that the traditional and neuroscientific concepts each have their numerous advantages and disadvantages, a collaboration of these two concepts is suggested. The neuroscientific concept in the study of consumers adequately compensates for the problem of "subjectivity" that cannot be overcome by traditional methods, while the traditional focus groups compensate for the problem of materialization and verbalization of opinions which, at the present stage of science, the neuroscientific methods cannot achieve. The key of collaboration of these two concepts can be found in the synergy of their power.

Ethics, as an indispensable guide in all scientific development, raises many ethical questions regarding the application of the neuroscientific concept in marketing. However, the quote of Martin Lindstrom greatly contributes to the understanding of the issue: "I believe that it (the neuroscientific concept) is a simple tool, like a hammer. Yes - in the wrong hands a hammer can be used to hit someone on the head, but that is not its purpose nor does it mean that it should be banned, that we should stop its use, or sanction it."

That which is certain is that the development of the neuroscientific concept has changed the understanding of how the human mind works, and thus it has changed the direction of focus of many scientific disciplines, including marketing. Neuroscience is the science of the future, and anyone who recognizes the value of pro-action and innovation in their field of expertise will recognize the importance and potential of application of the neuroscientific concept. Development of neuromarketing requires the engagement of academics and experts in the fields of marketing, psychology and medicine, allowing for a multidisciplinary approach as a response to a better understanding of the needs and desires of consumers, as well as the guidelines for an effective marketing communications strategy.

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MARKETING APPROACH IN E-GOVERNMENT

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Abstract: *The public sector is undergoing technological and organizational reforms. Following the market development and application of electronic commerce in the private sector, the public sector has started to introduce the application of information/communication technologies. In countries around the world, governments have introduced modern operating methods presented through the concept of eGovernment. This paper presents basics of eGovernment in terms of marketing, as well as challenges of eGovernment in Serbia. The results of empirical research on the level of implementation of eGovernment in municipalities in Serbia are presented at the end of the paper.*

Keywords: eGovernment, marketing, local government

1. INTRODUCTION

eGovernment is a new concept of government accepted in many, especially developed, countries. It became a global phenomenon and it represents a field in which governments of almost all the countries throughout the world invest a lot (Grant & Chau, 2005). Intensive application of Information and Communication Technologies (ICT) in government includes new management approaches that should provide better service to citizens and economy based on full cooperation between all entities and all levels. That is why there is an assumption that application of marketing activities in the development of electronic services may contribute to the accomplishment of this goal (Cicvarić Kostić, 2011).

The objective of this paper is to present the foundations and role of marketing in eGovernment as well as the application of eGovernment in Serbian local governments. The first part of the paper provides theoretical definition of eGovernment and indicates the necessity of applying marketing approach in its development. The second part presents the results of the survey on application of eGovernment in municipalities of Serbia, conducted in 2010.

2. MARKETING APPROACH IN E-GOVERNMENT

Apart from technological transformation of the state apparatus, another thing that stimulated changes is the understanding that there is a need for marketing in public sector as well (Walsh, 1994). Although the essence of marketing concept implies profitability, in terms of eGovernment the primary goal is meeting the customers'/citizens' (the terms will be used as synonyms, as the citizens are the consumer of governmental services) needs. Introduction of eGovernment created the opportunity to change the traditional understanding of the state apparatus as a slow and inefficient one. eGovernment offered a modern, efficient service and transparency as well as the change of paradigm in the process of communication between the government and the citizens (Vintar, 2002). According to the same author, the basic characteristics of communication in the earlier period were as follows: it was one-sided and the citizens had a subordinate role, i.e. communication was mostly oriented towards the needs of the government itself. eGovernment is a contemporary way of government operation according to the following principles (Vintar, 1999):

- Citizens and organizations are seen as new information systems' entities that require information (role of a partner);
- Two-way communication is necessary in order to build relations between partners;
- Citizens and organizations are seen as customers of government services (marketing approach).

Understanding of these principles and the fundamental change in government operation in line with the stated principles actually represent the biggest challenges for modern government.

However, experience shows that the application of eGovernment is not always successful. United Nations (2008) stated that one of the reasons for eGovernment failure was insufficient application of marketing. Although not a central starting-point of eGovernment, marketing orientation contributed to development

and improvement of eGovernment from techno-centrism to orientation to customers' needs. Furthermore, the basic goals stated in the European strategic choice of eGovernment system also testify of the need and necessity of applying the marketing concept in eGovernment here. They are, among other (document „Improving, development and standardization of Internet presentations of state bodies“):

- Putting the citizen in the foreground i.e. creating electronic services and ensuring the access to online services to all citizen categories;
- Services adapted to customers' needs;
- Provision of access to public information and services through innovative usage of ICT;
- Increase of public trust;
- Raising awareness of the benefits provided by eGovernment;
- Improvement of skills necessary for using the eGovernment services.

In the last years the development of eGovernment and its importance for the future government operation became a topic of discussion among theorists and practitioners from different fields. The phenomenon is still insufficiently studied and that is why it is frequently misunderstood and misinterpreted. First of all, it should be noted that eGovernment is not just a phase in automatization and computerization of government but it implies the usage of ICT for improvement of government activity and it addresses a complex problem demanding a holistic approach and study from different aspects – technological, legal, socio-political, organizational, functional etc. One of the aspects that may have a strategic role in eGovernment development includes examining the role of marketing.

eGovernment most often refers to provision of public services through the Internet. Wider definition of the term eGovernment is presented in Schwabe (2005) where it is defined as the “use of information and communication technologies aimed at improvement of range and quality of public services used by the citizens and business entities, making the public administration more efficient, reliable and transparent”. eGovernment is attempting to ensure easier access to public services by providing better conditions for the beneficiaries. Moreover, in that way it aspires to more efficient public administration and greater transparency in management of social and economic resources of the state.

Development of electronic services enables government functioning in a completely new way: without paper, without direct contact with customers and face-to-face communication etc. This involves specific environment for defining marketing goals and activities. In order to analyze the marketing aspects of eGovernment, it is necessary to define basic marketing instruments:

- Product – good online service adjusted to customers' needs.
- Distribution – service accessible to the customer, at the right time and at the expected location of access.
- Price – minimizing the time and effort necessary for getting the online service.
- Promotion – communication activities directed at providing information to potential and current customers on the availability of a service and stimulation of its usage.

The application of marketing in eGovernment may contribute to development of service focused on customers' needs.

Development of eGovernment includes three main areas (Heeks, 1999):

- Improvement of the administration process (eAdministration) – relates to improvement of the internal operation of the public sector;
- Connecting and building relationships with citizens and service customers (eCitizen and eServices) - encompasses the relationship between the government and the citizens as the target group on which the legitimacy of national and local government depends and as public sector customers;
- Connecting and building relationships with other target groups (eSociety) – organizations from other sectors.

Having in mind this definition of eGovernment development, the basic role of communication and marketing approach in the area of building and maintaining relationships with all target groups is obvious. Primarily, this means raising the level of awareness and knowledge about the existence of eGovernment, building trust in this type of government functioning, building partnership relations with all target groups and the like.

eGovernment is focused on five target groups: citizens, enterprises, public administration employees, other public institutions or departments and non-governmental organizations. In accordance with that, there are eight types of relationships in eGovernment (Fang, 2002):

1. G2C – Government to Citizen - provision of services and information to the citizens, online services, digital democracy;
2. C2G – Citizen to Government - exchange of information and communication of citizens with the government;
3. G2B – Government to Business - provision of services and information to companies, electronic procurement;
4. B2G – Business to Government - exchange of information and communication of companies with the government;
5. G2E – Government to Employees - intranet, internal communication with employees and provision of information, notice board, education;
6. G2G - Government to Government - intranet, communication subsystem, cooperation and internal exchange of information with other state institutions or between different departments of a single administration;
7. G2N - Government to Nonprofit - provision of services and information to non-governmental organizations;
8. N2G - Nonprofit to Government - exchange of information and communication of non-governmental organizations with the government.

3. E-GOVERNMENT IN SERBIA

eGovernment is still developing in Serbia and it has still not reached the level of development and sophistication of the EU member states (Marković et al, 2002; Marković et al, 2008). Based on the inspection of eGovernment portal of the Republic of Serbia, it could be concluded that two-sided communication with the state bodies is not fully developed and that eGovernment in Serbia includes providing information on public administration services, possibility to download the forms from websites, in some cases to order the forms to be delivered by mail, scheduling appointments for application submission in some government institutions, but also delivery of certain services electronically. By joining the public discussion processes and through the forum (eParticipation) the citizens may take part in discussions on topics of importance for improvement of government's work (www.euprava.gov.rs). Application of social media is necessary for the development of eParticipation. eGovernment intended for business entities is somewhat more developed which means that the companies may download most of the required documentation from the Internet.

More serious approach to development of eGovernment in Serbia is confirmed by acceptance of the EU's i2010 initiative and adoption of Strategy for the Development of eGovernment in the Republic of Serbia for 2009-2013 (document „Strategy for the eGovernment Development in Serbia“). The Government of Serbia accepted the i2010 initiative as a general framework for development of Information Society through signing of the eSEE Agenda +3 for the development of information society in South East Europe (document „Handbook for ICT in local government“). The Strategy does not explicitly state the application of marketing concept in eGovernment development in Serbia but it defines basic goals, mission and vision of eGovernment oriented towards customers' needs. The Strategy does not indicate the necessity of promoting eGovernment in Serbia but that conclusion is inevitable since commercial electronic business also needs to be promoted.

Usage of eGovernment services in Serbia is in its initial phase. According to a study of Statistical Office of the Republic of Serbia from 2010 (document „Usage of ICT in Republic of Serbia, 2010), 13.2% of the respondents among the Internet population and 70.6% of enterprises use eGovernment services. The number of customers in both segments (citizens and enterprises) has a tendency of growth. The number of customers, as well as the number of services used is expected to increase with the development of eGovernment.

eGovernment portal of the Republic of Serbia (www.euprava.gov.rs) was posted in March 2007. The portal enables eParticipation through public discussions where all interested persons may send comments, suggestions and attach documents pertaining to the topic of public discussion. Apart from that, at portal's forum page each registered user may take part in discussions on all topics of importance for improvement and advancement of contacts between state bodies and citizens and they may also start a new topic on the forum. Introduction of the portal will facilitate citizens' communication with state bodies and overall

public administration in terms of easier way to find information and appropriate forms, as well as simpler submission of requests and receipt of decisions and other documents.

Further introduction and development of service is planned in the Strategy for the eGovernment Development in Serbia while special attention will be given to improvement of service accessibility to citizens at local levels of government.

Since eGovernment development level in Serbia is still low, a survey was conducted among local governments to identify the electronic services being delivered, as well as attitudes of the employees regarding the challenges for the introduction of eGovernment, in order to find potential ways for its faster application.

The survey was conducted with assistance from: Ministry of Economy and Regional Development of the Republic of Serbia, Statistical Office of the Republic of Serbia and Standing Conference of Towns and Municipalities (SCTM). SCTM is a national association of local governments in Serbia, founded in Belgrade in 1953. Today the association has 167 members (towns and municipalities) that come together on a voluntary basis in order to achieve cooperation, joint action and accomplish common objectives at the local and international level. At the beginning of 2007 SCTM launched an initiative saying that every town and municipality in Serbia should appoint a person as a local commissioner. Namely, local commissioner is a person employed in the local self-government unit whose role is to coordinate and be in charge of communication between the association and the local self-government unit. The network consists of 167 members i.e. all towns and all municipalities have appointed a person as a local commissioner.

The survey involved collection of primary data by method of examination i.e. poll and it was intended as a census. The survey instrument was a questionnaire sent electronically to respondents by the SCTM representative, via the commissioner network, along with the letter explaining the subject and goals of the survey. The questionnaire was sent to the addresses of 167 municipalities in Serbia. Through four iterations the total number of collected valid answers was 109 which is a 65% response.

The main condition for ICT application in government and development of electronic government services is for the institution to have its Internet presentation. It is encouraging to know that only three of the surveyed municipalities in Serbia do not have a website and do not fulfil this basic condition for electronic services development.

A great number of municipalities that have Internet presentations (70.9%) regularly post information and documents pertaining to municipal institutions' work on their website. In conclusion, the first level of eGovernment development is reached, but it still involves only one-way communication between government-citizens/organizations, i.e. it is a static application of ICT.

Posting of applications and forms for submission of requests in a municipality was considered as the next level of eGovernment development. In 46.5% of municipalities this is constantly applied (regularly or occasionally), in 25.7% only occasionally while 27.7% does not conduct this activity.

Possibility to order documents via website is provided (regularly or occasionally) by 52% of surveyed municipalities while 47% of municipalities do not provide that service.

According to replies of the employees in surveyed municipalities, a great number of municipal departments are available (regularly or occasionally) to citizens and other customers through electronic mail (around 80%), while in one fifth of the cases there is no such possibility. As for electronic communication with other institutions of public administration, 97.1% of the surveyed municipalities in Serbia do not exercise this communication (regularly or occasionally). Aggregate results are shown in Figure 1.

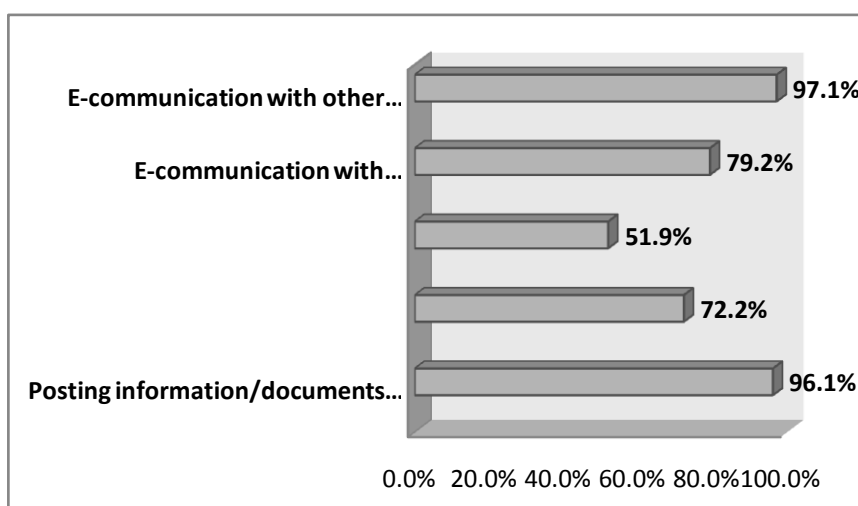


Figure 1. Electronic services development in Serbian municipalities

Among the most frequent dilemmas and challenges faced by the employees in municipality concerning the introduction of electronic business there are the following (the order does not represent the importance of the problem):

- Insufficient training of the staff for computer work;
- Employees' fear from introduction of innovation (especially with older population);
- Insufficient knowledge of the importance and advantages of eGovernment;
- Lack of financial means for introduction of eGovernment system;
- Lack of necessary equipment and software;
- Problem regarding protection of data and lack of adequate legal framework;
- Insufficiently developed procedures and standards;
- Fear from potential job loss etc.

By identifying potential challenges and problems i.e. barriers that might appear during the introduction of eGovernment, directions and priorities of action for the institutions in the process of eGovernment introduction may be clearly identified.

4. CONCLUSION

There is an evident need for government in modern society to adopt the manner of operation of the market-oriented business systems. Many studies have examined the altered role of citizens in society, new relationships among government and citizens, improvement of quality and ways to deliver public services through the introduction of eGovernment. As a contemporary way of government operation, eGovernment involves the application of new technologies for achievement of "better government practice". One of the important aspects of study and improvement of eGovernment is the application of marketing approach. Understanding of marketing principles and changing the government operation in accordance with them represents the biggest challenges of modern government.

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MARKETING STRATEGY FOR PROVIDING RESOURCES FOR NONPROFIT ORGANIZATIONS

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Abstract: *Provision of resources is very important for the survival, development and operation of nonprofit organizations. In addition, there are different approaches that non-profit organizations use. This paper investigates if the marketing concept is generally applicable when it comes to non-profit organizations, and how to create a marketing strategy for the provision of resources by non-profit organizations. Marketing desk research was conducted and secondary data from the literature dealing with this topic were used. The basic implication of the paper is to show the feasibility of the marketing concept in the non-profit sector. Besides, implications may relate to the need for the application of the marketing concept in non-profit organizations and can indicate important elements in the structuring of marketing strategies for the provision of resources by non-profit organizations that operate in the domestic environment.*

Keywords: *marketing concept, marketing strategies, a nonprofit organization, resources*

1. INTRODUCTION

Marketing concept is usually associated with business enterprises that operate profitably by providing long-term customer satisfaction. So, the question arises whether it is possible to use the marketing concept by non-profit organizations. The question in this paper can be seen at two levels. Firstly, we look at a general level, afterwards there is given analysis of possible application of the marketing concept in the provision of resources by non-profit organization.

The provision of resources is essential for survival, development and operation of nonprofit organizations. It can be identified with the provision of financial resources, human resources, and as well as the provision of resources to non-profit organizations in cooperation with the private sector. At all these levels, arguments may be identified that are in favour of the application of marketing concepts in the process of the provision of resources by non-profit organizations.

2. POSSIBILITIES OF APPLYING THE MARKETING CONCEPT IN NON-PROFIT ORGANIZATIONS

In the standard case, the application of marketing concepts is in the connection with business enterprises that seek to operate profitably by providing long-term customer satisfaction. However, marketing is characterized by ambiguity, so it can be seen as an economic process, a business function, a business concept and as a scientific discipline (Vasiljev, 2005). The above mentioned can suggest that the marketing observation upon the relation of company and the market does not illustrate all the meanings that can be added to marketing. Especially, if one takes into account the fact that goods, services, events, experiences, personalities, places, property, organization, information and ideas are placed on the market nowadays (Kotler & Keller, 2006).

Historically, the marketing concept is one of the ways in which the companies undertook marketing activities in their orientation to the market. Specifically, analyzing the various ways in which the companies undertook marketing activities in their orientation to the market, several competing concepts can be identified: production concept, product concept, sale concept, marketing concept and the concept of holistic marketing (Kotler & Keller, 2006). By using the marketing concept instead of previous philosophy "produce and sell" companies have passed to the motto "feel and react" aimed at the consumer. This motto is arising from the assessment that the essence of achieving company's goals is in greater efficiency in comparison with the competition, when it comes to the creation, delivery and communication of value for consumers in targeted markets. This approach is followed by the concept of holistic marketing, which stems from the need for a more complete, cohesive approach, and which is transcending the traditional application of marketing concepts and trying to accept and reconcile the scope and complexity of marketing activities.

Gašović (2009) points out that if marketing is seen as a mechanism that brings together those who have a need with those who meet the need, it should be noted that such a mechanism exists for non-profit organizations when they make the exchange with participants in program, donors, volunteers, recommended persons, the media and other non-profit and profit organizations etc. (p.112). The differences in marketing of profit and non-profit organizations can be recognized in the key goals of their marketing activities (profit or benefit to the community). The significant adjustment of certain postulates to specificities of non-profit organizations and feasible marketing strategies allow non-profit organizations to fulfil their mission, to research customer needs, to realize program goals and to raise the necessary funds.

Development of non-profit marketing is largely determined by the same factors that have influenced on the creation and operation of nonprofit organizations in society: the growth of privatization, reduction of financial support from traditional sources (government, companies, private donations), and increased volunteerism (Kancir & Đurica, 2011, p. 314). The increase in privatization in the non-profit sector is determined by the need to increase efficiency in resource use and effectiveness of non-profit organizations. The trend of reducing state support and assistance, as well as reducing private donations for financing the non-profit organizations, influenced the development of marketing in the market of donors / financiers. As a result of the need to compensate insufficient funds for financing the activities of non-profit organizations, it comes to increasing volunteerism i.e. involvement of people on a voluntary basis in order to achieve social interests. According to the results of extensive empirical research, non-profit organizations operate more effectively when they apply marketing concept. This is evident when such non-profit organizations are compared to non-profit organizations that do not do business in accordance with the philosophy of marketing (Kancir & Đurica, 2011, p. 316).

3. MARKETING STRATEGY OF NON-PROFIT ORGANIZATION

Marketing activities of non-profit organizations should be aligned with the overall strategy of non-profit organizations, primarily, in terms of coordination of all marketing activities, in order to form a single unit with clearly defined cause-effect relationships. This means that it is necessary to create a marketing strategy for non-profit organizations (Gašović, 2009, p. 112).

Establishing and implementing marketing strategy involves taking a series of activities related to marketing research and factual realizations of marketing. In this sense, it is necessary to conduct marketing research. In the marketing research, situation analysis and perspectives of non-profit organizations are particularly important. The next step is analyzing donors or funders of non-profit organization. Analysis of the employees and / or volunteers is also essential to a nonprofit organization. Competitive analysis is the next step in the process of marketing research. The analysis of the external public is related to all those factors which may not be sorted into any other category important for non-profit organization. Analysis of results may be related to the totality of achieving the mission, but it also relates to less specific goals. It is also necessary to determine (to review) mission in order to answer what task of non-profit organizations is, who are its customers, what is provided to them and what organization's tasks should be in the future. Establishing goals is in most cases related to the general quality level of activities, specific goals of the marketing mix instruments, quantified objectives, offer differentiation and positioning in the minds of the target groups, diversification of the activity into new segments and the like. SWOT analysis is, in fact, an analysis of non-profit organization and its environment by identifying strengths and weaknesses that are typical for a non-profit organization and that can be influenced by non-profit organization. SWOT analysis also includes the analysis of external opportunities and threats that non-profit organization faces in its activities. When it comes to the realization of marketing strategies, non-profit organizations use marketing mix technique, known as "4P". The instruments of marketing mix of non-profit organizations include product, price, place (distribution) and promotion.

4. THE PROVISION OF RESOURCES BY NON-PROFIT ORGANIZATIONS

When it comes to the provision of resources by non-profit organizations, Pavičić (2003), as sources, lists: all citizens, sales and special events, membership fees, regular contributions, large donations and planned grants (p. 282). He emphasizes that for each of the sources listed from the beginning to the end, the collection becomes more demanding and lasts longer.

Andreasen and Kotler (2008) identify three levels of the question.⁴ Firstly, the question is how to secure financial resources. The question of human resources is next. And finally, it can be concluded that a part of resources comes from the private sector to non-profit organizations.

The provision of financial resources by non-profit organization

In connection with the financial resources of non-profit organizations, their two sources can be identified: the collection of funds and generating of their own income. It should be noted that although the non-profit organizations consider fundraising as extremely important, at the same time they should pay attention to the fact that not all sources of financing are equally desirable. On the one hand, they may jeopardize the mission of the organization. It can be caused by external influences, for example, if any funder requires that the results of certain studies should not be published for some years. It can be caused from the side of organization itself, for example, when sources of funding for employee's benefits are being sought although it is inconsistent with the mission of the organization. In addition, some sources are not cost effective: for example, a charity concert that seems it will make a substantial income, actually makes significant costs or sometimes when non-profit organizations sell products that are not related to their basic business.

Fundraising in 21st century is significantly changing: the donor base is being diversified, the collection of funds is being transformed from periodic to the annual cycle, the specialists are being hired to gather funds, databases are being developed in order to track future donors or potential donors, more creative ways to help those in need are being sought. Throughout this process, the Internet plays a special role.

There are four sources of fundraising. These are the foundations, corporations, governments and individuals. When it comes to foundation, there can be identified independent foundations, corporate foundations and communities foundations. Corporations can also directly donate some funds to non-profit organizations, mostly within its own "strategic philanthropy" while attempting to the change of the image of the organization, to create an alliance that would give support to corporations in the period of crisis, to create awareness and interest for the corporation by future customers and future employees, to strengthen the link between employees and distributors, to lead to increased sales. Governments are also donors to non-profit organizations. However, the main source of funds is individuals who donate funds to non-profit organizations. With them, one can see the corresponding relationship between age and patterns of giving. Up to 50, they are mainly engaged in arranging their family life or caring about their careers. They do not have great resources available, but they are regular donors of money, less often of property especially to their churches and synagogues. When people are between 50 and 70, most of them have regulated life issues, most of the obligations in this regard or for children's education are paid, so they are still regular donors, and they become candidates for larger donations, such as, for example, a specific vehicle for non-profit organization, scholarships for students at local colleges or they support larger programs donations. After 70, they reduce the frequency of regular giving's, but they become candidates for giving "the last gift."

When it comes to individual providers, three types of giving can be identified: annual giving, major giving and planned giving. Great benefits allow that 80% of funds available to non-profit organizations are provided by 20% of effort. Planned giving is related to gifts to non-profit organizations that remain after the death of the donor.

Revenues from sales and services are caused, on the one hand, by intensified competition among non-profit organizations, while on the other hand it is a consequence of the efforts of these organizations to make their programs self-sufficient. These revenues are usually realized on the basis of marketing skills, retail operations and additional unique skills of non-profit organizations.

The provision of human resources by non-profit organization

When human resources of non-profit organization are concerned, they involve permanent staff, volunteers, and members of the board of directors.

In connection with employees the need to resolve the issue of human resources at two levels has to be emphasized. Firstly, it is necessary to ignore the frequent and unjustified assumption that the work in a

⁴ This paper is structured according to the classification given by Andreasen and Kotler (2008, p. 349-435).

non-profit organization means that employees need to live on the edge of poverty by receiving the minimum wage. Some examples tell us a different story and show that certain employees of such organizations have salaries and not only that they can be measured, but also they sometimes exceed the amount of money of those who work in similar positions in the profit sector. On the other hand, it is extremely important to make certain aspects of conducting business activities in non-profit organizations closer to those of profit organization in order to move easier from one sector to another.

When it comes to volunteers, firstly it is noted that a large source of volunteers are members of the younger population. However, in certain parts of the world there is a different approach to volunteering, particularly, bearing in mind, and the needs that are caused by certain characteristics of society. In Scandinavia, for example, there are fewer volunteers because the state takes a number of charitable activities and in the U.S., UK or Australia; all of them are undertaken by non-profit organizations.

Finally, members of the board of directors are involved in human resources. They have a role to oversee the operations of nonprofit organizations, make decisions, provide appropriate technical analysis and connect organization with the environment.

The provision of resources by non-profit organization in cooperation with the private sector

When it comes to cooperation of non-profit organizations with private sector, firstly it should be point out that this is one of the important ways in which it is possible to obtain resources. The cooperation between nonprofit organizations and advertising agencies has been significant and successful.

Cause related marketing should be specially mentioned within the cooperation of non-profit organizations and the private sector.

5. APPLICATION OF MARKETING CONCEPT IN PROVIDING RESOURCES BY THE NON-PROFIT ORGANIZATION

For each of these areas in which non-profit organizations are providing resources there can be found out connection with the application of marketing concept. In the literature, there can be found a view that activities in connection with the provision of resources, even though being a part of the overall marketing strategy, can be regarded as a separate strategic and tactical issues because of a significant number of people who specializes in these activities and because this issue is widely treated in literature (Pavičić, 2003, p. 281). However, possibilities and advantages of the use of marketing concept in the process of providing of resources by non-profit organizations will be primarily in the focus of this paper.⁵

It should be noted that when all these resources are concerned, it is extremely important to find an appropriate way to "sell" your offer to various actors who are relevant for non-profit organization. It is also important to emphasize the role of personal contact in such situations and to know the personal sales process (Gašović, 2010). This process is, of course, understood in a way customized with a variety of possible situations in which a non-profit organization may be while in the process of providing resources. Firstly, there is the need to find potential "customers" and to determine their characteristics which contribute to avoid the unnecessary loss of time or misallocation of sales efforts. Then, it is important to be prepared for "sales performance" by collecting additional information and planning the visit, which includes establishing goals, developing strategies and ultimately the scheduling of the meeting. The presentation refers salesman performance, start of presentation and convincing potential customers using different techniques of presentation. It is important to know how to behave when there are potential objections of customers. The following stage is the stage of closing. The process does not have to end up here. Post sale activities that follow are not less important for building long term relationships with customers.

The application of marketing concepts in the provision of financial resources

When it comes to fundraising, three different concepts can be identified as a possible source of financial resources. The first is the product concept with a slogan "We have a good goal, people need to support us." This concept is used by churches and colleges, most of them are supported by a small number of major donors for who are organized glamorous events. The second concept is sale concept characterized

⁵According to Andreassen and Kotler (2008, p. 349-435).

by: "There is strong competition for resources, and people generally are reluctant to give, so if we want to grow, we must be more aggressive." Sales efforts are accompanied by dramatic emotional appeals and propaganda that are characteristics of this approach. The last approach refers to consumer orientation (marketing concept) where there is characteristic attitude: "Like all the other marketers, our challenge is to understand needs and desires of our targeted market and then to find a way to fulfil them." Most of the time is spent in an effort to understand donors and potential donors and to answer what they seek.

An example of successful application of the latest concept is the organization of United Way of America. In fact, they realized that they are not successful in getting donations from increasingly important group of young business people - professionals. They dedicated themselves to this problem and they found out that the main difference of this segment in comparison to other donors was that they were significantly committed to investment in shares of various companies in the market. This characteristic considered a choice among purchasing shares of different companies in order to diversify risk in portfolio so the segment of young people was used to having a choice and a lot of information on possible alternative courses of action. Considering donating to non-profit organization, the problem was that they didn't have a clear attitude towards what amount of money that should invest, and what their options were. The classic appearance of non-profit organizations that did not offer them alternative investments and did not provide a lot of information but not lack of will, was the reason for the lack of humanitarian activities in this segment. By changing the United Way of America to "Charity Investment Chancellor" that allowed to mentioned category of donors to "invest" in the charity and offered a wide range of possible directions of money, the great success was accomplished and organization started receiving significant funding.

When it comes to fundraising sources (foundations, corporations, governments and individuals) there should be emphasized several elements related to the implementation of the marketing concept. Firstly, in connection with foundations, it is necessary to find a connection between the interests of foundations and non-profit organizations offer. In addition, it is important to estimate the expected level of interest of foundations to invest adequate resources. In this regard it is important to write a proper proposal for which is necessary to study the needs and interests of the foundation. When searching for the appropriate corporation that could donate to certain funds, non-profit organizations should seek corporation with similar features: it has to be local, to be engaged in activities in similar occupations, to have personal ties or contacts and to have adequate structural similarity as well.

Individuals as sources of funding non-profit organizations often provide that 80% of the funds are available to non-profit organizations with 20% of effort. So, the application of marketing concept in this context is extremely important. Namely, in order to organize effective annual giving campaign, a company needs to fulfil several requirements: to provide strong leadership to volunteers and support of staff, to determine a clear organizational structure, to have ambitious but realistic goals, to make a careful segmentation of donors and prospects, to make the preliminary research, to conduct training of volunteers in area of legal consultation, to make a detailed schedule of activities, to have reporting, to give recognition to donors and volunteers, to provide the option of online donating and to build donors for their whole life. The ways in which donating events can be organized are: auction, charity dinner, dinners with invitations, balls, fairs, fashion events, small gatherings at home of sponsors, meeting of the famous and the like.

The application of marketing concepts in the provision of human resources

Marketing is essential for reaching the appropriate human resources. There are two major issues when it comes to volunteers in non-profit organizations: their recruitment and management. When it comes to recruiting volunteers, it should start from the existing data to identify the segments from which is the most appropriate to recruit volunteers. Then you have to target specific segments and to take position in their minds by presenting them volunteering and the organization. Attention should be paid to the competition, but in a broader sense. There are four levels of competition. It may be in terms of competing the inertia that exists when the attitude to the activities of non-profit organization is concerned. The second level is the level of different contributions that an individual could give (donations, free services or just volunteering). Then it comes to a decision among various broad categories in which it is possible to work with the non-profit sector. And finally, it refers to the question about the choice of the specific organization.

Certain benefits need to be presented to potential volunteers (career advancement, self-satisfaction, strengthening social ties, understanding the environment, value expression), as well as the sacrifices that volunteering brings. It is surprising that researches show that as the required level of volunteer involvement increases, the motivation of people to embrace volunteerism increases as well. It is also

important to think about ways to make it possible to concretize one's desire to volunteer, and provide a test of experience and internal marketing activities to volunteers that would be tied to the organization.

Considering the management of volunteers, there has to be noticed that there is a space for possible conflicts especially in the relationship between full-time employees in certain non-profit organization and volunteers. On the one hand, the volunteers often assume that since they donate their services to the organization, they shouldn't be told what to do, but they should be asked to do something, that one should respect the schedule of their other activities when entrusting them the tasks and that they deserve a pronounced appreciation for their commitment. On the other hand a volunteer is, very often, regarded as a dilettante in the non-profit organization. They are regarded as people who receive training casually, and very often cannot execute the orders of others since they are the heads of their organizations. They are also regarded as people avoiding any demanding job in a non-profit organization.

In order to narrow the available space for conflict, the model of relationships with volunteers is proposed. It includes:

1. Identification of appropriate skills of volunteers and giving them tasks for which these skills are most appropriate.
2. Assignment of responsibility for certain tasks in detail and in advance.
3. Providing appropriate objectives and measures of performance,
4. Informing volunteers about the goals and expectations.
5. Informing that if the goals are not met, volunteers will be asked to leave or will be assigned to the harder task.
6. Insistence on respect of these standards and rules in order to make it clear that the management is firm considering their observance and implementation.

When recruiting members of the Board of Directors the application of marketing concepts plays an important role. Namely, it is necessary to start from their needs and desires, and they can be offered financial incentives and incentives in terms of achieving social responsibility, development and ideology.

The application of marketing concepts in providing resources in cooperation with the private sector

The most common motives for advertising agencies to cooperate with non-profit organizations are business contacts, increasing the "goodwill", the personal psychological satisfaction of its own employees, possibilities to express personal and organizational creativity and opportunity for young staff to gain valuable experience without fear to undermine their own important business partner. Non-profit organizations, like in the case of managing volunteers, should in the same manner contact with the staff of the private sector: treating them as paid professionals, instead as someone who works for charity. Also, it is necessary to take into account that such cooperation avoids endangering the realization of the objectives of non-profit organizations.

When it comes to cause related marketing, firstly it is necessary to distinguish it of corporate social responsibility and corporate philanthropy. Corporate social responsibility refers to the entire company's responsibility towards society, including the relationship with employees and the environment, corporate ethics and accounting practices and the like. Corporate philanthropy refers to help of companies to non-profit sector. But its goal is not to promote these companies. Because related marketing is an arrangement under which a corporation seeks to increase its own sales by contributing to the achievement of the objectives of one or more non-profit organizations. As the beginning of this practice is American Express decision in 1982 to donate a few pence to artists every time when someone uses American Express credit card, or a few dollars when they get a new member.

Generally, there are several forms in which the private sector has contributed to certain socially responsible goals. The first is promoting of socially responsible behaviour without connection to a particular non-profit organization. Another form is when a private company, in cooperation with the non-profit organization, promotes certain socially responsible behaviour, without expecting a refund in a direct manner. The third form of promotions aims to increase the sales of private companies. The following is a form of licensing and co-branding when, for example, a non-profit organization provides a license for a private company logo and expect material compensation. In addition to these, we should mention the internet support, volunteering or helping the expert knowledge.

Relations between private companies and non-profit organizations may go through three stages. The first is 'philanthropic' where non-profit organization looks for donations of private companies in a traditional way. The second is 'transaction' where the particular partnership is formed. Cause related marketing is part of this category. The third is the 'integration' stage where the mission, employees and partners' activities start to connect more closely.

Multiple benefits can be attached to using because related marketing. On the one hand, the company increases its sales, while non-profit organizations receive direct financial payments or donations of goods, services and volunteers. In the long run corporations can positively contribute to the morale of their own employees, the investor's attractiveness and the establishment of new forms of cooperation. For non-profit organization, in the long term benefits can be identified in terms of increased revenue, the impact on the mission, the increased visibility of the messages, the access to new audiences, the access to corporate networks, employees, suppliers, distributors and, as well as, expertise in marketing, strategy development, and other experiences.

On the other hand, one should not forget the risks that are possible consequences of such cooperation. When it comes to the private sector, it is usually the allegations that the engagement in such activities is a way to blur a clear picture of the basic unethical business. For non-profit organizations, there is a risk that other sources of fundraising decline and non-profit organization can be accused that it has "sold its soul" to corporations. The blurred image can be a special danger for both.

All these points show the need for the careful development of marketing strategies in the use of cause related marketing. First of all, in fact, it is necessary to identify potential partners, and then to choose the one with which there is mutual interest and to exclude those with which can occur conflict of interest. It is necessary to consider how the proposed cooperation can contribute to the goals of private companies, to design proposal of joint cooperation well and to describe in detail the role in that cooperation. In addition, it is important to involve the public, make long-term cooperation, ask for respect of certain flexibility of non-profit organization, and look at the results of cooperation in the honest way and clearly point out what a private company gets with its cooperation.

6. CONCLUSION

The application of marketing concept is, in the standard case, in connection with business enterprises that seek to operate profitably by providing long-term customer satisfaction. However, if marketing is seen as a mechanism that brings together those who have a need with those who meet the need, it should be noted that such a mechanism exists in non-profit organizations when they make the exchange with participants in program, donors, volunteers, recommended persons, the media, other nonprofit organizations, profit organizations, etc.

Marketing activities of nonprofit organizations should be aligned with the overall strategy of non-profit organizations, primarily in terms of coordination of all marketing activities in order to form a single unit with clearly defined cause-effect relationships. This means that it is necessary to create a marketing strategy for non-profit organizations. In the marketing strategy the issue of securing funds by nonprofit organizations is important. In addition, three levels of this set of questions are identified. First, the question is how to provide financial resources, then human resources and ultimately question is the provision of resources for non-profit organizations in cooperation with the private sector.

To each of these areas in which non-profit organizations provide the resources can be linked the application of marketing concept. When it comes to financial resources, non-profit organizations may apply a consumer oriented approach, where all marketers try to understand the needs and desires of targeted markets and then to find ways to fulfil them. Most of the time is spent in an effort to understand donors and potential donors and to answer what they seek.

When organization provides human resources, application of the marketing concept is expressed both in terms of volunteers and the members of the board of directors. Elements of the marketing concept should be applied in recruitment for both of these functions in a non-profit organization. When it comes to volunteers, it is important to identify the segments from which it is the best to recruit volunteers, target them and position among the members of these segments, taking into account the whole process and competition. When recruiting members of the board of directors it should proceed from their needs and desires, and they can offer financial incentives, and incentives in terms of achieving social responsibility,

development, and ideology. After recruitment, while managing volunteers, it is extremely important to rely on principles of internal marketing.

In cooperation with the private sector the application of cause related marketing is particularly important. Because related marketing is an arrangement under which a corporation seeks to increase its own sales by contributing to the achievement of the objectives of one or more non-profit organizations. Multiple benefits can be attached to using because related marketing, both for the private company and for non-profit organization. In doing so, it is necessary to develop marketing strategies carefully: from the identification and selection of potential partners, thinking about how the proposed cooperation could contribute to the objectives of private companies, creating proposals of cooperation with detailed description of the role in it, all to the engaging the public, making cooperation to be long-term, requiring compliance with certain flexibility of non-profit organizations and considering fairly the results of cooperation with stating in a clear way what private companies get from that cooperation.

Basic implications of the paper may relate to the necessity of application of marketing strategies in order to provide resources by non-profit organizations as well as to indication to the important elements in the structuring of marketing strategies in order to provide resources by non-profit organizations. The mentioned solutions are applicable when it comes to non-profit organizations that operate in the domestic environment as well and in authors' opinion necessary in such an environment.

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A CONJOINT-BASED APPROACH TO MARKET SEGMENTATION

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Abstract: *In the today's highly competitive business environment, identifying unique market segments is both a reality and a necessity for every company. Essentially, there are two basic approaches to market segmentation: a-priori and post-hoc. A priori segmentation requires the researcher to first choose variables of interest and then classify customers according to that feature, while in a priori segmentation, the number of segments, their relative size, and their description are known in advance. This paper deals with the applicability of a technique known as conjoint analysis to both segmentation approaches. Conjoint analysis is one of the best methods of measuring benefits sought by customers, where measuring actual or perceived benefits lies at the heart of most market segmentation approaches. Understanding what people value most in products or services allows to tailor marketing programs so as to communicate those benefits and redesign the existing products or create new products with those benefits in mind.*

Keywords: market segmentation, conjoint analysis, part-worth utility, preference-based segmentation.

1. INTRODUCTION

In today's highly competitive marketplace, locating and specifically targeting unique market segments is both a reality and a necessity for most companies. Creative market segmentation strategies often afford the company a strategic advantage over its competitors.

Market segmentation was first defined as a condition of growth when core markets have already been developed on a generalized basis to the point where additional promotional expenditures are yielding diminishing returns (Smith, 1956). There was later widespread agreement that they form an important foundation for successful marketing strategies and activities (Wind, 1978; Hooley & Saunders, 1993). And now, market segmentation aims to divide markets comprised of individuals into groups whose characteristics are relatively homogeneous within each set or segment and heterogeneous between segments, based on an identified set of variables (Kara & Kaynak, 1997).

Along with product positioning, market segmentation is one of the most talked about and acted upon concepts in marketing. The basic ideas are (Green & Krieger, 1991):

- Market segmentation presupposes heterogeneity in customers' preferences for products/services.
- Preference heterogeneity for products/services can be related to either person variables (e.g. demographic and psychographic characteristics, product usage, brand loyalties, etc.) or situational variables (e.g., type of meal in which beverage is consumed, buying for oneself versus a gift for someone else, etc.), and their interactions.
- Companies can react to preference heterogeneity by modifications of their current product/service attributes including price, distribution, and advertising/promotion.
- Companies are motivated to do so if the net payoff from modifying their offerings exceeds what the payoff would be without such modification.
- A company's modification of its product/marketing mix includes product line addition/deletion decisions as well the repositioning of current offerings.

Market segmentation and product positioning are indivisible related. This is due to the fact that customers and sellers seek mutual accommodation in product/service offerings that best satisfy customers preference and sellers profit objectives. This process takes place in a competitive milieu of other brands/suppliers in the same product category or even other categories of goods competing for the customer's budget.

The benefits of market segmentation have been seen to include an ability to gain a fuller understanding of a particular market, improved techniques to predict consumer behaviour, and an improved ability to identify and exploit new market opportunities for commercial benefit (Hoek et al., 1996). Where the company can create a more fine-tuned product or service offering and price it suitably for the target segment (Kotler, 2000) for which the company can more easily select the best distribution and communications channels, and also have a clearer picture of its competitor. The information of the

segments also helps the decision makers to deploy resources more effectively and efficiently and determine the particular competitive strategies (i.e. differentiation, low cost, or focus strategy) (Aaker, 2001).

In order to be a true market segment, the customers in each segment must respond differently to variations in the marketing mix compared with those in other segments. This implies that for any classification scheme to qualify as market segmentation, the segments must exhibit these behavioural response differences (Neal, 2005).

Green and Tull (1978) set four basic criteria for market segmentation:

1. The segments must exist in the environment (and not be a figment of the researcher's imagination),
2. The segments must be identifiable (repeatedly and consistently),
3. The segments must be reasonably stable over time, and
4. One must be able to efficiently reach segments (through specifically targeted distribution and communication initiatives).

This paper will explore various methods for market segmentation with emphasis on two approaches: *a priori* and *post hoc* segmentation. Special attention will be paid on applicability of technique known as conjoint analysis to both segmentation approaches.

Conjoint methods of analysis were first developed in the 1960s by mathematical psychologists and statisticians Luce and Tukey (1964). Because people tend to be better at giving well-ordered preferences when evaluating options together ("conjointly") rather than in isolation, the method relieves a respondent from the difficult task of accurately introspecting about the relative importance of individual attributes for a particular decision (Green & Rao, 1971).

Conjoint is one of the best methods of measuring benefits sought by customers. Actually, measuring actual or perceived benefits lies at the heart of most market segmentation approaches. Understanding what people most value in products or services allows to tailor marketing programs to communicate those benefits and redesign existing products or create new products with those benefits in mind.

2. MARKET SEGMENTATION METHODS

A market segmentation strategy requires a major commitment by the company. A company adopts either a mass-market strategy or a market segmentation strategy. There is no in-between. Market segmentation has several benefits over mass marketing as it provides the opportunity to expand a market after satisfying the specific needs of particular consumers

When a decision is made to explore a market segmentation policy, two immediate questions must be addressed: What method is to be used to segment the market, and on what basis will the market be segmented? (Neal, 2005)

The literature discusses two main approaches to segmentation. They are *a-priori* and *post-hoc* or data driven (Dolnicar, 2004; Kara & Kaynak, 1997; Wind, 1978). In *a priori* segmentation, the number of segments, their relative size, and their description are known in advance while in *post hoc* segmentation, these three characteristics are found after the fact.

A priori segmentation is a procedure whereby a company chooses to break out customer groups by a generally accepted classification procedure related to variations in customer purchase or usage of the product category. This grouping may be the result of company tradition, recognized industrial groups, or some other external or internal criteria. *A priori* segmentation requires the researcher to first choose variables of interest and then classify buyers according to that designation (Wind, 1978).

While an *a priori* approach may guarantee within segment similarity by ensuring, for example, that all segment members come from similar geographic regions and income ranges, this does not necessarily mean that all segment members will respond in the same way to marketing stimuli (Hoek et al., 1996). Therefore, the second approach is to segment markets on a *post-hoc* basis where the researcher chooses a range of interrelated variables and then clusters buyers into groups whose average within-group similarity is high and whose between group similarity is low (Wind, 1978). This approach may result in

segments that are not necessarily internally consistent. Even if researchers can identify groups with similar attitudes or usage habits, members often possess different demographic characteristics making marketing decisions such as media buying, difficult to action (Hoek et al., 1996).

Traditional a-priori and post hoc methods differ with respect to the selection of an appropriate base. A-priori methods require the analyst to select of a base for segmentation prior to analysis while post-hoc methods from a base for segmentation after analysis (Hoek, et al., 1996; Tynan & Drayton, 1987; Wind, 1978).

The bases available for *a priori* segmenting a market are nearly unlimited and can include (Neal, 2005):

- Standard Industrial Classification groups,
- Geographic regions or sales territories,
- Basic demographic groups (e.g., sex, age, household composition),
- Purchase or usage groups (e.g., heavy users, light users, nonusers),
- VALS (SRI's Values and Life Styles classification system), and
- PRIZM, or similar geo-demographic classification systems.

Post hoc segmentation is empirically derived based on the results of a research study undertaken for the specific purpose of segmenting a market. Segments generated from such a study are formed by aggregating customers who respond similarly to a set, or sets, of basis questions. The most critical question facing the researcher in conducting a post hoc segmentation study is selecting the basis variables for the segmentation. It takes an astute and product-experienced researcher to choose the relevant set. Examples include: product attribute preferences, values, product purchase patterns, product usage patterns, benefits sought, brand preferences, price sensitivity, brand loyalty, deal proneness, lifestyles, attitudes and opinions toward one's environment (Neal, 2005).

In general, there are four major classes of traditional algorithms for conducting post hoc segmentation studies. They are:

1. Cluster analysis,
2. Correspondence analysis,
3. Search procedures, and
4. Q-type factor analysis.

Among clustering methods, the K-means method is the most frequently used (Anil et al., 1997). Correspondence analysis procedures are gaining some popularity in the applied marketing research arena. Search procedures are also widely used, especially for segmenting large databases, while Q-type factor analysis has been mostly discredited and is seldom used (Neal, 2005).

3. SEGMENTATION IN THE CONJOINT ANALYSIS FRAMEWORK

3.1. Conjoint analysis concept

Conjoint analysis is a methodological tool that allows studying consumer preferences among multiattribute alternatives in a wide variety of product and service contexts (Green & Srinivasan, 1978). This technique has its origin in psychological research (Luce & Tukey, 1964). The term "conjoint" derives from the idea that buyers evaluate an overall product or service based on its multiple conjoint attributes – also called features (Orme, 2006). As opposed to traditional expectancy-value models, conjoint methodology is characterized by a decompositional approach (Green & Srinivasan, 1978, 1990; Jaeger et al., 2000). In other terms, products or services are thought as possessing specific levels of defined attributes, and respondents' liking for a product is modelled as the sum of the partial utilities for each of its attribute levels. Therefore the purpose of the research is to determine the contributed portion of each attribute level to the dependent variable (Moore, 1980).

Conjoint analysis assumes that a consumer assigns a utility value to each level of each attribute and makes his or her final decision based on the total utility values across attributes for a given choice set (Green & Srinivasan, 1978, 1990; Jaeger et al., 2000; Marshall & Bradlow, 2002). Assuming that a product can be defined as a vector in a multidimensional attribute space, and that the evaluation of the product is based on its attribute levels, it becomes theoretically possible to relate preference to attributes (Janssen et al., 1991).

In contrast to direct questioning methods that simply ask how important each attribute is or the desirability of each level, conjoint analysis forces respondents to make tradeoffs like the ones they encounter in the real world.

A conjoint analysis study includes the following key steps:

1. *Attribute list formulation.* A business problem is defined and an attribute (features) list as well as their performance levels is developed to study the problem.
2. *Experimental design construction.* The attribute levels are combined to create different alternatives called profiles or concepts. It should be decided which profiles to present to respondents
3. *Data collection.* Respondents are asked to express the trade-offs they are willing to make among product features by rating, sorting or choosing among hypothetical product profiles.
4. *Utility calculation.* A set of preference values (also called part worth utilities or part-worths) is derived from the interview data; they reflect the trade-offs each respondent made.
5. *Market Simulation.*

Conjoint analysis is based on the assumption that each product (service, idea) is composed of an almost infinite number of attributes. However, not all attributes are relevant to different customers. Therefore an important step in conjoint measurement is to define which attributes and levels do influence the most customers' preferences. To be included in the analysis, attributes should meet the following criteria:

- Relevance (they need to be relevant in the company's decision making)
- Influence (they can be influenced by company)
- Independence (attributes and levels should not interact)
- Compensatory (can be substituted one with the other in company's perceptions)
- Understandable (not misleading)

The attribute levels are combined to create different alternatives called profiles (see Figure 1).

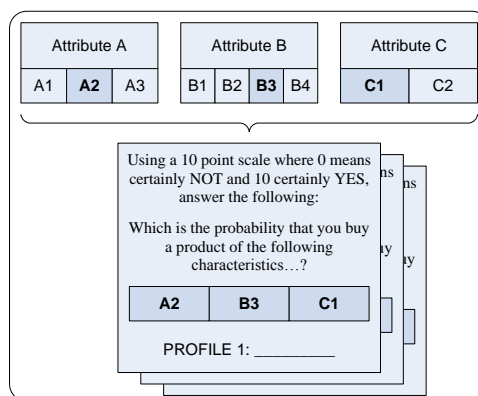


Figure 1: Creating profiles in conjoint analysis

The experimental procedure involves profiles being presented to respondents who are invited to express their preference by rating or ranking these profiles. Preference functions are estimated from this data, using ordinary least squares regression for rating the data, and ordinal techniques when the rankings are obtained. These functions assume preference, or utility, to be a linear-in-parameters function of the attributes that are included in the profiles.

It would be time consuming and difficult for respondents to evaluate all possible product combinations in order to provide information on their values for the various product features. Conjoint analysis offers the researcher a more efficient way to obtain such information: only a carefully chosen set of hypothetical product profiles is presented to respondents for evaluation. For that purpose, an orthogonal matrix should be developed, which allowed to screen and reduce the number of attributes and levels in order to keep the number of product profiles to a manageable size.

By analysing the answers conjoint analysis can estimate the weights and preferences respondents may have placed on the various features in order to result in the observed product preferences. The simplest

and most commonly used model is the linear additive model. This model assumes that the overall utility derived from any combination of attributes of a given good or service is obtained from the sum of the separate part-worths of the attributes. Thus, respondent i 's predicted conjoint utility for profile j can be specified as follows:

$$U_{ij} = \sum_{k=1}^K \sum_{l=1}^{L_k} \beta_{ikl} x_{jkl} + \varepsilon_{ij}, \quad i=1, \dots, I, \quad j=1, \dots, J, \quad (1)$$

where I is the number of respondents; J is the number of profiles; K is the number of attributes; L_k is the number of levels of attribute k . β_{ikl} is respondent i 's utility with respect to level l of attribute k . x_{jkl} is a (0,1) variable that it equals 1 if profile j has attribute k at level l , otherwise it equals 0. ε_{ij} is a stochastic error term.

Part-worth utilities (β_{ikl}) are estimated by a regression analysis. These parameters can be used to establish a number of things. Firstly, the value of these coefficients indicates the amount of any effect that an attribute has on overall utility – the larger the coefficient, the greater the impact. Secondly, part-worths can be used to calculate the relative importance of each of K attributes, which is known as an *importance score* or value. These values are calculated by taking the utility range for each attribute separately, and then dividing it by the sum of the utility ranges for all of the attributes. Thus the relative importance that i th respondent assigned to the attribute k is given by

$$F_{ik} = \frac{\max\{\beta_{ik1}, \beta_{ik2}, \dots, \beta_{ikL_k}\} - \min\{\beta_{ik1}, \beta_{ik2}, \dots, \beta_{ikL_k}\}}{\sum_{k=1}^K (\max\{\beta_{ik1}, \beta_{ik2}, \dots, \beta_{ikL_k}\} - \min\{\beta_{ik1}, \beta_{ik2}, \dots, \beta_{ikL_k}\})}, \quad i=1, \dots, I, \quad k=1, \dots, K \quad (2)$$

The results are then averaged to include either all the respondents belonging to a priori identified segments or respondents with similar preferences.

Using above presented model (1), every respondent's needs are modeled by an individual utility function - the functional form of the model is the same for all subjects, but the parameters of the function (betas) will differ. An aggregate model (using one model for all subjects) is also possible. However an aggregate model is likely to mask differences in preferences for different market segments. Individual models or models for separate market segments are likely to have greater predictive validity than aggregate models (Green & Srinivasan, 1990).

Overall utility scores (U_{ij}) for each of the possible concepts (profiles) can be estimated for different combinations of attributes by inserting the appropriate part-worths into Eq. 1. These utility scores can be further used to predict the market shares for each of the defined combinations. There are three most common choice rules to transform part-worths into the product choices that customers are most likely to make. They are maximum utility, share of utility, and logit rules, while the logit is one of the most common used rules. A logit model represents the probability that customer i will choose the j th profile from a set of m exiting profiles on the market, and can be expressed as:

$$P_{ij} = \frac{e^{bU_{ij}}}{\sum_{j=1}^m e^{bU_{ij}}}, \quad i=1, \dots, I, \quad j=1, \dots, J. \quad (3)$$

The exponent b is used to fine-tune the results so that they reflect the current customer behaviour on the market more accurately. However, the real power of conjoint analysis is the ability to both predict preferences for profiles that weren't rated by the respondents, and to perform a *what-if analysis*. This can be done using *conjoint simulation models*. Market simulations make it possible to find out all hidden effects that could have influence on products' market share.

3.2. Segmentation based on conjoint data

As mentioned above, conjoint analysis is well suited for the implementation of both types of market segmentation: *a priori* and *post hoc* (see Figure 2.). It is possible for several reasons. First, the focus of conjoint analysis is squarely on the measurement of customer preferences for product attribute levels (including price) and customer benefits that may flow from the product attributes. Second, conjoint

analysis is a micro-based measurement technique. Part-worth functions (i.e. preference for attribute levels) are measured at the individual level. Hence, if preference heterogeneity is present, the researcher can find it. Third, conjoint studies typically entail the collection of respondent background information (e.g., demographic data, psychographic data). One should bear in mind, however, that customer background variables, particularly demographic ones, do not necessarily correlate well with attribute preferences (Moore, 1980). Increasingly, background data include information collected on respondents' perceived importance of purchase/use occasions. Fourth, even rudimentary conjoint studies usually include a buyer choice simulation stage in which the researcher can enter new or modified product profiles and find out who chooses them versus those of competitors. Wind (1978) calls this approach flexible segmentation.

It should be noted that there are two types of conjoint data which can be used as variables for market segmentation: importance values of attributes and part-worth utilities of attribute levels. Consequently there are two types of conjoint-based post hoc segmentation, also known as *preference-based segmentation*:

- importance-value-focused post hoc segmentation
- part-worth-focused post hoc segmentation

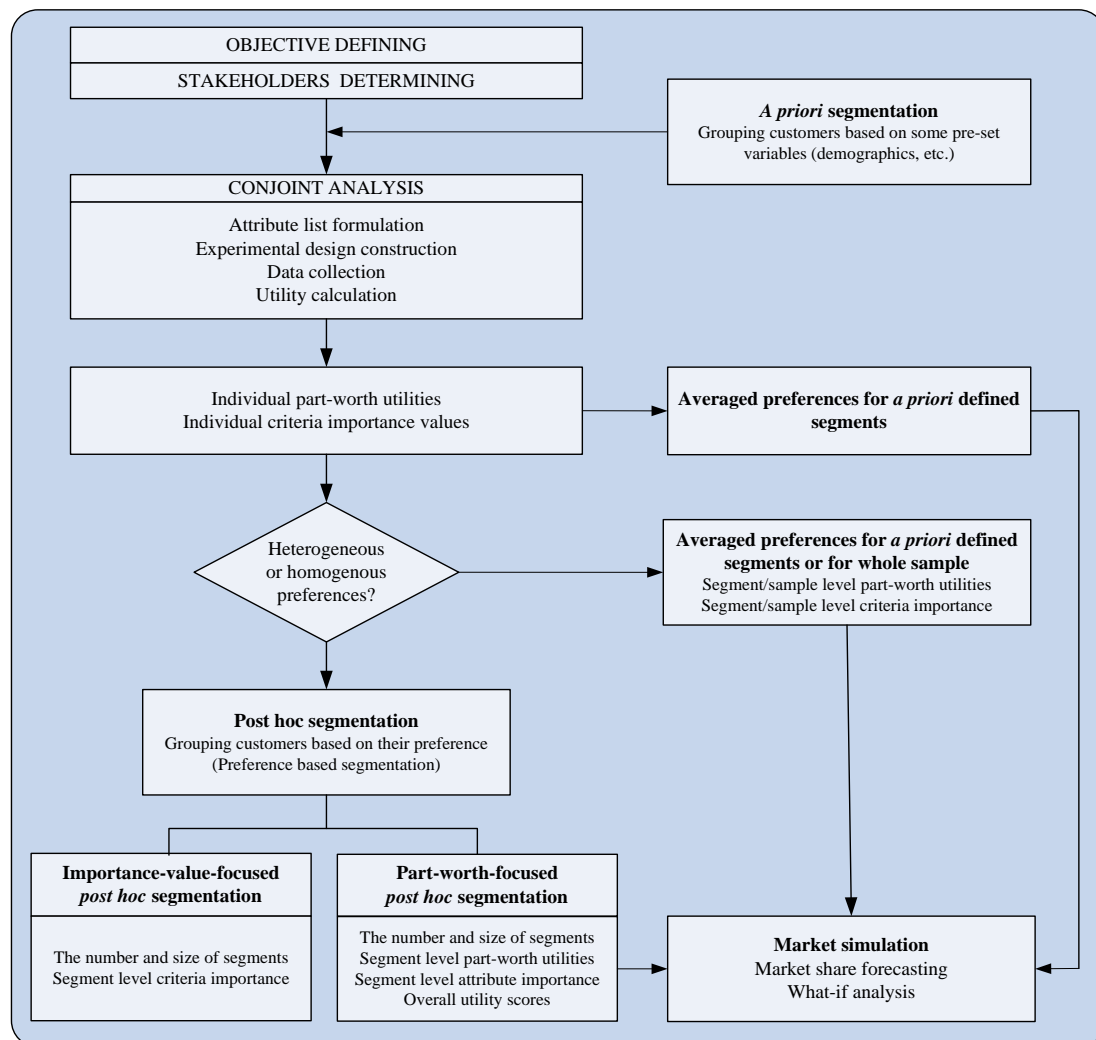


Figure 2: Conjoint analysis implementation procedure and its application for market segmentation

At first glance it seems that the *importance-value-focused post hoc segmentation* is enough simple and suitable. Although in many cases this approach gives good results, it is not always adequate. The reason is that it lacks the ability to identify heterogeneity within the attribute. For example, importance-value-focused segmentation may indicate that a brand is a very important attribute in segment 1 (let us assume that its significance for segment 2 is negligible), but it could not indicate whether the members of segment 1 prefer different brands differently.

Disadvantages of this approach to post-hoc segmentation can be overcome by using part-worth-focused segmentation. Segmentation of conjoint part-worths produces true "benefit segments", i.e. respondents who place similar value to the various attribute levels will be grouped together into a segment.

Widely used method for preference-based segmentation across industries is K-means cluster procedure (Kuzmanovic et al., 2012; Mankila, 2004).

Another procedure is *Latent class segmentation*, tool for discovering segments of respondents who tend to have similar preferences manifest within CBC (choice-based conjoint) data. This approach requires larger sample sizes than traditional cluster analysis, but it is the most useful when researcher does not know (or cannot make a good guess about) the number of segments.

One more procedure is *Hierarchical Bayes procedure*. Let us assume that customers come from one or more populations (i.e., from a finite mixture of populations), but that customers in each population have different part-worth functions determined according to a specified distribution (e.g., multivariate normal). It can be then estimate the "posterior point estimates" of each respondent's part-worth function, conditional on that respondent belonging to a given population (segment). These part-worth estimates may be used in simulations to determine the expected market share for any specified product in any segment, and across the overall population. Hierarchical Bayes methods are computer-intensive, but software packages are now available to simplify their practical applications.

4. CONCLUSION

Market segmentation is a powerful and well-developed marketing tool. A properly segmented market can improve marketing, distribution, and manufacturing efficiency and generate additional profits and/or market share. It is crucial to choose those variables that form the appropriate basis for market segmentation. Therefore, market segmentation research, especially baseline segmentation research, must be carefully planned and executed, using the highest professional research standards.

The purpose of this paper was to point out the applicability of conjoint analysis for both a priori and post hoc market segmentation. Conjoint analysis defines precisely the performance levels of studied product attributes, whereby ensuring that respondents and researchers understand the research question more clearly. Conjoint analysis allows measuring and analysis of consumer preferences even for individual respondents, thereby enabling the segmentation and clustering of customers. An additional advantage is that a conjoint analysis can be conducted on small samples, which is particular useful in business-to-business settings that are characterized by a relatively small sample size.

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MARKETING INNOVATION THROUGH DIGITAL ADVERTISING

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Abstract: *The beginning of the 21st century is marked by an increasing number of media and marketers. This new trend is caused by increasing use of the Internet, which began in 1990s. Advertising through the web is becoming the most popular medium, connecting customers directly to advertisers by clicking on ads. The focus of this paper is on exploring different ad types, formats and revenue models. Furthermore, successful promotional campaigns using digital advertising are presented. The final part of this paper focuses on analysing pros and cons of this new form of advertising, and how companies and customers can benefit from the use of innovative technologies in promotional activities. Finally, projections of future trends and concepts are given in the form of suggestions for all parties included.*

Keywords: *digital marketing, digital advertising, Internet, ad formats*

1. INTRODUCTION

With growing use of Internet and online media, new trends are emerging in both marketing and advertising. Jared Reitzin (2007) point out that "Digital Marketing is the practice of promoting products and services using database-driven online distribution channels to reach consumers in a timely, relevant, personal and cost-effective manner". Digital media, or new media, refers to any video or audio content that exists in digital formats and are distributed via the internet (Ming, Kumar & Whniston, 2008), or more generally to any media that publish or diffuse information goods in digital formats (Shapiro & Varian, 1999). A digital campaign can easily be tracked and measured, along with many following parameters, including frequency of views and details about purchases. All of the previously stated points out the new direction in advertising, the switch from traditional to new and innovative form of advertising. Companies are becoming aware of this, and the funds from the promotional budget for digital advertising are increasing every year. Other main reasons for this switch include: the improvement of technologies, focusing on two-way communication with customer, easier communication with target groups and "behavioural targeting" that enables companies to focus on sending personalized message to customers.

Online advertising or online ad is a "form of promotion that uses the Internet and World Wide Web for the expressed purpose of delivering marketing messages to attract customers". Harker (2008) defines online or Internet advertising as, "any form of commercial content available on the internet, delivered by any channel, in any form, designed to inform customers about a product or service at any degree of depth". Jensen (2008) states that internet advertising consists of three primary constituents: display advertising – which includes banners, pop-ups and interstitials; search engine optimization (SEO) and search engine marketing (SEM) – including paid and unpaid SEO and SEM (e.g. Google Adwords); and, affiliate programs, where a marketer's link (e.g. Amazon) is provided on a host's website.

Search engine optimization (SEO) and marketing can be organic or paid for. Organic SEO represents the achievement of high listings on a search engine without payment. Paid for SEO, also referred to as search engine advertising (SEA) is commonly identified as Google Adwords. Under this approach, marketers use keywords to indicate what the ad is about – subsequently paying not for the appearance of the ad, just when someone clicks on it. In effect, consumers are affirming that the ad is relevant and not intrusive to their interests at the time (Clarke, 2008).

2. THE LOGIC BEHIND ONLINE ADVERTISING

When it comes to traditional marketing promotion techniques (TVC, radio, print) the supplier of media space is evident – it is the TV/radio station or a newspaper company. But when it comes to online advertising, who should an advertiser call when he want to place his ad? That's what Ad Servers are for. An Ad server is a technology that places advertisements on web sites, and delivers most of these types of ads. Ad serving companies provide software (to web sites and advertisers) that is able to serve ads, count them, choose the ads that are best fitted for the content of the website, and monitor the success and progress of advertising campaigns. An ad server also helps the publisher monitor and manage the

available advertising space on a website. One of the fastest growing ad server companies in the world is *DoubleClick* - a subsidiary of Google that develops and provides Internet as server services. Its clients include publishers who serve customers like Microsoft, General Motors, Coca-Cola, Motorola, L'Oreal, Palm. Inc, Apple Inc., Visa USA, Nike, Carlsberg etc. Since 2008 Google controls estimated 69% of the online advertising market (Browser Media, 2008)

So, what the ad server does is store advertisement and deliver them to website visitor, with the purpose of delivering targeted ads that match their interest.

It can be said that the most common and most important ad server functionalities are:

1. Uploading advertisements
2. Trafficking ads according to differing business rules.
3. Targeting ads to different users, or content.
4. Tuning and optimization based on results.
5. Reporting impressions, clicks, post-click & post impression activities, and interaction metrics⁶.

Ad targeting and optimization

One of the most important characteristics of ad serving technology is the ability of targeting – optimization of bid prices and placement of the ads. There are more ways in which targeting can be done, and the most important methods include:

- Behavioural Targeting - Using a profile of prior behaviour of the viewer to determine which ad to show during a given visit. For example, targeting computer ads on a portal to a viewer that was known to have visited the computer section of a general media site. That means that ads that are shown to you depend on your web browsing history and previous interest shown online.
- Contextual Targeting (also known as Semantic targeting) – The process accurately interprets the meaning and classifies the main subject of the page and then infers the optimum ad placement from information contained on the page. A contextual advertising system scans the text of a website for keywords and returns advertisements to the webpage based on what the user is viewing (PC Magazine, 2008). A good example is placing kitchen wear ads automatically on a web site with cooking recipes. By closely linking content to advertising, it is assumed that the viewer will be more interested in the advertised product or service.
- Geographical targeting – When ads are served based on a user's geographical location, it is known as geo-targeting. The audience will be shown only the advertisements that are relevant to their geographical position. For example, if you are living in Belgrade, Serbia and looking for a hair salon, you won't be shown ads for hair salons in any other country, or city for that matter, than the one you are actually in.

3. REVENUE MODELS

While highly efficient investing is one of the main advantages of online advertising, the choice of revenue models for ads is one of the most confusing aspects. Each has its advantages and disadvantages, so the choice should be made taking in consideration the site's audience and the product being advertised. The most common revenue models are the Cost per Impression, Cost per Click, and the Cost per Action.

3.1. Cost per Impression (CPM)

One of the simplest types of ad revenue, and the first to emerge when Web sites started advertising, is the CPM ad (Monocur, 2004). The term CPM means *cost per miles* or *cost per thousand impressions* and refers to the amount the publisher (website) is paid for showing 1000 ads. That means that advertisers pay for exposure of their message to a specific audience. However, some impressions may not be counted, such as a reload or internal user actions.

3.2. Cost per Click (CPC)

Some advertisers want to pay for immediate results rather than views. A cost per click ad pays a publisher a certain amount, typically between one and fifty cents, each time a user clicks on an ad. As with a CPM ad, usually only the unique clicks are paid. Unlike the CPM method, running a CPC ad presents an element of risk for the publisher - if no users click the ad the publisher doesn't earn anything. But on the

⁶ http://en.wikipedia.org/wiki/Ad_serving

other, if an ad's target audience matches the audience of the site, the publisher can often earn more than low-end CPM ads.

3.3. Cost per Action (CPA) or PPF (Pay Per Performance)

While a publisher earns money instantly when a user clicks on a CPC ad, CPA (cost per action) ads require more of a commitment from the user. The publisher is paid each time a user completes a particular action—for example, completing a survey, signing up for a subscription, or buying a product. CPA ads are typically used with affiliate programs, and there are two basic types of CPA ad campaign⁷:

- **Cost per lead:** You are paid each time a user signs up or provides contact information. This usually doesn't require a payment from the user. These programs typically pay somewhere between 50 cents and \$3.00 per signup.
- **Cost per sale:** You are paid each time a user buys one or more products. The commission is usually a percentage of the sale price, so the amount you earn for a sale depends on how much the user spends.

Like CPC ads, In this payment scheme, the publisher takes all the risk of running the ad, and the advertiser pays only for the amount of users who complete a transaction, such as a purchase or sign-up. Some webmasters make more money from affiliate programs than any other source, because they have found affiliate programs that closely match their audience. If a program does not fit your audience, the publisher may find himself running thousands of ads without a commission.

3.4. Cost per Pixel - Million Dollar Homepage

As seen above, the large majority of online advertising has a cost that is brought about by usage or interaction of an ad; there are a few other methods of advertising online that only require a one-time payment. The Million Dollar Homepage⁸ is a very successful example of this. The home page consists of a million pixels arranged in a 1000 × 1000 pixel grid - the image-based links on it were sold for \$1 per pixel in 10 × 10 blocks. Visitors were able to pay \$1 per pixel of advertising space and their advert would remain on the homepage for as long as the website exists with no extra costs. The purchasers of these pixel blocks provided tiny images to be displayed on them, a URL to which the images were linked, and a slogan to be displayed when hovering a cursor over the link. The aim of the website was to sell all of the pixels in the image, thus generating a million dollars of income for the creator (and it did). The Wall Street Journal has commented that the site inspired other websites that sell pixels, marking a trend called pixel advertising (Bounds, 2005). Today it is defined as a form of display advertising on the web, in which the cost of each advertisement is calculated dependent on the number of pixels it occupies (Bounds, 2006).

4. AD FORMATS

One of the many advantages of online advertising is a wide variety of online ad formats and targeting methods to ensure the most effective and cost-efficient media buys for your campaign goals. Depending on the particular format, online advertisements can be categorized into following types:

4.1. Text ads

Text-based ads, as their name applies, are simple text-based hyperlinks that do not include graphic images. They are usually related to the content of the website they are published on, and can be set up with a program like AdSense or manually added by the publisher of the site. Text ads can be website-wide and located in the sidebar, footer or any other area in the advertising site or Internet search engine (Google, yahoo, etc). Sometimes they are even incorporated within the content of the website itself. One of the most effective types of text ads are *Search engine driven text ads* that are used in Search engine advertising. This type of online advertising involves purchasing text ads and having those ads show as sponsored results with a link to a publishers website when certain keywords or phrases are searched for.

⁷ Retrieved from <http://www.whyaffiliatemarketing.com/>

⁸ Retrieved from www.milliondollarhomepage.com

4.2. Display Ads

Graphical advertisements featured on websites are known as Display Ads or Banners. These banners can consist of static or animated images, as well as interactive media that may include audio and video elements. Display ads use eye-catching visuals to quickly grab catch the attention of website visitors. It is intended to attract traffic to a website by linking to the website of the advertiser. The advertisement known as a "click through". Display ads are often available in many standard shapes and sizes, that have been standardized by the Interactive advertising Bureau (IAB). These standards include: banners, leader boards, skyscrapers, large boxes, and other sized graphical ads (see graph below).

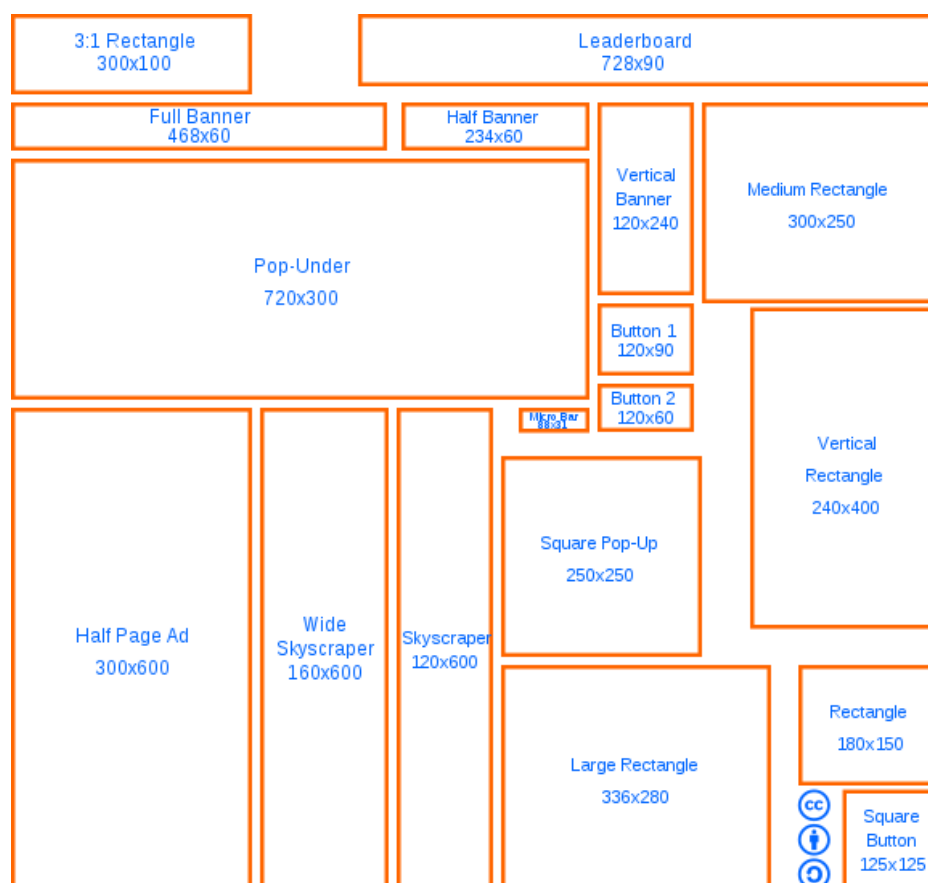


Figure 1. [Graph – Standard dimensions of banner according to the IAB⁹]

4.3. Pop-Up Ads

A sub type of display ads are Pop-ups - Advertisements that appear to "pop up" in a new window as users browse a website. Hoover ads, floating ads, expanding ads and slide-in ads are also considered pop-up ads. Sometimes these ads are also known as Pop-Under Ads, depending on whether they are displayed over or underneath the current web content being browsed. Because they tend to distract a person browsing the web, the use of Flash and DHTML ads has risen in recent years in an effort to counter the increased usage of pop-up blockers.

4.4. Social media ads

Social media ads are a type of online advertisement that is placed on social networking sites like facebook, MySpace, Google+ and so on. One of the major benefits of advertising on a social networking site is that advertisers can take advantage of the users demographic information and target their ads appropriately. Two most common forms of social advertising are:

⁹ Retrieved from <http://www.iab.net/>

- **Direct Advertising on social networking sites** - the same as banner ads on other sites, except the social network itself strictly regulates their dimensions. Here networks can take advantage of demographic data on a person's profile and hence target the ad directly to them.
- **Indirect Advertising by creating 'groups' or 'pages'** - This is an innovative marketing technique in which a company will create a 'page' or 'group' that users can choose to join. They will use this to build up 'subscribers' or 'fans' and use this to market a contest, a new product, or simply just to increase brand awareness.

4.5. Interstitial ads

Interstitial ads appear before or after an expected content page, that is between web pages that the user requests, often to display advertisements or confirm the user's age (prior to showing age-restricted material). For example, an interstitial ad may appear after you click on a link in an excerpt to view the full content of news story. Because interstitial ads load in the background and do not interrupt the users immediate browsing experience, they are a preferred method of delivering ads with rich media, streaming video, and/or large graphics. Some people take issue with the use of such pages to present online advertising before allowing users to see the content they were trying to access (Brown, 2007).

4.6. Rich media ads (interactive ads)

Interactive ads normally refers to products and services on digital computer-based systems which respond to the user's actions by presenting content such as text, graphics, animation, video, audio, etc.

4.7. Video Ads

With the popularity of online video watching, video ads have become a viable means of distributing rich advertising content. Google (via YouTube), MSN, Yahoo and AOL offer advertising on their video websites. There are two types of video ads:

- **Website commercials** - A video that is entirely created by the advertiser, and has an entertainment value attached to it and has the potential of going "viral" (being passed around through referrals or word-of-mouth).
- **"In video" ads** - Ads that will show your ad within a video. "In video" advertising is done in the same manner as banner advertising by using different video screen sizes or it can have blatant advertising and presented as Website commercials.

4.8. Email Ads

Ads that are distributed by a publisher through email audiences are known as email ads. Email ads have emerged as a popular tool that marketing managers use to raise product and service awareness among customers. Advertisers can individually sponsor a publisher's email newsletter or they can purchase classified ad space. Legitimate Email advertising or E-mail marketing is often known as "opt-in e-mail advertising" to distinguish it from spam. Though email spam is a menace, 'opt-in' e-mail delivers some of the best results for online advertising along with contextual advertising.

5. EXAMPLES OF INNOVATIVE ONLINE ADVERTISING

5.1. Tipp-ex "A Hunter Shoots a Bear" campaign – Example of rich media ads

Online video ads have much more potential than static video content that is available on TV, and the following example proves how a successful campaign through online media can be created (). Tipp-ex is a European company that makes correction fluid, and in 2010 it wanted to promote its whiteout called "Pocket Mouse". Target groups included mainly students and other existing customers of Tipp-ex. Even though the product is not exactly web-related product, the campaign relied on using online advertising, and it proved to be very effective.

The strategy used in this campaign was to create a unique user experience through an interactive production, and therefore "The Tipp experience" was created on Youtube. "Share" and "like" buttons were integrated, so that the viral experience of the video is complete.

The ad represents a new type of interactive video in which viewers can create their own storyline. The video's original title is "A Hunter Shoots a Bear", but in the end of the video a user can replace the word "shoots" with any other word. A hunter suddenly faces a bear in the woods, and the viewers can decide what happens next. Video content for 42 different scenarios has been created, and if the chosen word scenario is not available, line "Error 404" or "On strike! Won't work!" appears. By inputting words such as: eats, sleeps, dances etc., a user can get interesting video content. Whatever the viewer chooses, the hunter reaches outside of Youtube video and grabs the Tipp-Ex Pocket Mouse from the banner placed on the side of the video. A hunter whites the word "shoots" and the viewer can input any word in the blank field provided.

The campaign provided excellent results both short and long-term. In first 100 days the Tippex Youtube channel received more than 35.5 million views. The campaign started by sending videos to bloggers in Italy and UK, but later expanded to 217 countries around the world. The video was shared over 380.000 times on social media, and the virility rate of 500%. In long term, the campaign had a total of almost 50 million views, 1 million shares, 220.000 tweets and 60.000 online articles. It earned international TV coverage, 3.2 million euros, and the sales increased by 30% in Europe during the campaign. Total sell-in increased by 35% in 2011 vs. 2010. The success of this campaign proves how online advertising has much more potential than traditional form of advertising, and how it enables much more creative approach in attracting new customers.

5.2. The Google Job Experiment – Example of text ads

The next example shows how Google AdWords can be used in a creative and practical way, resulting in getting the wanted job. The story focuses on Alec Brownstein, a young advertising executive looking for a job in one of the leading New York advertising agencies. Among hundreds of other candidates, Alec was unable to attract attention and get himself hired. However, he used Google AdWords and by spending only 6 US Dollars, he was able to get his dream job.

As Alec didn't manage to get an interview with creative directors from agencies where he wanted to work, he appealed to their ego and the habit to Google themselves. Alec knew their names and he used Google AdWords to say "Hey, Ian Reichenthal (the co-executive creative director at advertising giant Young & Rubicam in New York), Googling yourself is a lot of fun. Hiring me is fun, too." This was the first link that appeared in sponsored search results. Alec created personalized AdWords for four more directors. When clicked on a link provided in an ad, creative director would be able to see Alec's portfolio. Out of five creative directors, four invited Alec for an interview and he got two job offers. Finally, he got a job at Y&R New York.

6. GOOGLE ADSENSE AND ADWORDS

When talking about online advertising when cannot go by without mentioning platforms like Google AdWords and AdSense. The main difference between the two is that AdWords is used by *advertisers* and AdSense is used by *publishers*.

AdWords is Google's main advertising product and main source of revenue¹⁰. It lets people advertise on Google.com, the Google Search Network (including sites like AOL search and Ask.com), and the Google Display Network (content sites that are not search engines). AdWords allows advertisers to reach new customers at the precise moment they're searching for their type of products and services. For example, when users search on Google, they're demonstrating which products they're interested in. With AdWords ads, users will see advertisers ad next to relevant search results they've requested. In addition, the ads could also appear on relevant search and content sites within the Google Network. And with Google's precise targeting and the advertisers ability to control how much they're willing to pay per click, the end result is a higher return on investment (ROI) for their advertising budget¹¹.

AdSense lets publishers in the Google Network to monetize their websites or blogs by earning money from relevant AdWords ads displayed next to their content. The publishers receive a small payment each time one of these ads is clicked on. These adverts are administered, sorted, and maintained by Google, and they can generate revenue on either a per-click or per-impression basis. If a publisher's site has

¹⁰ Retrived from <http://investor.google.com/financial/tables.html>

¹¹ Retrieved from <http://www.netthing.net/pdf/AdWordsOverview.pdf>

enough readers, this can be a simple way to generating a revenue stream from its content. In Q1 2011, Google earned US\$2.43 billion (\$9.71 billion annualized), or 28% of total revenue, through Google AdSense¹²

AdWords/AdSense important phrases:

- **Keywords:** The words or phrases you select – when users search for those words on Google, your ad may appear next to or above the search results.
- **Clicks:** The number of times users clicked your ad. **Impressions:** The number of times your ad appeared.
- **Click-through Rate (CTR):** The number of clicks divided by the number of impressions, shown as a percentage. A good CTR can improve your average position.
- **Average Position:** The average position that an ad appears in when it's triggered. An average position of 1-8 generally means that the ad is appearing on the first page of search results.
- **Cost:** The total amount you spend with AdWords.
- **Conversion:** The action that your advertising results in, such as a phone call, lead, or sale. This is usually a good metric to use to measure the success of your advertising.

7. CHARACTERISTICS OF DIGITAL ADVERTISING – Pros and cons

Online advertisements function the same way as traditional advertisements are intended to function: notifying consumers of the product or service and presenting reasons why the consumer should choose the product in question (Briggs, R., Hollis, N., 1997). Online advertisements differ in that the results for advertisement campaigns may be monitored real-time and may be targeted to the viewer's interests. That is why advertiser's investments are more efficient in online advertising. For example, AdWords, Yahoo!Search Marketing and Google AdSense enable ads to be shown on relevant web pages or alongside search result. Another benefit is the fact that online marketing is not limited by geography or time. The cost of digital advertising is minimal, compared to other traditional forms of advertising. Moreover, banners are much more effective. For the price of five hundred Euros in Serbia, a banner can be seen by 200.000 people in one month, which is much larger reach than the reach of traditional media forms for the same price. A company can also control and adjust ads to the characteristics and interests of its target groups. Finally, the success of the campaign can easily be measured. Unlike traditional advertising forms, where it is impossible to measure how many people have seen a billboard and how many have chosen to buy the produce, in online advertising the effects of a campaign are being analyzed by simple tools, such as Google Analytics. It enables anyone to get information about number of people that have seen the content, visits per web site or number of purchases made. By implementing received data into everyday operations, the company is able to decide about further marketing strategies and ways of adjusting marketing campaigns to target audiences.

Digital advertising is a growing form of advertising, as previously mentioned. However, it still leaves space for improvement, especially in the area of frauds and manipulations. One of the main disadvantages of digital advertising is Click fraud (Knight, 2005), a form of fraud caused by clicking on ads without an intention of buying a product or any interest in it. It appears in pay per click advertising, and is caused by either a person or a computer. Digital advertisements can also be irritating for a user, with ads randomly popping up and distracting from an actual content (Edwards, Li & Lee, 2002). In spite of irregularities and problems that occur, future of advertising lies in digital advertising. Everyday improvements are being made in order to improve online advertising process and help companies develop better connection with target group. The biggest advantage for a company is gathering information about its customers, and using new forms of advertising enables complete data collection. Further research in this area must be made in order to help develop technologies and methods that can help create benefits for both company and its customers.

8. FUTURE IMPLICATIONS

The future predictions for digital media are mainly related to mobilization of the content. It is projected that in by 2014 mobile internet will take over desktop internet in number of users¹³. This means that advertisers must adjust content for accessing via mobile device. It is also expected that in future customers will be more able to pull content they are interested in, rather than having it pushed to them by companies. Digital

¹² Retrieved from http://investor.google.com/earnings/2011/Q1_google_earnings.html

¹³ Retrieved from <http://www.digitalbuzzblog.com/2011-mobile-statistics-stats-facts-marketing-infographic/>

advertising in future will be much about an individual being able to create content for himself, and the advertisers must focus on discovering new and creative ways of getting consumers interested in their business.

The authors of this paper advise advertisers of the 21st century to embrace the marketing innovation and to become more acquainted with online advertising. Some are still sceptical about its efficiency, but it is evident that is becoming an integrated part of marketing promotion, and can lead to a viable source of income. Society as a whole is becoming more globalized and connected, and the way we advertise must follow that path.

Further studies on the subject matter should be done, in order to fully grasp how online advertising affects brand loyalty and brand recognition, and to create the basis for an innovative marketing approach.

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CROWDSOURCING AS A PLATFORM FOR INNOVATIVE BUSINESS AND MARKETING APPROACHES

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Abstract: *In today's business, companies are trying to lower everyday costs and labour expenses. The increasing numbers of educated and ambitious people who are willing to participate in various projects by using modern online technologies have forced companies to switch from outsourcing their business activities to other countries to the new approach known as crowd sourcing. This term is used to describe outsourcing tasks to the online community that is able to complete it in a better way or for less money than the company's employees. The aim of this paper is to define the term crowd sourcing and distinguish it from similar theoretical and practical concepts, such as open innovation, user innovation and open source. The authors tend to describe crowd sourcing in light of new product and service development. Furthermore, this paper will show examples of applying crowd sourcing in various companies and organizations, both profit and non-profit. Finally, the conclusions regarding the future of this concept will be presented by analysing its advantages and limitations.*

Keywords: *crowd sourcing, outsourcing, marketing, innovative business concept*

1. INTRODUCTION

The switch from traditional Internet to Web 2.0. has marked the beginning of new concept that most companies tend to take advantage from. Le Deuff, (2007) and O'Reilly (2005) describe Web 2.0 as "the utilisation dimension and not to the physical network that supports it". This concept tends to encourage collaboration and sharing between users, which leads to numerous options for application in everyday business. By using Web 2.0, a company can switch from outsourcing activities to other countries or firms specialised in certain field to engaging individuals in its everyday activities. This way, the company can collect fresh ideas from individuals all around the world, and save and allocate resources to other business activities. Crowd sourcing presents one way of using the power of crowds in solving everyday tasks and challenges.

Even though crowd sourcing platforms and concept itself appeared much earlier, the term crowd sourcing was firstly introduced by Jeff Howe and Mark Robinson in an article published in wired magazine in June 2006. Since, the concept of crowd sourcing has appeared in many blogs, magazines and books. Dahlander and Magnusson, (2008), and Agerfalk and Fitzgerald, (2008) discuss the term crowd sourcing, while others only mention it as an example of Web 2.0 (Tapscott and William (2007), Albors et al. (2008)). Due to the fact that this concept is still developing and growing, it is important to distinguish it from other similar concepts, such as open source, open innovation and user innovation.

2. CROWDSOURCING

2.1. Definition

The word crowd sourcing consists of words crowd and outsourcing. Its basic meaning is outsourcing to the crowd. At first it was mentioned on an Internet forum, it was not popularised until Howe and Robinson explored this subject in an article published in an online journal Wired. Howe gave this definition of crowd sourcing: "Simply defined, Crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call." Howe adds that "the crucial prerequisite is the use of the open call format and the wide network of potential labourers". In his recent book and posts on his blog¹⁴ (2008 and 2009), Howe gives two more precise definitions of crowdsourcing – The White Paper Version, and The Soundbyte Version. *The White Paper Version* describes crowdsourcing as "the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined,

¹⁴ <http://www.crowdsourcing.com/>

generally large group of people in the form of an open call”, while *The Soundbyte Version* states that crowdsourcing is “the application of Open Source principles to fields outside of software”.

The most typical use of crowdsourcing tracks the following pattern: The company recognizes processes and activities that are suitable for outsourcing. Instead of forwarding these actions to another company or performing them within a company, they are “released to a crowd of outsiders who are invited to perform the task on the firm’s behalf for a stipulated fee”. There are two options to conduct this action: an open call to everybody who is interested to participate in completing the task, or by limiting the crowd to certain individuals who have previous experience in this field and therefore are more suitable to complete the task. It is also possible to combine these two methods by limiting an open call to a group of people most likely to complete the task. Whitla (2009) also notices that “sometimes a single task can be completed by many different users and each can be paid if they successfully complete the task”. This illustrates why crowdsourcing is becoming more and more popular among both companies and individuals – while companies are enabled to significantly lower fees that they are paying, individuals get the chance to earn money in easy way, by using resources available to them. In many cases, individuals are not familiar with the company itself, but only with the task given to them. A widely known Amazon’s Mechanical Turk is a perfect example of this type of platform. Named after Hungarian nobleman Wolfgang von Kempelen who invented “the Turk”, the first machine capable of beating human at a chess game, Mechanical Turk is a platform that enables individuals to solve simple tasks that computers are not able to do. These tasks are called HIT’s (human intelligence tasks), and require very little time and effort to complete. The amount of money rewarded to those who complete the task usually varies from couple of cents to less than a US dollar. Whitla (2009) illustrates the crowdsourcing process in the following figure:

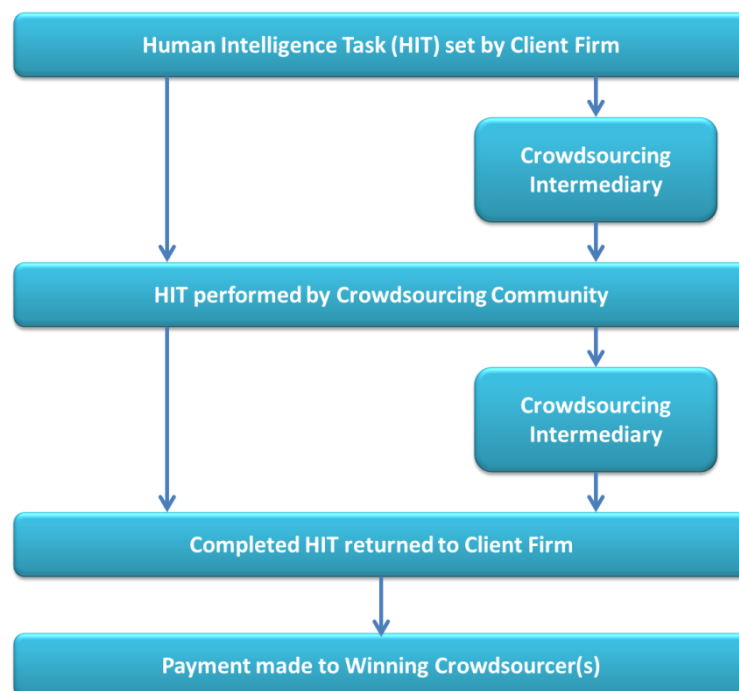


Figure 1: Crowdsourcing process

Even though there are modifications depending on the purpose of crowdsourcing, the basic principle of outsourcing specific activities from a company to individuals remains the same.

2.2. Similar concepts

Since crowdsourcing is yet to be further explored and analysed, it is sometimes difficult to distinguish this new concept from other similar concepts that rely on the power of crowd.

First of all, there is a difference between crowdsourcing and outsourcing. Basic process of both activities is very similar, with both having a client company that seeks help from outside, but the main difference is

the fact that, while outsourcing means seeking help from other companies, crowdsourcing company focuses on getting ideas from individuals.

Open Innovation and user innovation have the same central idea as crowdsourcing, that “in a world of distributed knowledge, companies should not rely on their own research and development”, but to “outsource some R&D functions through Intellectual Property Rights (IPR) purchases from other companies.” Open innovation, like outsourcing, focuses on cooperation between firms, while user innovation describes connection between specific product users who focus on solving issues with final products. In both open and user innovation processes, the focus is on innovative and original solutions to the problem, and crowdsourcing is not restricted only to innovations and innovative processes.

The term “Open Source” is used by Howe (2008) to describe crowdsourcing as “an application of the open source principles to other industries”. Schenk and Guittard (2009) notice that Open Source Software relies on the concept of sharing and altering free access codes, and “thus Open Source Software can be copied and freely distributed on a large scale”. Brabham (2008) states that “it is obvious that crowdsourcing is not restricted to software development”. With all this in mind, we can conclude that open source is a practical approach to theoretical concept of crowdsourcing. It is one of the fields where crowdsourcing model can be applied.

3. APPLICATION OF CROWDSOURCING

3.1. Types of tasks

As previously mentioned, a call for crowdsourcing can be in form of an open call, or limited to a certain group of individuals. The question is, what types of tasks can be crowdsourced? According to Schenk and Guittard (2009), there are three types of tasks that can be outsourced to a crowd: routine tasks, complex tasks and creative tasks.

Routine tasks refer to the tasks that can be completed quickly and easily, such as collecting data or mark text and images. Micropayments are usually a reward for this kind of effort. Examples of solving routine tasks include ReCaptcha¹⁵, Open Street Map (OSM)¹⁶ and TxtEagle. ReCaptcha window is used for text recognition on websites where it is necessary to distinguish virtual robots from human beings. OSM collects geographic data in order to create a world map. TxtEagle¹⁷ enables mobile phone users to complete simple tasks by sending a text message. Routine tasks are usually issued in form of an open call, due to the fact that almost anyone can participate in solving them.

Solving complex tasks requires more skills and knowledge than solving routine tasks, and therefore it is limited to a smaller group of people. This makes it a limited or selective type of crowdsourcing. This type of tasks can be solved in profit and non-profit sectors, and it usually involves larger compensation from a firm, due to the effort required to successfully complete the task.

Finally, the third types of tasks that can be solved are creative tasks. This type of tasks was crowdsourced even before Internet, in form of design contests and competitions. Companies usually issue creative tasks with limitations only in the form required from a solution. This way the crowd can provide original ideas and solutions. Monetary compensation for these type of tasks is couple of hundred dollars, but varies depending on the task.

3.2. Crowdsourcing marketing activities

To explore practical use of crowdsourcing, this paper will focus on its application in marketing. Whitla (2009) explored the nature of Human Intelligence Tasks (HIT's) and identified the fields of marketing that are most suitable for their use. By surveying literature and published HIT's, he recognizes product development, advertising and promotion and marketing research as three fields where crowdsourcing is widely used by firms.

¹⁵ <http://recaptcha.net>

¹⁶ <http://www.openstreetmap.org>

¹⁷ <http://txteagle.com/>

In the area of advertising and promotion, it is possible to use crowdsourcers in basic activities that a firm has no resources to complete, or in getting fresh ideas for promotional and advertising campaigns. Sometimes people are hired to post comments and reviews on social networks, which can lead to getting false impression about the company. On the other hand, smaller firms often hire crowds to help them get fresh and innovative ideas that can be implemented in the campaign.

Crowdsourcing in market research usually focuses on collecting data in form of a paid survey. However, it is questionable wheatear the research is objective, due to the fact that the payment may have effect on the responses, resulting in unrealistic image of the company.

3.3. Use of Crowdsourcing in product development

Third and final area where crowdsourcing is most present in marketing aspect of new product development. This is the area which we will be mostly focusing on, mainly due to its wider use than in other aspects. Von Hippel (1998, 2006) notices that firms have been using consumer inputs for its purposes for a long time. Manufacturers have been collecting feedback and implementing results in new product development for years. But the crowdsourcing process is expanding this approach in three basic ways. First of all, getting feedback is not limited only to customers, but also to potential customers or anyone interested in suggesting improvements. Crowdsourcing allows companies to directly contact customers and gather information, unlike getting feedback in a classic way where distributors are involved. Finally, while crowdsourcing an activity, the company is able to select specific fields of product development where they require help. Having this in mind, many firms are now turning to this innovative approach, looking for fresh ideas and suggestions regarding improvement of their products and services. In this paper we will further focus on successful examples of using crowdsourcing in developing new products and services in profit and non-profit sector.

3.4. Successful crowdsourcing profit projects

Even though crowdsourcing is a relatively new concept, many companies have already successfully implemented it in their businesses. A crowdsourcing firm InnoCentive¹⁸ specialises in offering scientific solutions to firms. Howe (2006) points out that InnoCentive “enables companies to tap into the talents of a global scientific community for innovative solutions to tough R&D problems”. Companies offering tasks include Proctor and Gamble, Boeing, DuPont, which offer up to 100.000 US dollars for a winning solution. Other examples include Netflix and Google, and they offered up to a million and ten million USD respectively for those who developed innovative and successful solutions to their problems. A perfect example of a company looking for new ideas on how to improve everyday business is Nokia with its project “Calling All Innovators”. This project was launched in May 2009. and it was Nokia’s answer to Apple’s “App Store” by creating “Ovi Store”. “Calling All Innovators” was divided into three areas and interested parties were called to submit a solution in one of these categories, which included internet innovation, flash applications and innovative applications created by using mobile technologies. Three best projects were rewarded with 30.000, 15.000 and 10.000 USD, but even non-winning projects could earn money depending on number of downloads from the Ovi Store. Even before the launch of the project, there were over 1.700 pending requests from developers from 85 countries, which only confirm that crowdsourcing proved to be very successful in gathering ideas from professionals and enthusiasts all over the world.

Not only large companies offer monetary compensation to those who helped those finding solutions for new business challenges. Smaller businesses are able to provide more exciting and creative tasks to their crowdsourcers. They are able to either submit their designs and create products of their own, or to offer information and experiences which help the firm in developing new products. Threadless is a web based company that organizes online competition for t-shirt designs. Users vote and the winning designs are rewarded with up to 1.500 USD prize and the satisfaction of having their design available for sale through the web site. Online portal Cafepress.com has a similar concept where crowdsourcers provide designs for various items and get a percentage of each sale. Crowdspirit.org enables members to select ideas and jointly finance product development in the field of electronic items (Hempel, 2007). Furthermore, iStockphoto.com is one of the most popular crowdsourcing site. On this website users can post stock

¹⁸ www.innocentive.com

photography, video clips and animations. Photographers are paid 20 per cent of the purchase price for the photo each time the photo is downloaded, and this platform gathers both amateurs and professionals.

In order to remain competitive in both local and global market, companies must search for new, innovative business models. Crowdsourcing is one of the platforms that enable companies to implement these concepts. The examples we have shown confirm that application of crowdsourcing is justified.

3.5. Successful crowdsourcing non-profit projects

One of the newfound potentials of collective knowledge is certainly the use of crowdsourcing in emergency management. Disasters and catastrophes happen in various natural and social contexts. In these situations, disaster relief teams need certain information in order to make proper plans to resolve the critical issues. This information is habitually generated by various individuals on the site, but it is usually unstructured and disorganized. Vivacqua and Borges (2012) identified the information needs for emergency management, as well as the various types of information needed in different phases. The mitigation phase (pre-disaster) demands information needed for risk assessment. The preparedness (pre-disaster) phase requests information needed for composing plans and procedures to deal with the possible emergency. The most information intensive phase is the response (disaster) phase. In this phase a large amount of time sensitive information is required. The following phase is the recovery phase. Crowdsourcing has found its great use particularly in the response phase. Best-known initiatives for crowdsourcing in the response phase are Ushahidi¹⁹ and Sahana²⁰.

Ushahidi is a crowdsourcing platform, which can be freely downloaded and used for various projects. Ushahidi allows anyone to collect and visualize information on a given set of information. The platform enables individuals to send in information (by Web or sms), and aggregates this information. This open source platform was first used in Kenya, as a violence-mapping tool after the post-election fallout in 2008. Its most known and successful usage was in the Ushahidi Haiti Project when the platform was used to quickly map the needs after the Haiti earthquake (Morrow et al., 2011). In the words of David Kobia, a Kenyan software developer and founder of Ushahidi, the reliability of the crowd-sourced information can represent a problem in certain situations. On the other hand, crowdsourcing is based on Internet, as a liberating technology, and people's willingness to help in common issues (Vericat, 2010).

Crowdsourcing has found its use in many other non-profit areas. One popular example includes Hult Global Case Challenge. It is a competition for students all around the world, with the goal of financing the best project for a non-profit organization. Each year an organization provides a task in form of a case study, and students are required to give a realistic and sustainable solution for a given challenge. The best solution receives 1 million USD for implementation and the students are involved in the process of further development of the solution and its implementation. Some of the best known non-profit organizations, such as Water.org, One Laptop per Child and Habitat for Humanity are among those who have successfully participated in this event and are currently in process of completing implementation of their projects with the help of students

During the last several years, some non-profit crowdsourcing projects have been started in Serbia, one of them being imamproblem.rs²¹. This project proposes crowd-sourcing knowledge about communal issues in Belgrade and promotes voluntary engagement in solving recognized issues.

4. CONCLUSION

The above discussion showed that ranges of application which may be handled by means of crowdsourcing exist. Even though the concept is in its development stage, there is no doubt that many businesses in the future will find many tasks which can be accomplished by using this innovative approach. The evolution of technology and the increase of the competition on a global level are only few of the major crowdsourcing drivers. By showing some of the most successful examples, it has been presented that crowdsourcing as one the modern approaches can provide many benefits for the organisation. However, some disadvantages can also be identified.

¹⁹ www.ushahidi.com

²⁰ <http://sahanafoundation.org/>

²¹ www.imamproblem.rs

Despite the fact that the bigger sample should generally give more accurate and higher-quality results, sometimes an uncontrolled crowd can turn into a vast amount of noise source, which can provide irrelevant information and thus cause harm to the goals or the intended purpose of the system. That is why mechanisms for filtering ideas have to be developed in parallel with the crowdsourcing platform. Furthermore, additional issues may arise in the legal aspect, where it can be hard to deal with ownership of ideas etc. Finally, there are some limitations in the use of crowdsourcing, for example in cases where the success of the business relies of information or tasks' secrecy. Ethical issues may arise as well.

We need to learn much more about the possibilities and limitations of crowdsourcing. One important area of research, for example may be understanding the motivational and reward structure of crowd workers and how they generalize across different kinds of markets. The concept itself includes variety of disciplines such as: psychology, sociology, management science, technology, information technologies etc which is why the improvements of the concept should be searched for from different perspectives. However, the development of ICTs gives the biggest support for the development of crowdsourcing platform. Therefore, taking into account their rapid development, we can expect similar in the crowdsourcing area.

Further research should focus on possibilities of using a wide range of social networking platforms for both profit and non profit crowdsourcing initiatives. Social networks attract millions of users, whereby attracting only a small percentage of them could give significant contribution to the increase of innovation capacities and capabilities all over the world.

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KEY ASPECTS IN BRANDING AGRICULTURAL PRODUCTS

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Abstract: *The trend of increasing prices and shortages is predicted for food and other agricultural products in the future. Brands among agricultural products are found more often and have increased importance for products sales on the market and building relationships with customers. This trend will certainly continue, given that consumers are looking for something they can trust and something that will give them security in terms of the quality and origin of agricultural products. The essence of this paper is to define and determine the most important factors affecting the formation of the brand of agricultural products which includes labeling of unprocessed agricultural products, geographical indications, as well as the relationship between agricultural products brands and country brand. This paper also presents the results of research on the possibilities and directions for branding of agricultural products in Serbia.*

Keywords: *branding, agricultural products, geographic origin, country brand*

1. INTRODUCTION

Aaker and Joachimsthaler(2000) stated that the development of brands was the only way to remove oneself from commodity status and price competition. Brand is a name, term, sign, symbol, or design or a combination of them intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of competition. Brand equity consists of awareness, recognition, and tom of the mind awareness of the product among consumers; positive brand association; perceived quality and brand loyalty. Brand equity will result in price premiums, consumer and trade loyalty, trade co-operation and joint marketing efforts and pride of ownership among the company.

Traditionally producers of fresh produce have seen their responsibility for the product end when their produce leaves the farm gate (Crocombe, Enright & Porter, 1991). Agricultural producers focused on large volume throughput to a large number of independent buyers who purchased unbranded, undifferentiated produce on an *ad hoc* transactional basis from the supplier who offered the best price and quality at the same time (White, 2000).

Marketing for agricultural products has often been left up to single desk producer boards that have focused on increasing product quality in order to develop a competitive advantage (Crocombe, et al., 1991). Lichentathal and Long(1998) stated that it was no longer sufficient for agribusiness to produce a technically superior product. Agribusiness would need to adopt strategic planning models if they are to be successful in the future. These models will need to address the development of strong brands, a unique selling proposition, the formation of close relationships throughout the supply chain, and the development of market orientation (Miles, White & Munilla, 1997).

This research provide the initial point towards building a theory of branding agricultural products which aims at understanding which information can differentiate a brand from its competitors and so make a company gain a benefit advantage.

2. COMMODITY BRANDING IN CASE OF UNPROCESSED AGRICULTURAL PRODUCTS

Branding strategies have become widely accepted part of marketing activities and as a rule processed food products are offered to consumers as branded products. However, we can easily see that there is a wide range of food products that are not branded. This is usually the case with agricultural products such as meat, fruits and vegetables that are sold relatively unprocessed and without any label either of manufacturer or a seller. In attempt to explain the reasons for the lack of brand among these products, it is often assumed that the lack of activity of branding is a result of many small producers who have the same products or lack of knowledge among these producers about the need for brand development.

There has been little consideration of agricultural products in the branding literature. However, one author who has attempted to bridge the gap between agricultural products and main stream marketing

theory is Bowbrick. Within agricultural products branding seems to include identifying a product with various types of labels (e.g. region of origin, variety) to differentiate products. Bowbrick(1992) acknowledges this characteristic and suggests that a “brand is a label attached to products from a specific manufacturer, distributor, country of origin, or retailer with the aim being to convey information on, or persuade the consumer about; the quality, reliability, social status, value for money or safety of a purchase“(p.29).

A product provides an array of cues that a consumer uses as the basis for making judgments about which product they will purchase. Consumers form a composite judgment about which product to purchase by going through a process in which the consumer identifies, evaluates, and integrates some or all of the various items of information (i.e. cues) associated with the product. The cues that consumers use when making purchase decisions have been classified as intrinsic or extrinsic cues (Jacoby, Olsen & Haddock, 1971). Intrinsic cues are those cues which if changed would change the physical product itself (e.g. taste, nutrition content, size, shape, and color of a product). Extrinsic cues refer not to the physical product itself, but to other cues provided (e.g. price, store image, label, advertising). The important distinction to note is that cues of an extrinsic nature can be supplied by either the producer or the seller, whilst the intrinsic cues are determined by the product itself. Intrinsic cues pose further problems for consumers as they can be classified as either hidden intrinsic cues or revealed intrinsic cues. Hidden intrinsic cues are those product attributes which cannot easily be physically identified by the consumer before purchase, (e.g. the flavor or taste of the product, or the durability and reliability of a product). Revealed intrinsic cues include those product attributes which the consumer can identify and assess visually or physically, (e.g. the shape, size and color of a product).

Whether these important attributes (i.e. cues) are hidden or revealed becomes important to the consumer during this search. To aid consumers in their search for the desired bundle of attributes, the seller can make an extrinsic cue available (e.g. a label) to act as a proxy for the important hidden cues. For example, as an indicator of the different taste characteristics different varieties of apples possess, retailers provide an extrinsic cue in the form of a variety label. Consumers subsequently use this cue to select the variety of apple that has the taste characteristics which correspond to their preference (Pay, White & Zwart, 1996).

It has been suggested that consumers would be prepared to pay a price premium for those products which are difficult to inspect and too expensive to sample (Png & Reitman, 1995). Although many agricultural products cannot be considered too expensive to sample, many are difficult to inspect. Where inspection is difficult consumer search costs are high. Labeling can reduce these search costs. Where producers have extra costs of labeling to retrieve, and consumers have high search costs, it would seem likely that labeled products would attract price premiums. This framework can be illustrated with a simple model (Pay et al., 1996, p.8).

PRODUCERS ABILITY TO CONTROL
BIOLOGICAL VARIABILITY
WITHIN IMPORTANT PRODUCT ATTRIBUTES

	HIGH	LOW
IMPORTANT PRODUCT ATTRIBUTE IS CHARACTERISED BY:	• SUPPLIER LABEL	• NO LABEL
	• CONSUMER BRANDS	• COUNTRY OF ORIGIN
	• RETAIL BRANDS	• VARIETY LABEL

Figure 1 : Model of brand development

The model is a combination of the ability of consumers to assess this important product attributes given that the attributes can either be hidden or revealed and the producer's ability to manage biological variability within important product attributes. Depending whether the important cue is revealed or hidden, and to what extent producers can control variability within product attributes, the model can be used to predict the type of labeling observed on a particular product

In cases where the important intrinsic cues are revealed and a single producer has little or no ability to control biological variability of the important product attributes, we would expect to see no labeling. For those products which have important hidden intrinsic cues and where producers have little ability to control biological variability, country of origin or variety labels may be used. Country of origin labels may be used for those products where the region of production consistently affects product attributes, or variety labels may be used for those products which consistently differ due to the genetic make up of the product.

In those cases where the important attributes are revealed and the important product characteristics are controllable by the producer, a label will not be offered to consumers. However, as the producer is able to control the biological variability of important product attributes, or can use management practices to consistently differentiate products, a supplier label may be provided which is important to buyers within trade channels. Finally, where the important attribute is a hidden intrinsic cue and producers have a high level of ability to control the biological variability within important product attributes or use management practices to consistently differentiate their product from others, it is expected that these products will be labeled with consumer brands. In the case where the important intrinsic cue is hidden, and the seller is providing the management practice to consistently differentiate a product, it is expected that these products will be labeled as retailer brands. We now have a basis for formulating three testable hypotheses.

3. GEOGRAPHIC ORIGIN AS A FACTOR OF BRANDING AGRICULTURAL PRODUCTS

Origin indication has been used as a basis for differentiating agricultural products for a long time. Over the course of decades, and in some cases centuries, some of the most successful and internationally renowned agricultural products have had their quality reputations built with reference to their geographic origin (e.g. Champagne, Parma ham, Roquefort cheese, Czech beer, Scotch whisky). As agricultural markets become increasingly liberalised, it is likely that many more producers will consider using origin within their marketing strategies - not only is the market for origin-labelled food products growing, a range of policy instruments now exists at national and European Union levels to encourage the development of such products (Tregear & Gorton, 2006).

It is important to bear in mind that many origin products are not traded on markets under a geographical indication, and consumers and other economic participants may well be unaware they are dealing with an origin product. The use of a geographical indication to indicate product origin is a step in the value-enhancement process and a result of the behaviour of local and non-local actors. As a consequence of their ties with a specific territory, origin products are characterized by one or more key factors, albeit to different degrees: (i) material characteristics making the product 'particular' (virtually no other products exhibit exactly the same characteristics); (ii) specific character of the resources used in the production process; (iii) product history and tradition, and connections with the history and tradition (know-how, traditional know ledge) of the inhabitants of the territory; and (iv) collective dimension (many actors involved) with shared local knowledge of production (Barham & Sylvander, 2011, p xiii). Long before the geographical origin has been recognized in the legal framework, the names of different parts of the world had an important place in the trade. Certain products are recognized for being in possession of specific characteristics and they are often, but not systematically, determined by geographical name when they were found on market. These cases are dating long before the period of industrialization and continue to the modern world where the food is almost completely commercialized. Recognition of products based on place of origin by consumers and retailers because of its specific quality is nothing new. Generally speaking, the origin of the product is viewed as the expression of specific local resources and knowledge shaped in the form of different products.

Indicating the geographical origin may imply different types of informative elements. Some geographic indications are constituted only by a geographical name (Bordeaux wine, Roquefort and L'Étivaz cheeses), whereas other geographic indications are constituted only by a non-geographical name referring to a geographical origin (as in the cheeses Fontina, Tête de Moine, Feta) (Barham & Sylvander, 2011). Products with geographical origin are established with a link between the product and its special

characteristics, no matter what are those characteristics or how they are determined. Products with geographical indications are those products that have a known origin, which is credited for a given quality, reputation or characteristics. Specific quality of products with geographical indications are primarily identified and maintained in local community. Even if their reputation is maintained at that level, the preservation of local knowledge and resources such as indigenous varieties still gives enough reason for public recognition and protection on national and international level. But the real market value of such products occurs by creating a reputation in the competitive market with similar products that may be protected or generic.

As product with geographic indication strengthens its reputation and recognition as special product in different markets around the world, may over time be perceived by consumers more as a type than as the concrete result of origin-specific assets that consumers are not aware of. In this case, the name becomes generic and product features are no longer controlled by the original manufacturer. This creates opportunities for producers who are not located in the region of origin to use the geographical name for products of a similar type to the original one, even if their production cannot have exactly the same characteristics as that coming from the region of origin. In this case, the name becomes generic and the properties and the characteristics of the product escape control by the original producers (Bérard & Marchenay, 2008). Protection against this practice is at the source of rules which aims to protect the identity of origin products by associating them with an intellectual property right represented by the geographical name. Know-how and tradition are determining factors for maintaining stable quality in GI products, given that these products pre-suppose a continuity of production practices and product appreciation over generations.

Taking into account that geographical indication transmits information to consumers, we can say that it is the same role as the brand. In other words geographical indications have the potential to change the perception that the consumer has towards the product attributes which can be very similar to products coming from other geographical areas. Geographical origin may be determined by other indications than words, pictures, emblems or design of packaging can be interpreted as an indication of geographical origin as well.

Numerous studies have demonstrated that consumers are interested in the origin of products of both ordinary and specialized use. For example, the origin of a spice (e.g. paprika) counts for more when it is used as an ingredient in cooking than when it is just one among other condiments found in already prepared dish. Loureiro and McCluskey(2000) calculated consumers' willingness to pay for 'Galician Veal' which is known to 48% of Spanish shoppers. They found that the geographic indication label generates a high premium for only certain cuts of meat occupying the mid-range of the quality spectrum (specifically, for 'high'-quality cuts), but it has no effect at the poles of the spectrum (both for high-end 'deluxe' cuts and 'low'-quality cuts) (Loureiro & McCluskey, 2000). These results suggest that geographic indication labels attract effective value – which is the main goal of collective quality control – only in combination with other aspects of the product.

4. IMPORTANCE OF COUNTRY BRAND FOR BRANDING AGRICULTURAL PRODUCTS

Historically, there has been considerable public sector involvement in agriculture, where most farms are too small to garner the economics of scale associated with marketing activities. Individual farmers face direct competition from other farmers producing near perfect substitutes, the production of any individual farm is not sufficiently large to satisfy retailers' demands for consistency of supply and quality, and costs of organization are high. Governments become involved to assist agricultural producers in overcoming these hurdles. Product differentiation comes in many forms. For example, the European Union has been in the forefront of developing product differentiation strategies based on geographic indicators. Countries as New Zealand, Scotland, Kyrgyzstan and Ecuador have implemented or investigated country branding strategies.

Defining the difference between a label and a brand is key to understanding how a country brand for agricultural products differs from a country-of-origin label. Both can signal information about a food's origin and bring to mind past experiences with the country and its products, while a brand is not limited to describing the product itself (Van Riel & Van den Ban, 2001). For example, a "Product of Canada" label is only informing consumers that the product was produced in Canada. A Canada brand, in contrast, would by its design represent all past brand marketing and a heightened awareness of what the consumer associates with Canada, in addition to identifying the product's origin. A brand's use of a consistent image

or logo rather than just words means that the associative effect of linking all past experiences to the current product is much stronger than for a label.

Applying a symbol indicative of a particular country to a range of food products can be viewed as an origin brand or country brand that links a product with its place of origin. Van Gelder(2003) states that this type of brand seeks to leverage the reputation of a geographic location to contribute to the consumer's positive perception of a product. Using a country brand that builds on the collective reputation of a country, its citizens, and other products using the brand makes managing it considerably more challenging than managing a traditional private brand. There are two challenges inherent in a country brand for food products: the complexity of managing a brand that is used on multiple products; and the effect on brand equity of the country's image in general (Innes, 2007).

Effective management of a brand requires appropriate linkages and information transfers along the supply chain to ensure that consumers receive a consistent message about the brand. When the owner of a brand manages all stages of the supply chain, the task of ensuring the product lives up to the brand's proposition is simplified. Vertical integration by agribusiness companies is one way to facilitate information transfer and product consistency. Alternative approaches exist, for example the cooperative model. As outlined by Hobbs(1998), 97% of Danish pork is channeled through cooperatives that participate in an umbrella organization which acts to ensure that consumer preferences are communicated to producers who then deliver consistent products.

A country brand will only assist in expanding exports if foreign consumers have a positive image of the country. We cannot assume that a country's brand equity will always be positive, especially as it is impacted by factors beyond the control of the licensor or its users. Many of the factors influencing country brand are beyond the control of either the brand users or managers. With the reputation of the brand resting in part on the reputation of the country, to fully manage the brand's image one would in theory need to control political, environmental, human rights and food safety systems in the country. If a country brand can credibly signal a positive product attribute about its brand equity, complementing the exporter's own private brand then it could be a valuable tool for a government to promote their agribusiness industry. From an individual firm's perspective geographic labels have been shown to add value to private labels by providing complementary quality signals (Hobbs, Kerr, and Klein, 1998).

A country brand on a food or agricultural product is intended to signal specific quality characteristics to consumers, which have been promoted as embodied in the country's products, in addition to consumers' preconceptions of what the country represents. A country brand therefore queues consumers to recall an image of the quality attributes that they associate with the country, its citizens, and the brand itself.

According to Caswell(2002) brand equity results from past experiences with the product, marketing efforts, and individual factors relating to a consumer's perception of the country and its citizens. Brand equity, in-turn, influences the strength of an extrinsic search indicator by providing a recognizable mark or logo that can signal a specific quality to the consumer. The intrinsic attributes of the product, like taste, appearance or the way it was produced, influence the perceived quality of the product following consumption. Past consumer experiences with the intrinsic attributes of products carrying the country brand can affect the total level of brand equity inherent in the country brand.

5. RESEARCH RESULTS IN SERBIA

The main objective of this study is determining of the most important factors that influence branding of agricultural products in Serbia and assessment of the importance of different participants in agriculture in creating branding strategy. The study included 125 respondents of which 65 were male and other 60 were female. Respondents in most cases were employed in different types of organizations involved in agriculture. Respondents in a given sample were aged 22 years and up to 66 years, and the average age of respondents was 38.46 years. The questionnaire also measured the number of years of experience in agriculture, which ranged from respondents with no work experience in agriculture to those with 60 years of experience, and the average number of years of experience in agriculture in this sample was 10:38 years.

Evaluation of factors affecting the formation of brand for agricultural products in Serbia, the following results are presented for unprocessed and processed agricultural products:

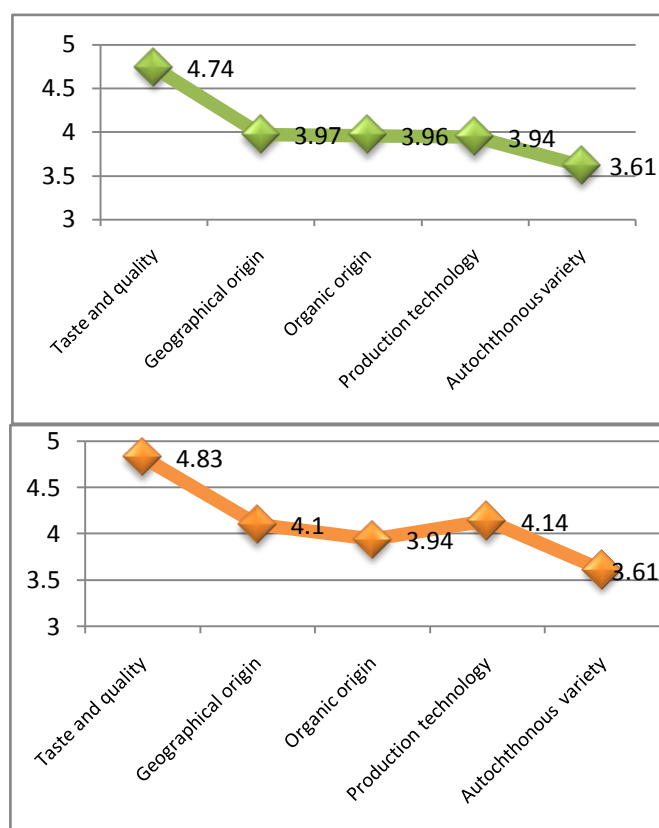


Figure 2: Significance of different factors for branding of agricultural product

Research results shows that the taste and quality are recognized as the most important factor in branding for unprocessed agricultural products while the geographical origin and organic origin acquired lower, but roughly the same ratings. In processed products taste and quality are also best evaluated while the technology of production and geographical origin scored somewhat lower grades. On the basis of these results it can be concluded that the taste and quality is the most important prerequisites for developing brand among agrarian products while other factors may significantly contribute to a successful brand and better communication with consumers.

Respondents were asked which sector of agricultural production in Serbia has the greatest potential for creating a brand, the following results were obtained:

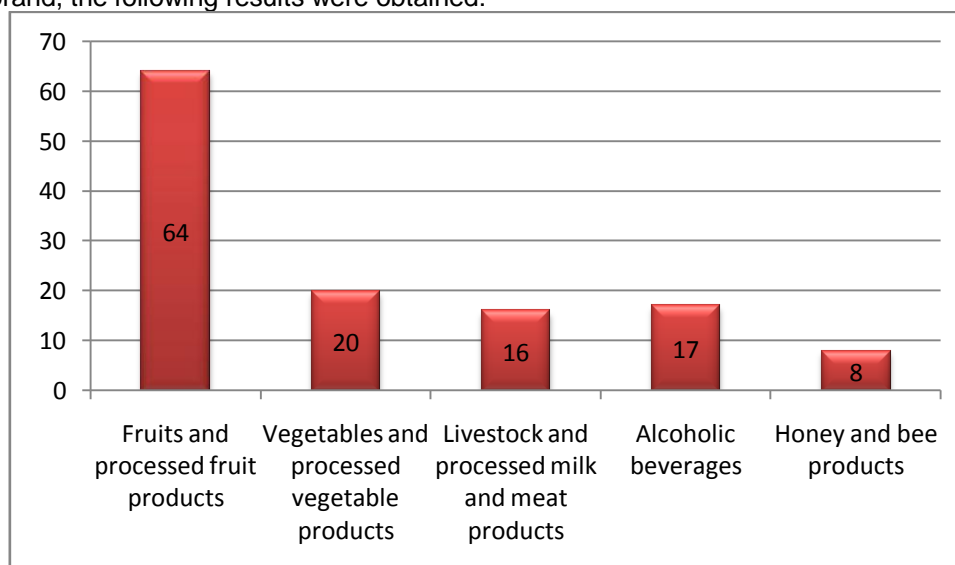


Figure 3: Rank of branding potential for different sectors of agricultural production

When asked which is most important level for development of agricultural products brands, respondents said that the agricultural products should be branded on product level (38%) as well as on national level (33%) in that way products from Serbia would have better chance to be accepted in foreign markets.

6. CONCLUSION

Looking at present trends both in the field of branding as well as in agriculture and food industry, it suggests that the branding of agricultural products will become increasingly important for their placement and sales, especially given the predictions of an increase in food prices in the future.

Brands in agriculture have the most important function to create an association to the product in the mind of consumers and provide a guarantee of quality and safety of marketed products. They can transmit the information about the product that will make consumers choose particular manufacturer or product. Geographical origin also indicates the specific product characteristics, quality assurance, a specification of production and place of origin, but does not include emotional relationship between customer and the product itself. One can therefore say that the geographical origin of products is a good basis for brand development, but it takes certain effort to create successful brand.

For branding agricultural products, it is necessary to take into account the natural characteristics that affect the brand that we want to create. Some products, especially unprocessed, are difficult to brand as there aren't characteristics which would make connection with consumers. When a manufacturer can produce unique high quality product then starts process of branding by putting a label that will effectively communicate with consumers.

Bearing in mind that agriculture is of great importance to the economy of most countries and this applies particularly to Serbia, branding is becoming one of the ways in which different countries can improve the competitiveness of their products on the global market. The activities of the country are reflected primarily in the creation of conditions for the successful production and product branding, and the can be, as well, implemented through the creation of the country brand that would serve as a support and a guarantee of quality products from certain countries.

Research on branding agricultural products was conducted on a sample of 125 respondents who were mainly employed in organizations from agribusiness. Results show that the greatest potential for creating brand in agricultural production has fruits and processed fruit products which clearly shows the strategic direction in creation of agricultural brands in Serbia. According to the survey branding of agricultural products in Serbia should be performed both on the product level and at national level in order to achieve more significant effects, and manufacturers should play a major role in this process

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UTILIZATION OF CONSUMER RESEARCH IN STRATEGIC DECISION MAKING

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Abstract: *The purpose of this methodological article is to explore the utilization of consumer research in the building of informational surrounding for strategic decision making. The article exposes methodologies of longitudinal research and segmentation research as two key methodologies which possess the required analytical and employment potential for successful utilization in strategic decision making. Practical implications of the article imply guidelines for managers and consultants which ensure that strategic research provides positive contribution in the process of strategic decision making. Theoretical implications imply guidelines for further scientific research which can enhance practical application and the overall quality of strategic research efforts.*

Keywords: *research methodology, strategic research, longitudinal research, segmentation research, strategic decision making.*

1. INTRODUCTION

Strategic decision making has always been one of the greatest challenges managers face throughout their carriers. First decades of long awaited second millennium have brought unprecedented macroeconomic uncertainty and volatility, and thus made strategic decision making even harder and riskier. Managers extensively rely on Business Intelligence (BI) in order to reduce the inherent risks of decision making, and subsequently base their decisions upon the learning acquired through various instruments of BI. Due to the fact that the majority of strategic decisions directly influence market performance, Consumer²² Intelligence (CI) as an integral component of BI, fulfils a particularly important role in strategic decision making.

Previous scholarship has thoroughly investigated the field of strategic decision making in marketing (West, Ford, & Ibrahim, 2010) and the field of consumer research (Aaker, Kumar, & Day, 2004). However, further research is necessary in order to explore (a) utilization of consumer research in strategic decision making, and (b) specific methodologies of consumer research which can deliver findings with strategic employment potential. Therefore, the purpose of this methodological article is to expose two methodologies of consumer research which have the required employment potential to be successfully utilized in strategic decision making. The article summarizes author's professional experience in project management of strategic research and management consulting, with previous scholarship in the field of consumer research.

2. CONSUMER RESEARCH AND STRATEGIC DECISION MAKING

Main instrument for acquisition of data for CI are various types of consumer researches. However not all consumer researches are of equal importance from the standpoint of CI. Therefore, the question is which type of consumer research possesses required analytic and employment potential to be utilized for the acquisition of findings which can be subsequently converted into inputs for strategic decision making?

Easwaran and Singh (2006) have introduced a very valuable classification which recognizes two distinct types of research regarding their role in decision making:

- *tactical* research which is utilized to objectively evaluate decisions made in the past in relation to their contribution in achieving corporate objectives; and
- *strategic* research which is utilized in setting and assessing long term corporate objectives.

When it comes to tactical research it is useful in providing answers on some of the following questions:

²² Author suggests distinguishing the term *consumer* which designates final recipient of goods or services, from the term *customer* which designates a person who has purchased a good or service but may or may not be the final recipient of a good and service.

- How effective is our advertising?
- To what extent are we successful in satisfying our customers?

Consumer satisfaction surveys (CSS), mystery shopping, advertisement tracking surveys (ATS), and so forth are excellent examples of such types of consumer researches. Even though they provide valuable findings, their contribution in the process of strategic decision making is not significant.

On the other hand strategic research recognizes how volatile business environment is, and the fact that successful policies and strategies of yesterday may not be equally successful in the years to come. Therefore, the key property of strategic research is its orientation towards future. Strategic research provides answers on some of the following questions:

- Are we going to experience growth or decline of our market share in next 12 months?
- What limits further growth of consumption of particular products or services?
- Is the introduction of new product going to decrease the demand for other products from our portfolio?
- Which consumer segments exist, how large they are, and what is their growth forecast in two years time?

3. PURPOSE AND OBJECTIVE OF STRATEGIC RESEARCH

Even though strategic research is the most important type of research from the standpoint of CI, it is very important to recognize that strategic research is not the *only* instrument for acquisition of data for CI. Conducting strategic research alone is not enough to build quality surrounding for strategic decision making. Furthermore, strategic research can yield its true potential *only* in synergy with other instruments of CI. Secondary researches, such as macroeconomic studies, can be particularly valuable for strategic decision making.

Therefore, the *purpose* of strategic research is to provide positive contribution in the building of informational surrounding for strategic decision making. Even though generic *objectives* of strategic research are related to the acquisition of various types of data for CI, particular objectives of strategic research projects can significantly vary. (Further argument reveals more details about specific objectives.)

4. METHODOLOGIES OF STRATEGIC RESEARCH

Subsequent sections expose two research methodologies which have the required employment potential to be utilized in strategic decision making. These researches belong to the group of strategic researches because of their orientation towards the future. The objective is to provide an overview of their main methodological properties, rather than detailed methodological specifications.

Longitudinal Research

Methodology of longitudinal research can be utilized to deliver forecasts²³ of consumption on the basis of continuous, comprehensive, and systematic acquisition of data in reference with consumers' behaviour, usage of goods or services, preferences, satisfaction, loyalty, needs, lifestyle, demographics, and other subjects of observational interest. Even though this type of data is primarily available for acquisition through survey research—which mainly offers insights into consumer attitudes—it can be also obtained through other sources such as: retail audit, customer relationship management (CRM), panels, audience measurement, and so forth. These accompanying sources complement survey researches because they reduce the bias which may surface when surveying consumer attitudes. However, having in mind the inherent rigidity of their methodology, they cannot substitute customized longitudinal survey research.

What are the main properties of longitudinal researches which determine their analytic and employment potential in strategic decision making?

²³ Easwaran and Singh (2006, p. 576) indicate the distinction between the term *predicting* which denotes the announcing the likelihood of occurrence of an event derived from examination of cause and effect relationship between two variables, and the term *forecasting* which denotes measurement of the exact probability of the occurrence of an event.

Firstly, longitudinal research requires *continuous* acquisition of data in a *systematic* and *unified* manner in regular frequency, preferably in longer time periods (more than two years). Discontinuous acquisition of data, without sequence and coherence, combined with frequent changes in research methodology, or changes of research contractor will significantly degrade analytical and employment potential of the research. If nothing else it will make the aggregation of data from various sources even more difficult.

Secondly, the reach of longitudinal studies is not limited to the examination of current consumption. Its reach also covers future consumption by examining intended future consumption of *present* consumers and intended future consumption of *prospecting* consumers. This data is vital for subsequent consumption forecasting.

In terms of strategy of data analysis longitudinal researches favour *integral* over *isolated* observation. In contrast to the other types of researches which limit the reach of research subject to a *single* topic—such as consumer satisfaction or corporate image—longitudinal studies intend to explore a *multitude* of topics. Integral observation delivers superior findings because it is possible to study cause and effect relationships between various topics of observational interest (e.g., the effects of consumer satisfaction on loyalty, or the effects on communications on brand equity, etc.).

In the case of research methodology of longitudinal surveys, it is especially important to use medium size or large samples ($N \geq 1,000$ respondents)²⁴. When possible, utilization of stratified random sampling (SRS) method is highly recommended, due to its superior reliability and representativeness. Non-probability based methods, such as quota sampling, should be used *only* under circumstances when application of SRS proves to be unfeasible or impractical. Otherwise it should be avoided. As mentioned earlier, longitudinal research must be conducted in a pre set constant frequency (e.g., bimonthly, quarterly, etc.). This is very important because otherwise research will fail to maintain its integrity and ultimately be of no value for decision makers. Computer Assisted Telephone Interviewing (CATI) is the survey method of choice for longitudinal surveys, because it provides affordability and rigorous supervision and control of data acquisition. However, due to the fact that longitudinal surveys can require lengthy questionnaires Face-to-Face (F2F) survey method can be utilized when necessary.

The main objective of data analysis strategy of longitudinal research is to deliver forecasts. Therefore, the process of data analysis consists of following phases.

- Phase 1: Synthesis of data in reference with present consumption with the data about intended future consumption.
- Phase 2: Analysis of probability for various future outcomes.
- Phase 3: Development of forecasts for most probable outcomes.

Data analysis in the longitudinal studies requires the usage of various forecasting methods such as: moving averages, exponential smoothing, time series, and so forth. These methods are important for subsequent development of various marketing strategies as strategic response for each of possible outcomes.

Even though the importance of longitudinal research is immense there are some inherent deficiencies and limitations of this research methodology. Firstly, conducting any type of research on a large sample in a continuous manner demands significant amount of financial resources, thus making these types of surveys particularly expensive. Therefore, this type of researches might be out of reach for majority of companies. Secondly, forecasting method have deficiencies of its own. They require expert knowledge, advanced technology, and adequate experience in order to deliver reliable outputs. This further limits their range of application only to those companies which have required resources.

Segmentation Research

While the longitudinal research focuses its efforts to track and forecast consumption, segmentation research offers insights into the future from entirely different angle. Methodology of segmentation research can be utilized in strategic decision making to reveal consumers' segments, and subsequently provide insights on how to develop customized marketing strategies for each specific segment. Segmentation research achieves this by examination of strong habits (Ji & Wood, 2007) of target population which mold

²⁴ This and other recommended sample sizes refer to surveys conducted on a single geographical domain, which may contain 4–6 smaller geographical units, regardless the size of the target population in question.

entire consumer behaviour, drive their needs, colour their preferences, and so forth. Furthermore, these insights into specific properties of target population are prerequisite for consumer segmentation and analyses of consumers' segments from the standpoint of strategic decision making (e.g., whether particular segment will adopt changes in packing or new taste of beverage). Therefore, segmentation research wonderfully complements longitudinal research because it provides in-depth insights and compensates the informational deficit which may arise due to the focus of longitudinal research on describing consumption.

What are the main properties of segmentation research?

Firstly, segmentation research explores strong habits of target population which tend to be deeply embedded into personality of each respondent. These habits are very resilient and usually change very little or very slowly over time. Strong habits are representation of constitution of personality, beliefs, ethnic, social and cultural background of elements of target population. Therefore, segmentation research is primarily *explorative*.

Secondly, segmentation research employs a unique strategy of data analysis. The data in segmentation research is acquired with intention to reveal consumers' segments, on the basis of the acquired data about strong habits of target population. This requires the usage of advanced methods of data analysis such as cluster analysis. The ability to observe and analyze particular consumer segments from the standpoint of specific research objectives provides the necessary employment potential of segmentation research for its utilization in strategic decision making. Without segmentation research managers would not be able to develop marketing strategies customized according to the specificities of each consumer's segment.

Finally, segmentation research is by default related to the exploration of consumption of certain products or services. But, in contrast to the longitudinal research which tracks and forecasts consumption, segmentation research aims to reveal *why* consumers purchase certain goods or services, what drives their choice of brands, how consumption differs across various consumers' segments, and so forth. This makes them an indispensable instrument for decision making in product management. Decision making about products based upon findings acquired through various smaller studies, conducted quickly on small scale samples, can be dangerously misleading or impartial. Development of new products or major changes in product portfolio deserve serious research efforts and that is exactly what segmentation research provides.

The methodology of segmentation research is quite different than the methodology of longitudinal research, even though both of them belong to the group of strategic researches. Segmentation research requires extensive preparation through a series of exploratory researches which precede the main survey. Preparations commence by conducting prevalence research, which is utilized to determine whether elements of target population are particularly hard to reach or reluctant to participate in the survey. It is also necessary to obtain description of target population which is further utilized for sampling.

If the main survey proves to be feasible, it is necessary to conduct qualitative research through focus groups, in-depth interviews, or other methods of qualitative research in order to aid the development of methodology of main survey. Insights acquired through qualitative research are mainly utilized for questionnaire development and formulation of initial research hypothesis. After completion of research methodology, pilot survey needs to be conducted in order to confirm soundness of finalized research methodology.

In terms of research frequency it is recommended to conduct segmentation research once in two to three years in the times of relative macroeconomic stability. There is no need to conduct them more often due to the fact that changes of strong habits of target population require more time to develop.

Regardless of the sampling method recommended sample size is $N \geq 2,000$ respondents. Such large samples are necessary for subsequent analyses of consumers' segments. Unfortunately, due to the complexity of target population, it is not always possible to obtain sampling frame for sample development. Therefore, research contractors are usually forced to conduct these researches by utilizing some of the non-probability based sampling methods, such as quota sampling. Due to the inherent deficiencies of non-probability based sampling methods, rigorous quality control needs to be enforced throughout the phase of data acquisition. Otherwise, the representativeness of the sample may be compromised. The

segmentation research is usually conducted through Face-to-Face (F2F) survey method, due to the fact that questionnaires for segmentation research can be particularly lengthy. Usage of F2F is a reason more to enforce rigorous quality control and strive for flawless execution of data acquisition.

Defining target population is of crucial importance for the success of segmentation research. In general target population can be either *present* or *prospective* consumers. Exploration of prospective consumers (e.g., customers interested in taking car loan in next 12 months) can be particularly useful because it provides insights how prospective consumers make their first choices, which drivers influence their choice of brands, and so forth. These findings can be utilized to create strategic advantage over competitors. Another direction for defining target population is related to the usage of products or services. Target population can be consumers of some *general* type (i.e., category) of products or services (e.g., non-alcoholic beverages, or banking services) or *particular* type of products or services (e.g., carbonated non-alcoholic beverages, or holders of savings account). Either way, definition of the target population must integrate the requirement for information research ordered intends to acquire. In order to avoid unsatisfactory research outcome, definition of target population must be perfected until the mentioned criterion is met.

The reach of research subject in segmentation research is determined by the need to retrieve data which can be utilized for subsequent consumer segmentation. Therefore, the subject of segmentation research covers a multitude of topics including consumption but with emphasis on consumers' strong habits, needs, preferences, perception, and so forth. If needed, more attention can be paid to the communication topics such as brand or corporate image. These findings can be utilized to develop customized strategies of communications.

The data analysis in segmentation research is a complex and nonlinear process consisting of various phases and individual steps, some of which need to be repeated multiple times. The objective of data analysis in segmentation research is to develop consumer segments and reveal how strong habits influence consumption. Therefore, it is necessary to apply advanced methods of statistical analyses such as cluster analysis and various accompanying methods (e.g., factor analysis, discriminate analysis, analysis of variance [ANOVA], regression analysis, conjoint, correspondence analysis, etc.). In general the entire process of data analysis starts with development of segments and continues with analysis of segments, from the stand point of various topics which research subject covers.

Segmentation research is to an extent limited by inherent deficiency of cluster analysis. So far there has not been developed a completely objective procedure for statistical significance testing of cluster analysis (Aaker et al., 2004), so it is hard to assess the quality of developed consumers' segments. Also, the usage of quota sampling can turn to be a problem if instruments of quality control are not enforced, or if the response rate turns to be significantly lower than predicted by prevalence research (Biemer & Lyberg, 2003).

5. RECOMMENDATIONS

Recommendations for practical application of longitudinal and segmentation research are very specific depending on particular industry, company, requirement for information, and other circumstances. However, some general recommendations can be made.

Firstly, it is recommended to develop corporate resources for conducting strategic researches *prior* to the engagement in such types of research projects. Without adequate operational and human resources, especially among middle management who is in charge of carrying out these research projects, it is much better to postpone them until adequate resources are developed. Relaying *only* on the expertise of research contractor may be counterproductive and effectively undermine subsequent strategic decision making. Also, it is very important to ensure benevolence and involvement of senior management. Ultimately senior managers are the ones who will be making strategic decisions, and they need to believe in the power of strategic researches.

Secondly, it is recommended to optimize annual research program around strategic researches. This usually requires sacrificing smaller research projects in order to have enough financial resources to carry out strategic researches. If planned out properly, it is possible to organize strategic researches in such

manner that they fulfil the majority of requirements for information and effectively substitute majority of smaller research projects. Also, from the standpoint of research management it is certainly easier to manage two or three large projects annually than a significant number of small studies. Furthermore, conducting a large number of unplanned small studies can actually create confusion, if findings acquired through these studies are conflicting and overlapping. Therefore, in terms of overall involvement of financial, operational, and human resources, properly planned strategic researches are actually more efficient than smaller studies.

Finally, whenever possible it is recommended to choose the methodology of strategic research which is developed specifically for the application in a particular industry, rather than a generic methodology developed for application in various industries. Generic methodologies may neglect some important aspects of a particular industry and therefore may not deliver required information.

In practice here are some guidelines for development of methodology of strategic researches.

Longitudinal researches should be conducted in steady frequency once every three to four months on medium sized samples ($N = 1,000 - 1,500$ respondents). These researches should cover a multitude of topics such as: present and future consumption, needs, preferences, satisfaction, loyalty, image, and demographics. They can be complemented with some topics of special interest from time to time, depending on the particular requirements for information. By conducting them in such manner they will effectively assume the role of CSS, provide information about competitors' consumers, and fulfil their main objective to forecast consumption.

Segmentation research should be conducted once in every two to three years on large samples sized ($N \geq 2,000$ respondents) especially when there is a need to setup or revise market offer or strategy of communications, or gain in-depth insights into consumers' segments. If found necessary segmentation research can be conducted more often through a sequence of research projects. The sequence starts with a research project which objective is to gain in-depth insights into all consumers' segments, and continues with a research project which is focused to further explore one consumer segment of particular interest. This is particularly useful when there is a need to gain more insights into consumers of particular brand of goods or services. Insights into the profile of consumers' segments, their size, and growth potential will steer further development of customized marketing strategies according to the specific needs of particular segments.

6. CONCLUSIONS

Previous argument displayed two methodologies of consumer research which possess required analytic and employment potential for application in strategic decision making. Longitudinal research and segmentation research provide different but complementary insights into the future. While longitudinal research forecasts consumption, segmentation research reveals strong habits of consumers' segments and allows development of marketing strategies customized to the specific properties of consumers' segments. Optimized annual research program allows efficient deployment of operational, human, and financial resources even with such expensive research projects.

Further efforts in terms of scientific research of methodologies of strategic research should be invested into improvement of their reliability and overall survey quality. Also, the applicability of strategic researches deserves particular attention of scientific community. It is especially important to explore how inherent deficiencies and limitations of these research methodologies influence strategic decision making, what are practical challenges managers face when using these research methodologies, and so forth. All of these efforts can increase analytic and employment potential of strategic researches.

Nevertheless, strategic researches will remain a valuable instrument of strategic decision making. Its findings and insights highly enhance effectiveness of strategic decision making and bring certainty to a rather complex and demanding process.

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GROUP BUYING IN SERBIA: NECESSITY OR JUST MARKETING?

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Abstract: *The concept of group buying services in Serbia is spreading very fast. With a simple business model, many new entrepreneurs are turning to this type of business, expecting low costs and quick profit. There are three types of participants in this business process: customers, web sites offering group discounts and clients who are giving discounts on their own products or services. The main idea of this study is to show that clients do not need to give their products and services at a lower price for the purpose of advertising, but they need to give the discounts because it became a necessity today, as the Serbian market is saturated with sites for group purchases.*

Keywords: *group buying, discounts, consumers, clients, services, survey*

1. CONSUMERS VS. CUSTOMERS

A consumer is a person or group of people that are the final users of products and or services generated within a social system. A consumer may be a person or group, such as a household.

The consumer is the one who consumes the goods and services produced. As such, consumers play a vital role in the economic system of a nation because in the absence of the effective demand that emanates from them, the economy literally collapses.

A consumer and customer are commonly used in the same context at times in business literature. However, they are not the same. Consumers are just one sub group of customers. What does this mean? It means that if you buy a product for any commercial purposes, you are not a consumer. If you buy a product purely for your own consumption, you are a consumer.

2. INTERNET SHOPPING

Online shopping is a form of electronic commerce whereby consumers directly buy goods or services from a seller over the Internet without an intermediary service. An online shop, eshop, e-store, Internet shop, webshop, webstore, online store, or virtual store evokes the physical analogy of buying products or services at a bricks-and-mortar retailer or shopping centre.

Internet shopping represents the launch of a new industry with corresponding levels of praise and concern. It is both the golden child for innovative net users, and the evil empire for anxious brick-and-mortar retailers. That on-line purchasing is growing at a dramatic rate, but, yet the expected explosion of Internet shopping has not occurred; its market share is small, at under 2 % of total retail spending (Retail Forward, 2003a). Most consumers have been slow to adopt on-line shopping.

3. GROUP BUYING

Group buying, also known as collective buying offers products and services at significantly reduced prices on the condition that a minimum number of buyers would make the purchase. Origins of group buying can be traced to China where *tuangou* or team buying was executed to get discount prices from retailer when a large group of people were willing to buy the same item. In recent time, group buying websites have emerged as a major player in online shopping business. Typically, these websites feature a "deal of the day", with the deal kicking in once a set number of people agree to buy the product or service. Buyers then print off a voucher to claim their discount at the retailer. Group buying strategy is quickly gaining traction as a truly effective marketing medium.

Group buying websites leverage the power of collective bargaining to provide attractive local deals that offer significant savings for consumers while also promising lucrative sales numbers to participating merchants.

A business promotes their product or service on the group buying website, typically marking down the cost of the item by 50 %, sometimes more and sometimes less. For consumers to take advantage of this deal, a minimum number of buyers must also buy in. The business advertising their product pays nothing upfront and if the deal does not attract the minimum requirement of sign ups, then the business pays nothing at all. Once the deal is valid and the product or service is paid, the group buying site keeps a percentage of the sales as their commission, cuts a check to the business that advertised their product and sends a voucher to the consumer.

We defined three key groups in this business model: consumers, group buying services and companies that provide discounts on their products or services. (in further text: clients, because they are actually clients of the group buying services).

4. SITUATION IN SERBIA

Population in Serbia in 2011. is 7.310.555 people, country area is 77.474 square kilometres. Capital city is Belgrade with population of 1.764.650 people in 2007. There are 4.107.000 Internet users in June, 2010., and 3.173.440 Facebook users in December, 2011.

The concept of collective buying in Serbia is becoming very popular in recent years, and has a tendency to increase. On the Serbian market, there are currently 44 companies operating as a service for group buying. 75 % of these companies are operating as Limited liability companies. During the time period between 2009. and 2011., there were 35 group buying companies opened, and 9 companies were registered before 2009., but did not deal with this type of business. 59 % of these companies were opened in 2011. The question is how many of them will survive. Some of the companies are already in liquidation process, and some companies, with their unattractive and outdated offers, clearly show small chance of survival.

Services that offer discounts cover all areas of your life. Hairdressers, salons, gyms, cafes, restaurants, travel, doctors, dentists... And the fun is the fact that you suddenly need all of that, and everything is waiting just for you. These services force you to buy goods and services you would not need otherwise. But they are here to create the need, perhaps even to cause addiction. They offer luxury at a reduced price. We are familiar with the fact that customers do not buy products/services, but they buy the value. Therefore, service providers offer additional value for customers, such as „head massage" which is free when you buy voucher for hair washing. Everyone tries to make an attractive title for its offer.

Putting ourselves in the role of a group purchasing service, we recognized two main target groups:

1. Clients, who are actually service companies (rarely manufacturing companies) who offer services at a discounted rate.

These are the companies where business is not going so well and the companies that look on these services as an exceptional opportunity for good marketing move. Market conditions are creating the necessity to provide the goods and services with discounts, because that is the way to stay concurrent. If our competition offers discounts, we must also offer discounts.

2. Consumers who buy vouchers

Our market is very big. It includes part of the Serbian population that uses the Internet. The focus is placed on the larger cities, such as Belgrade, Novi Sad, Kragujevac, Niš,... Main characteristic of our target group is that they are people with less purchasing power, who want to afford a bit of everyday luxury. And there will be more and more such people.

In order to obtain a real market situation in Serbia, we researched all of three aspects of this business model: consumers, group buying services and clients of the group buying services.

5. CONSUMERS' POINT OF VIEW

In order to obtain information about group buying websites' customers, we conducted a survey. Our survey was completed by 250 persons, 130 of them are male, and 120 are female. 9 persons are ages

between 16 and 20, 234 persons are ages between 21 and 30, 6 of them are between 31 and 40, and one person is older than 40. Their payment ability is shown on the chart below:

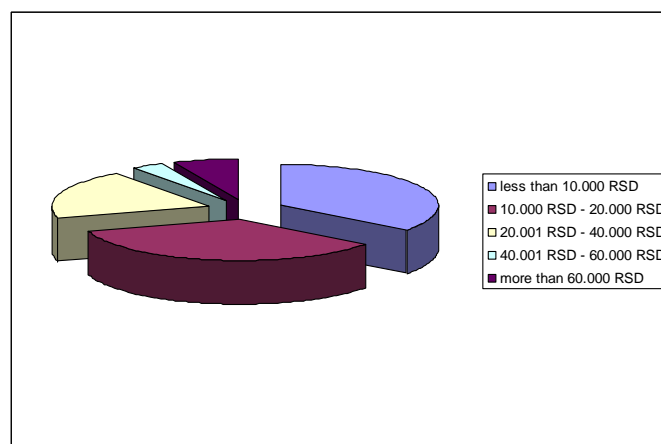


Table 1: *Payment ability of survey participants*

97,38 % of our survey participant are using Internet every day. 47,55 % have never bought something over the Internet. Only 73 people have used group buying services. 36 people found out about these services via social networks, while 31 found out through recommendations. 59 of them are sharing interesting offers with their friends. We asked our survey participants which service do they use the most. There was possibility to choose multiple answers. The results are showing:

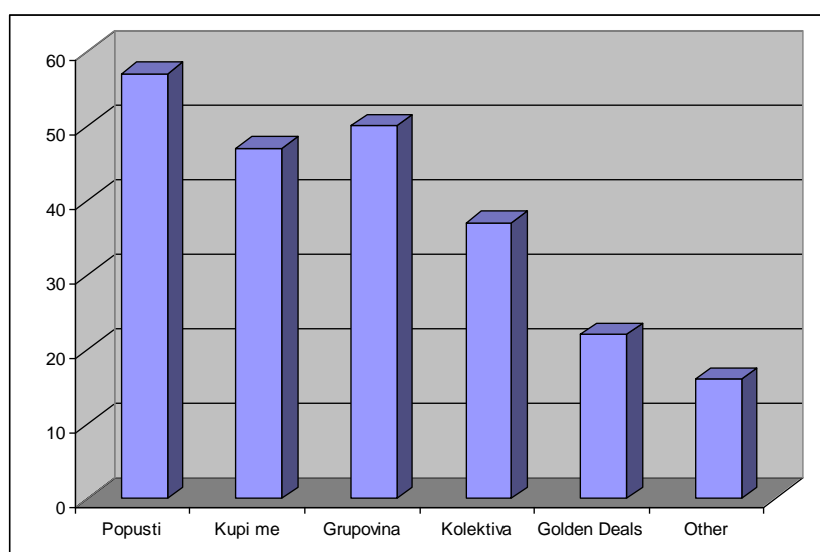


Chart 2: *Choice of group buying services*

85 % are paying offers via invoice, which will later be proven by managers of these sites. The value of bought voucher is usually not bigger than 1.000 RSD (54 say so). The most sold services are beauty and health vouchers, also as concert and theatre tickets. 60 % participants who used these services were completely satisfied by service, 37 % were sometimes satisfied and 3 % were not satisfied at all. 90 % will repeat the shopping again.

We also asked people who do not use these services why are they not using them. There was possibility to choose multiple answers.

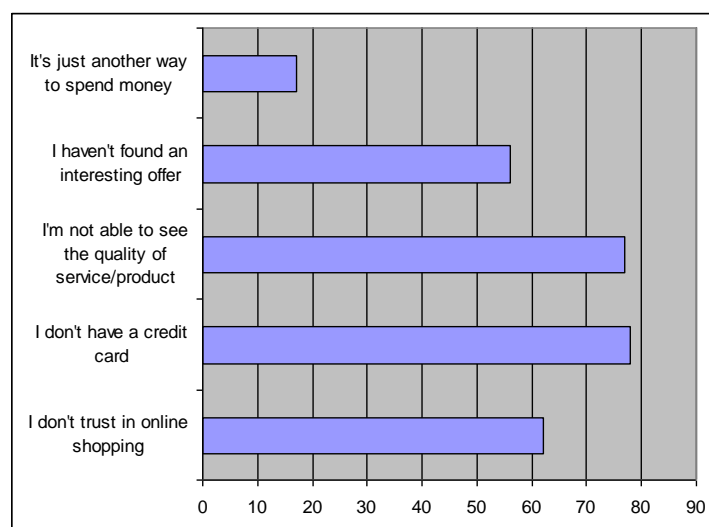


Table 3: *Why people do not shop online?*

6. GROUP BUYING SERVICES' POINT OF VIEW

We interviewed few managers of this type of companies, and some of their answers were very similar, while the others were very different.

The first thing to know was their opinion about current market situation of group buying services in Serbia. The fact is the market is saturated and overcrowded with sites and offers. There are many players, which makes the market chaotic and establishes the basis for destroying the loyalty. It is very hard to differentiate among the concurents and create a new value for customers. People generally think that this business model is easy to copy and follow, keeping the costs low and gaining profit easy. They are not aware it is easy to build a model, but it is hard to stay on the market. As we already said, it is extremely hard to differentiate among concurents, to inovate your strategy and think up of something new. Since the number of these services is rapidly growing, it will lead us to burst of the bubble dot com system.

Bubble dot com is a company that embraces the internet as the key component in its business. Dotcoms are so named because of the URL customers visit to do business with the company, e.g. www.Amazon.com. The "com" stands for "commercial."

The biggest and the most persistent will survive.

We looked a little bit closer to operations of these companies (group buying sites). Bestsellers services are in domain of health and beauty. They are followed by concert and theatre tickets. Analysing active and previous offers of one group buying site, purchasing preferences for 2011. are:

- 5.507 vouchers for dentists services were sold,
- 10.000.000 RSD was spent on weight loss treatments,
- 8.147 vouchers for massages were sold,
- 14.780 vouchers for hair treatments were sold

Some services are very committed to seeking clients, so they could prepare a single and unique offer, while on the other side, there are services where clients rather come by themselves. Of course, in some companies, this relation is balanced. Most of the clients are coming back to make a new arrangement, because they are satisfied with the previous results.

Managers of the group buying services think some branches are sentenced to fail if they do not provide discounts, like beauty and hairdressers industry. They are forced to give discounts on their services, because the competition is providing the same service at a lower price. But, it depends from industry to industry.

Some of the clients are convinced that their offer on a site is a perfect type of commercial. But, the biggest benefit of their offers is surely amount of sold vouchers. Group buying services pay their clients in different

periods of time. Some are paid in three to five days, some are paid fifteen days after the offer is ended. Services take a fee, which is between 20% and 50% of sales vouchers. We were also interested to find out which is the most common form of customers' payment. Most of the managers said it is invoice, about 70 % users are paying via this way. We wondered what happens when great amount of vouchers is sold and people do not have enough time to use it. Usually, services in agreement with clients, extend the time limit of possibility using vouchers.

7. CLIENTS' POINT OF VIEW

Since we wanted to get the other side of the story, we contacted the salons that are offering their services via these sites. Namely, on the basis of their answers, we came to certain conclusions.

The questions they asked were the following:

- What led you to offer your services through the websites for group discounts, whether it is marketing or necessity?
- Have you repeatedly been bidding?
- Did you use more than one site?
- What percentage of your salary was their?
- Do you think that you can remain competitive in the market with your real prices, while those sites exist?
- Do you have a website?
- Do you advertise in any other way?
- What do you expect in the future related to these sites?

Although we tested different types of salons, from hairdressers to beauty salons, which offered different types of services, their responses were very similar. The conclusion to which we came is the following:

With the advent of the sites for group discounts in Serbia, there was a loss of work for salons that offered their services in the traditional way. Therefore, in order to stay competitive, they were joined by other, smaller salons, and hence the spread of clients, which necessarily leads to the space for new group discount sites. Over time it became a necessity, and the marketing completely lost the sense here, but it is a necessity to remain present in the market. They consider that this way of doing business is to serve the people for small price to see how the professionals do, but very few of these people return, because these clients will always go to a new place. Only 1% of satisfied customers return to the same salon and pay full price for the service.

Salons often collaborate with multiple sites, but works with better, more popular site, and other associates are usually small or new sites which offer better business conditions. Our respondents made offer via these websites average five to six times. With the advent of this type of business, the percentage taken by the sites for group discounts was 50, but as the competition among them is increasing, now it is an average of 30%. Sites like Kolektiva.rs or Popusti.rs are currently the most popular and have a maximum of conditions for cooperation, they require 40% of its clients. But, new and lesser-known sites, sometimes ask not for even 10%.

Some of these salons have their own sites, some of them plan to have them in the near future, but the current form of marketing they are using is the Internet, precisely cooperation with specific portals that specialize in this type of service.

What do they expect in the future, is that the market will saturate of these sites and the traditional way of doing business will be restored. They also hope that the way these sites are operating is going to change, because the current situation does not make enough profit neither one or the other.

8. CONCLUSION

Summing up the impressions of consumers, sites and clients, we came to the conclusion that the offers on group purchasing sites are not really for marketing purposes, but they are necessary part of survival strategy. In the beginning, it was really all about marketing, but the market became saturated and many new group purchasing sites were born. In the context of service industries, those companies must give discounts to keep pace with the competition. Otherwise, they are threatened of disappearance from the

market. These companies hope that this system will not last for long, that „the bubble is going to burst", and that one day, they will make greater profit with decreased volume of services.

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Swinyard, W., & Smith Scott, M., Brigham Young University: „Why People (Don't) Shop Online: A Lifestyle Study of the Internet Consumer

THE ROLE OF MARKETING IN OBESITY PREVENTION

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Abstract: *The subject of this paper is the application of marketing in the prevention of obesity. Health Marketing aims to influence the public by a range of actions with the aim of achieving changes in behaviour, attitudes or habits of each individual for the benefit of the overall community.*

Marketing is a necessary and useful tool that can be applied to improve the function of communication aimed to prevent obesity. Based on previous studies of the obesity problem in Serbia, it can be concluded that there is a considerable scope for the application of marketing approaches to improve population health by reducing obesity and excessive body mass. Although marketing strategy in profit-oriented organizations - whose ultimate goal is their own profit - is used in the prevention of obesity and excessive body mass, it would be wrong to measure the effects only through direct financial impact. Health as a capital asset has no cost, and profit in health, quality of life, reducing the years of lost life, as well as the prevention of negative consequences of obesity as an epidemic in the population, is above any direct financial gain. Much more developed economies than ours have recognized the importance of this problem and developed a national strategies to define actions and multi-activities that are aimed at reducing the incidence of obesity, and are primarily aimed at children as a target group.

Keywords: *obesity, marketing, prevention, children, population*

1. INTRODUCTION

Research on the application of marketing in the prevention of obesity analyzes the possibilities of using scientific achievements through which both the individuals and population in general can be influenced in order to promote and maintain health (Berkowitz E.N., 2006).

The main purpose of applying marketing in the prevention of obesity is to satisfy the needs of users more efficiently; to raise the level of health care and life quality; to connect the participants of health care system both vertically and horizontally in order to provide preventive measures of protection; to determine the priorities within the prevention activities; to rationalize business activities and use available resources in prevention more economically and to include all factors outside the health sector that can give their contribution to health (Kotler F., 2007, Filipović V., 2009).

The way to introduce marketing concept in the health sector should be gradual, in the following order: identification of needs for adopting marketing concept and orientation towards the user; determination of strategic directions of marketing activities; definition of the marketing vision, mission and objectives; determination of strengths, weaknesses, opportunities and threats (SWOT), concretization of strategic objectives; development of marketing strategies; determination of marketing mix instruments; control and analysis of the effects achieved.

Marketing in health services, being a segment of social marketing, is directed towards the collective benefit. Its objective is to exert influence over the public by a series of actions in order to make some changes in behaviour, attitudes and habits of each individual to the benefit of collective. However, marketing actions directed towards the collective benefit cannot be implemented if the decision-makers are not willing to solve the problem recognized by the professional circles (Marks L, Cave S, Hunter DJ, 2010).

It has been known for decades that mass non-infectious diseases are the leading cause of morbidity and mortality in non-developed and developing countries. And while one part of our planet is struggling with malnutrition as a widely spread problem, the other part of the planet and general population come face to face with obesity and overweight and their consequences (Atlas of Health in Europe 2008).

The phenomena underlying these negative developments and problems are unhealthy life-style, obesity and physical inactivity, to which their contribution is given by industry and fast-food market, way of living and cheap high calorie foods as well as lack of facilities and motivation to go in for any sports or physical

activity. Insufficient strength and cohesion of the society to tackle these problems and to try to stop these negative trends by appropriate decisions and in a systematic way lead to even more negative trends in the population health condition (Fleming F, Zgodzinski E, 2005).

Global increase in overweight and obesity depends on numerous factors, including:

- Global change in diet in favour of increased intake of energy rich foods with high content of fats and sugars and low content of vitamins, minerals and other micro-nutrients
- Trends regarding diminished physical activity resulting, first of all, from other forms of transport and increased urbanization

Overweight and obesity and diet-induced diseases represent big problems of public health for the World Health Organization (WHO) in Europe and forthcoming growing epidemics and leading causes of mortality and morbidity in Europe. Overweight or obesity is recorded in more than 50% of adult population in Europe. Overweight is found in 30-80% of adults and 20% of children in the countries of European region of the WHO, whereas one third of children are obese. The annual rate of increase in children obesity prevalence is constantly on the rise, and today it is 10 times higher than in 1970s (Closing the Health Gap in EU 2007).

An increased body mass index (BMI) is the main risk factor in development of the following diseases:

- Diabetes – became a global epidemics very fast. The WHO predicts that the rate of death caused by diabetes will rise by more than 50% worldwide in the next 10 years
- Arterial hypertension
- Cardiovascular diseases (predominantly cardiac diseases and insults) – already takes the first place as the cause of death of 17 million people every year in the world
- Some forms of cancer (endometrial, lung and colon cancer)
- Bone and muscle disorders – particularly osteoarthritis.

Obesity is associated with very high expenses in public health care and losses in productivity. Obesity prevention programs can reduce expenses in public health care for a short time; however, their effects on long-term expenses are still insufficiently determined. According to some studies, obesity directly increases total expenses in public health care services for more than 7% (The European Health Report 2009).

Implementation of current recommendations requires the permanent cooperation of a great number of participants, both public and private ones. Governments, international partners, associations and non-government organizations and private sector have a vital role in the formation of healthy environment and creation of healthier eating habits which are acceptable and easily available (Health in All Policies, 2006).

Special attention should be paid to the most vulnerable categories in the society – the poor and children – who have limited choices regarding food and surrounding in which they live (WHO European Action Plan for Food and Nutrition Policy 2007-2012, 2008).

The starting point of marketing concept in problem solving is the necessity and wish of potential patients, including the knowledge at various levels, from obesity as a disease to social and economic politics which result in different models of exposing the individuals and population to risk factors. The emphasis in this approach is put on the importance of economic, behavioural and social factors whether they are manifested at the level of an individual or a greater part of population (Witkowski TH 2007).

Body mass above normal affects metabolism, blood pressure and increases cholesterol, triglycerides and insulin resistance. In addition, many other discomforts and symptoms are associated with obesity: difficulties in breathing, skin problems, infertility, etc. Cardiovascular diseases, endocrine disorders, some cancers (breast, colon, prostate, endometrial, renal cancer, etc) and insulin dependent diabetes represent serious health consequences which are greatly enhanced by obesity.

One of possible ways to achieve satisfactory effects and results is to:

- Create conditions which will provide proper choice of fiber rich foods with low content of fats
- Provide appropriate sports facilities to individuals and all different population categories
- Promote healthy life-styles; higher consumption of vegetable and fruit and wholemeal grains; physical activity for at least 30 minutes a day; limited intake of saturated fats and increased intake of unsaturated fats

- Engage all levels of authorities and make decisions on investments into infrastructure, economy, environment which means systemic and planned allocation of appropriate amount of money
- Follow the effects achieved by decisions made at the level of cooperation between food manufactures and consumers
- Engage clinical medicine in giving efficient support in reducing body mass, where necessary; it should be noted that health care services deal with the consequences of inadequate decision-making process and implementation of decision in non-health sector, which give their contribution to health

Bearing in mind all facts influencing the development of problem of overweight and obesity, it is obvious that obesity is not only a health problem of the individuals; it is the problem of wider social surrounding and a diverse range of participants. Such an approach to the problem compels us to think of the importance and role of social marketing (Filipović V, Stanković Kostić, 2008)

2. COMPOSITION

The attempt at getting insight into the knowledge and skills of social marketing in the function of solving the problem of obesity is the topic and challenge of this paper. Marketing in health services can be observed as corporation marketing, wide-sector marketing, brand marketing and social marketing.

The paper is aimed at pointing to the importance of strengthening the capacities of marketing resources while attempting to achieve the positive outcome of the actions undertaken in the prevention of obesity and overweight.

According to the results of measuring BMI within a study performed in the population of Serbia in 2006, there were 38.3% of those normally nourished, every other person was overweight (54.5%), 18.3% of the participants were obese and 36.2% were pre-obese.

One of the strategic objectives of the national healthcare policy is to promote health of the population of Serbia by reducing the incidence of obesity and pre-obesity. The application of marketing in the field of preventive medicine and public healthcare is being done without a systematic approach, clearly defined plan and sufficient knowledge of scientific principles in the implementation of marketing skills.

Marketing approach to this issue starts from the needs and wishes of potential patients, including the knowledge at various levels, from obesity as a disease to the social and economic policy which result in different models of exposure of the individuals and general population to risk factors. The main point in such focusing is the important role of economic, behavioural and social factors which can be manifested either at the level of a person or a greater part of population.

Children obesity has become the biggest healthcare challenge because it affects every third child under the age of 12 years. Marketing of fast food rich in saturated fats and salt is one of the main causes of children obesity. Although the experts agree that children obesity results from several factors, such as insufficient physical exercises, big portions, poor choice, sedentary way of life, genetic predisposition, food marketing is still widely discussed with food manufacturers (Child Obesity Policy Brief, 2010).

If good results are to be expected in the prevention of obesity, multi-sector approach and wide social actions are required, starting from the fact that public health institutes carry the activities as one of the most important links in the chain of all necessary steps to be taken in order to achieve the effects in the prevention of obesity and increased body mass.

The paper also deals with the importance of mass media participation and the possibility of their contribution, which may be even negative in case of inadequate transfer of information. In accordance with the fact that mass media are an important source and a partner in public health, their exposure was analyzed in order to survey the presence of this topic in media and to assess the number of readers who receive the information on the key words: nutrition, obesity, diet, physical activity (Table 1).

Table 1. Number of contributions with the key words (nutrition, obesity, diet, physical activity) compared with the contributions on other subjects in print media

Fields	Number of contributions
Political parties	28402
Banks, leasing	26698
Car industry	10588
Oil companies	8356
Health	8200
Insurance companies	7623
Culture	7264
Sports	6666
Telecommunication	6403
Meat industry	2121
Healthy nutrition, diet, obesity, physical activity	660

Table 2. Participation of media exposure of key words in print media

Key word	Number of contributions
Nutrition (incorrect)	498
Obesity	211
Diet	133
Physical (in)activity	207

The analysis of the participation of media exposure of key words in print media suggests that the key words connected with obesity are minimally present in research results, the most exposed word is nutrition and the least exposed is diet, which practically means eating habits. The accuracy of use of these terms was not analyzed (Table1, Table 2).

The annual analysis is available first of all for print media and it has been performed within the case study research of public health institutes. The greatest number of contributions published by print media in 2010 dealt with political parties and corresponding topics – over 28000. The second place was taken by topics about banking and leasing discussed in 26698 contributions, and 10588 contributions discussed about car industry.

The number of contributions dealing with the key words healthy nutrition, diet, obesity and physical activity was 660, the highest number of which (572) was published in periodicals (the so called lifestyle magazines and magazines for women).

The following has been found by analyzing the source of contributions:

- The greatest number of contributions discussing the topic (un)healthy food was published in Vita, Lepota i Zdravlje (Beauty and Health) and Lisa
- Obesity was written about in the greatest number of contributions published in Lepota i zdravlje (Beauty and Health), Blic and Vita.
- (In)activity was discussed in the greatest number of contributions published in Vita, Lepota i zdravlje (Beauty and Health) and Blic Woman.
- Of 88 contribution published in daily newspapers, 23 were published in Blic, 18 in Politika and 11 in Press.
- Of 572 contributions published in periodicals, 102 were published in Vita, 54 in Lepota i zdravlje (Beauty and Health), and 53 in Blic Woman.

The number of contributions discussing the above topics was as follows: (in) correct nutrition – 498, Obesity – 211, Physical (in) activity – 207, Diet – 133.

The source of information according to which the journalists wrote the articles was not given in the greatest number of contribution (314), medical staff working in Serbia was the source of information in 102

contributions, whereas only 33 contributions mentioned medical magazines, i.e. institutions outside Serbia as their source of information.

The estimated number of readers of all the articles was 14,826,000. According to the results, it is clear that there is a gap between needs/demands and inadequate response of the media to the existing problem and the absence of education of journalist in this field.

This analysis points to the fact that the journalists, having the valuable sources at their disposal, represent an important partner; however, additional education and motivation is necessary, together with more intense cooperation between health professionals and journalists not only in print media but also in all kinds of available media. Although the information transfer and education are not within the primary assignment of journalists, it is possible to make a move and ensure adequate space in media and motivate the journalists to be more cooperative in pursuit of the common goal in the prevention of obesity and overweight.

The very fact that more than 50% of the population are pre-obese and obese corroborates the statement confirming the existence of demand, i.e. need for finding the solution to this problem. Top-down approaches can be used when strategic solutions and actions are expected at the national level, financed from the secured sources. Bottom-up approaches are used when assessing the frequency of obese people and assuming that there will be enough people interested to visit nutrition consultancy services. It should be noted that this part of demand for services has been covered by activities of prevention centres in public health institutes.

Resources in solving the problem of obesity are analyzed by SWOT analysis

Strengths: Network of public health institutes and departments Strategic documents Ministries of Health of the Republic of Serbia Primary health care Interests shown by non-government organizations	Weaknesses: Insufficient engagement of non-health sector Insufficiently developed conditions for physical activity Inadequate implementation of strategic documents Difficulties in changing habits and behavioural patterns
Opportunities: International funds Support in research work Mobilization of non-health sector Greater cohesion and cooperation within various levels of healthcare services Strengthening the role of network of institutes and departments of public health in cooperation with local government	Threats: Strong trade lobby in the field of food consumption Marketing of food, particularly for children Epidemic proportions of the phenomenon of obesity, starting at younger age Financial expenses resulting from not solving the problem of obesity

The gap between the number of users of nutrition consultancy services and potential users is enormous. Marketing and media plan would help to reduce this gap and make space for better work and higher number of patients. In addition to nutrition consultancy services, other activities are necessary to contribute to positive outcome in solving this problem. It is now clear that there is a gap between the need and demand, which is also evident in the population being educated and informed about their responsibility regarding their health.

As for the assignments and activities which are and should be coordinated by the Ministry of Health and National Institute of Public Health, there certainly is a gap, which could be reduced by additional engagement of experts and adequate systemic solutions (activities directed towards reduction of obesity to be planned for longer period and coordinated by the network of institutes and departments).

Users of services rendered by institutes and departments for public health are heterogeneous, which correlates with the diversity of services offered and which are not directed only towards a person but toward the general population, certain target groups or certain institutions. The users of services can be grouped as the patients from the primary health care, patients from the secondary and tertiary health care, local government, economy – e.g. private food producers, importers, non-government sector (partnership

in projects), educators and sector of education, children and student population, persons who interested in services but do not have doctor's recommendation for these services so they have to pay for them, etc.

When it comes to the identification of users regarding the problem of obesity, the situation is similar, i.e. the communication with these groups of users can be direct and indirect through various activities. Possible multi-sector activities in the prevention of obesity by applying marketing approach are as follows:

- Prevention of children obesity in cooperation with the educational sector
- Implementation of school programmes in order to increase physical activity among young people
- Promotion of physical activity to achieve longer life
- Implementation of comprehensive interventions in the local community to increase physical activity (incorporation of cycling into the plan and creation of transport means)
- Education on nutrition and strategies at schools, with local government
- Education of consumers on healthy food choice with target groups
- Programmes of screening and education, monitoring of obesity
- Promotion of foods with positive recommendations and their consumption
- Promotion of healthy nutrition in primary schools (Kotler P 2010, Francesko B, Nikogosian H, Lobstein T, 2007)

On the basis of research, the following strategies for promotion of communication in the prevention of obesity are recommended:

- The strategy of direct marketing in nutrition consultancy services

Direct marketing and promotion can be organized in nutrition consultancy services in cooperation with media, schools, local community, family and all levels of authorities. On the basis of the defined target groups, determined objectives and marketing of the communication plan it is necessary to offer understandable and clear messages in accordance with the target group they are attended to, use direct canals of communication and, along with emphasizing the benefits for the individuals, and adequate evaluation, aspire to a wide inclusion of the selected target group (use mailing lists, telephone conversations, direct communication, interviews and other methods).

- The strategy of promotion of cooperation with media

Relations and cooperation with media is nowadays considered an indispensable link in the marketing strategy. Public health sector may use free forms of forwarding messages on the importance of maintaining desirable body mass, which can be communicated to the public through various media. Experts may convey the information to the widest circle of potentially interested people in an adequate way; therefore, mass media are the most important link in the communication between the institution and the public. They are used to influence both the public and individuals: future users of the services, competition, local and broader community as well as the whole country. The possibility to broadcast educational programmes intended for children, parents, general population is of great importance in boosting awareness, level of informing the public and knowledge, and thus, the motivation to change bad behavioural patterns and accept good eating habits and take up sports activities. Choosing the advantage of advertising desirable foods and limiting advertising of bad food are connected with financing the commercials, which cannot be influenced easily. These are the reasons why it is necessary to provide necessary time in informing the population about correct nutrition and good choice of foods as well as about physical activity. Various media have various capacities and possibilities for conveying the information and this should not be forgotten.

- The strategy of electronic communication (internet and social networks)

Today it is impossible to imagine the communication among young people without using social networks. Therefore, if we want to address children and adolescents, messages and communication must be developed through internet pages, blogs, micro blogs, internet forums and similar ways. Social networks and digital communication are the only ways to cover this very important target group, in spite of all potential risks involved with this forms of communication from the social aspect.

- The strategy of economic publicity (donations to some publications, organizing meetings, etc)

The marketing strategy of economic publicity is indispensable because the activities in the public health sector are usually not profitable and sustainable without sponsorship and support of non-health sector, media, individuals, and other organizations. A good example is finding the sponsors for campaigns promoting correct nutrition who make such activities possible by their products, but on the other hand,

they use the space for their marketing. Various sponsors promote physical activities, for example, and give support to the local community, which has created conditions for the citizens to be physically active by appropriate investments into the infrastructure.

- The strategy of market relations with the public

By recognizing the necessity for services rendered by consultancy for obesity prevention, i.e. for correct nutrition, some organizations opt for developing marketing plan in rendering health services which are in accordance with the existing conditions of financing either by the users of services (individuals or organization) or by donors and sponsors.

- The strategy of cooperation with economy and food producers

Under the present conditions it is possible to develop the marketing strategy bearing in mind the possibility of cooperation with the Chamber of Commerce and appropriate groups that assemble food producers, and thus influence and contribute to creation of adequate labels for food, and recommend production of foods which are not only desirable for the market but are justified from the health aspect. It is necessary to provide the possibility of recognizing and stimulating those producers who do not count on profit only but have the consumers' health in mind as one of the priorities besides their production.

- The strategy of cooperation with the sector of education

The marketing plan of promoting communication in the sector of education is probably of utmost importance because it has the direct influence on the most important target group – children. The communication plan includes conveying messages and collecting feedback information as well as the top-down and bottom-up approach and cooperation with children, parents, teaching staff, and those who prepare food. It is also important to make decision on prohibiting fast food shops nearby schools and to provide adequate budget and conditions for preparing high-quality, desirable and safe meals at schools. In addition, adequate conditions and facilities must be provided for physical activity.

- The strategy of cooperation with the local community

The marketing strategy of promotion of communication in the local community can be developed during the preparation of the local strategy for public health, where it is one of the possible components depending on the priorities which are determined at the level of the local government in relation to nutrition, obesity, physical activity and all the conditions in the surrounding which may contribute to reducing negative consequences of environmental factors in the community.

3. CONCLUSION

Marketing is an indispensable and useful instrument that can be used in the function of promoting communication in obesity prevention. According to the previous studies on the problem of obesity in Serbia it can be concluded that there is considerable space for the application of marketing approaches in the promotion of the population health through reduction of obesity and overweight.

The public health sector should use marketing tools in conquering the market space and achieving its objectives. Constant development of marketing strategies will contribute to better positioning of public health sector and provide better insight into the needs of users.

It is necessary to use marketing strategies and then follow their implementation at all levels, including both national and provincial government, local community and the institution itself, because this is the only way which ensures long-term positive effects in solving the problem of obesity.

Within marketing which is applied in the prevention of obesity and overweight it would be wrong to measure the effects only through the direct financial effect. Health, as the most precious asset of the society, is priceless and benefit in health, life quality, fewer years of lost life, hindered by negative consequences of obesity which seems to be an epidemics in the population, are above the direct financial profit. Economies much more developed than ours have recognized the importance of this problem and developed national strategies, defined multi-sector actions and long-term activities aimed at the reduction in obesity incidence, directed first of all at children as a target group.

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RESEARCHING THE ROLE OF SOCIAL MEDIA MARKETING IN CONTEMPORARY BUSINESS PRACTICES

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Abstract:

Purpose – The aim of the paper is to present an overview and assessment of challenges and opportunities for companies emerging from greater diversity and complexity in doing social media marketing. It focuses on social media marketing benefits in business practice.

Design/methodology/approach – The paper adopts a theoretical approach and reviews the current deployment of social media into marketing practice. The paper examines how social media marketing issues have emerged, progressed and diversified with the process of the development of information technologies.

Findings – The paper argues that marketers' perceptions of marketing in a new communication era have changed with the market expansion of companies. The paper concludes that, regardless of the dominant focus of marketing within an organisation, marketing practitioners increasingly have a social media requirement within their marketing practice.

Originality/value – The paper is a reflection on the changing nature of marketing and companies' new priorities in their marketing strategies and tactics in order to achieve a better position on the market. The paper advances that the understanding of social media marketing can improve their relationships with customers and their business process.

Keywords: social media, marketing, web 2.0, blog, social network

1. INTRODUCTION

If we choose to see the Internet as a single invention, it would probably be one of the greatest inventions of all time. It has developed from a small university network into a versatile worldwide communication tool. Today, we can do our shopping, read and listen to the news, pay our bills, socialize with our friends and even stream movies and TV-shows using the web. In the beginning, the Internet was primarily a static place; however, with the introduction of the web 2.0, all has changed. The web has become more flexible and its content increasingly user-generated. We can now interact with one another and therefore, the Internet has become a social medium. As humans, we have always been engaged in social networks. They can be formed around our families, friendships, religious beliefs, social status and more. Social media is any kind of information we share with our social network, using social networking websites or services. Examples of it are blogs, forums, photos, audio, profiles and status updates (Eley & Tilley, 2009).

Social media allows people with no special knowledge to post and share content with the world instantly. In the last few years, social networking has become increasingly popular with hundreds of millions of users worldwide. These new web sites are not only useful for keeping in touch with friends and family, it is a new powerful marketing tool. Web is a place where customers set the rules and the word-of-mouth makes or breaks the product. With social media, marketing is a two-way communication, rather than the one way communication used in traditional marketing. While these social networks may have started up as the typical geek hangout, just like the Internet did in the 1990s, it has now become mainstream. Everyone, from college students to business people has embraced this new channel.

2. THE ROLE OF WEB 2.0 IN CONTEMPORARY MARKETING PRACTICES

While researching and promoting web technologies, the term Web 2.0 refers to the second generation of web-based communities such social sites, wikis (for example Wikipedia), blogs and so on, promoting the creativeness, collaboration between and sharing of information and content amongst users. Although the term itself suggests a new version of WWW, it does not refer to any technical improvements whatsoever; it rather refers to changes in the manner in which software developers and end-users use the web. Web 2.0 enables the user much more than a simple information generation; it enables them to fully personalize the

existing web content of various kinds and to create their own one (e.g. an on-line diary in the form of a blog, a personal presentation on a social network) and a direct exchange of information with other users (e.g. the creation of video contents for www.youtube.com).

Companies have also found a way how to promote their services and products as well as build better relations with existing clients and more easily find new ones using these communication channels (Tepper, 2003). This means that interactivity and collaboration possibilities are the primary advantages of web 2.0. Users can now interact much more easily with each other, and create collaborative documents on the web. For example, a multiple author internal blog can serve a number of purposes; a living document of processes, a knowledge container and shorter decision cycles with comments and discussions. A well-known web 2.0 service, with collaboratively created content, is a free encyclopaedia - Wikipedia.

3. SOCIAL MEDIA AND MARKETING PRACTICES

Social media have been developed through web 2.0. Social media are *consumer-generated media* and represent a diverse source of online information created, driven and used by consumers intending to inform each other about products, brands, services as well as problems they have encountered (Blackshaw & Nazzaro, 2004).

Social media include various types of Internet communications, just to name several types (Mangold & Faulds, 2009):

- Social networking sites (*MySpace, Facebook, Faceparty*)
- Creativity works sharing sites (For instance: photos, videos, music, intellectual property people share on *YouTube, Flickr, Jamendo.com, Piczo.com, Creative Commons, etc.*)
- User-sponsored blogs (*The Unofficial AppleWeblog, Cnet.com*)
- Collaborative sites (*Wikipedia*)
- Virtual worlds (*Second Life*)
- Commercial communities (*eBay, Amazon.com, Craig's List, iStockphoto, Threadless.com*)
- Business networks (*LinkedIn*)

An increasingly important role of social media is reflected in the fact that, through social media, organizations are able to communicate with their consumers and also encourage consumers to communicate with each other. Particularly important is communication between consumers, because consumers have more trust in information regarding the products and services received through social media, rather than through the traditional means of communication through a promotional mix (Foux, 2006). Social media are frequently updated, have a large number of hyperlinks and encourage further social networking on the Internet. Sites such as *Facebook, MySpace, YouTube, Flickr, Trip Advisor, etc.*, allow consumers to share their experiences in different ways by posting their comments, pictures and videos (Xiang & Gretzel, 2010).

As their use increases exponentially, not only the existing social networkers but business firms and government organizations as well are joining and using them as communication tools. Unlike individual social networkers, these entities actively make use of the media for advertising and marketing. While commercial messages and interactions with consumers partner with media, events, entertainment, retailers, and digital services through social media, it is possible to perform integrated marketing activities with much less effort and fewer costs than before. According to Kim and Ko (2010), social media can have a dramatic impact on a brand's reputation. One-third of the surveyed participants posted opinions about products and brands on the brand's blog, and 36% thought more positively about companies that have blogs.

Before accepting the social media practise, companies need to know what they want to achieve, and what they do not want to achieve. Therefore, a strategy is needed on how to produce the social media content. There are a lot of social media tools that can be used, so companies must decide which one suits their goals the best. A blog is often the easiest tool to begin with, and to set a solid strategy on how to use it.

3.1. Inclusion of blogs in a company promotion technique

There are several important reasons why companies use the blog in their promotional presentations on the Internet (Dyrud M. A., et al., 2005):

- the great visibility of blogs on search engines,
- direct communication with the consumers,
- the ability to create market brands and means for differing from competitors and a personal relation with the consumer,
- to provide a better introduction to the market, build on-line reputation, enable the demonstration of personal attitudes and opinions and internal communication in companies.

Everyday reasons multiply for companies to use blogging platforms to their social media channel. Platform like [LinkedIn](#) creates an environment for companies and clients to connect online (Deis et al., 2010). Companies recognizing a need for information, originality and accessibility employ blogs to make their products popular and unique, and ultimately reach out to consumers who are privy to social media (Chiang et al., 2011). Blogs allow a product or company to provide longer descriptions of their respective products or services. A longer description can include reasoning and uses. It can include testimonials and can link to and from *Facebook*, *Twitter* and many other social-network and blog pages. Blogs can be updated frequently and are promotional techniques for keeping customers. Other promotional uses are acquiring followers and subscribers and directing them to your social network pages.

3.2. Social networks as a marketing tool

Social networks are a form of social media. They have become the basis of modern electronic communication and, gradually, they push out the so-far mechanism of information exchange. The time when one-way means were used to sell a product or develop a brand has gone. No longer is it sufficient for a company on the Internet. The consumer wants more and their expectations are greater. Attention is increasingly paid to interactive contents, created by a wider social community, not just a company. In that manner, faster and more easily, companies come to information about the market they are doing business on, creating their campaigns virally widespread, blogging, giving useful pieces of advice. Communication has become the essence of digital technologies and media.

Many researches are indicative of the fact that using social networks is currently one of the most present activities of the user in Internet using. Today, there are around 1.5 billion people worldwide using social networks. Each one of them is inside the system where it has become normal to publicly advertise favourite companies, products and services. The majority of them are ready to reveal their demographical data, which, together with data about their wishes and ways of thinking, make a good basis for collecting pieces of information significant for companies' marketing activities. Some social networks have a user-base bigger than the population of the country is. Thanks to that extremely big user-data- and user-attitude base, companies have found themselves in a situation that they have started to establish direct contact with the precisely determined target group and potential consumers. On the other hand, the consumer has found him/herself in a situation that they have started to receive personally tailored offers with a much greater chance to attract their attention to.

Social networks represent a big potential for companies' business doing and have become extremely interesting for companies in a sense of conducting various marketing activities. Companies should be paying due attention to their presentations on social networks, simultaneously choosing those services and communication channels deemed to be the most appropriate ones when the nature of their business doing is concerned. There are a large number of social networks and they are typical of a certain geographical climate, profession, interest and need. Each of them has its different purpose and requires specific marketing techniques in order to generate the biggest benefit from itself.

4. TRANSPARENCY IN BUSINESS

Conversations in social media are available to everyone to observe or participate in. This leads to both good and bad effects. More openness does not necessarily lead to good feedback and information about a company. However, all available knowledge is valuable within a market analysis (Landslips & Lundgren, 2009). Transparency is one of the most complicated aspects of social media. Precisely, transparency is an

aspect of all communication, and communication is the essential part of social media. It is often discussed as two extremes, total openness or total confidentiality. It is important what company represents be discussed and, then, the level of transparency will grow. It is much more likely that companies see transparency as a threat; however, the truth is that it is more about safeness. Transparency creates the trust and speed required for the social media usage.

Transparency is the future of all business, mostly because it will solve the trust issue. Business increases through good relations, which requires requires trust, and to earn trust, you have to be transparent. It is possible to compare transparency with a unique selling point. Social media and transparency increase and improve dialogues, and dialogues are important especially in times of a crisis.

5. THE NEW COMMUNICATIONS PARADIGM

In the traditional communications paradigm, the elements of the promotional mix are coordinated to develop an IMC strategy, and the content, frequency, timing and medium of communications are dictated by the organization in collaboration with its paid agents (advertising agencies, marketing research firms, and public relations consultants). The flow of information outside the boundaries of the paradigm has generally been confined to the face-to-face and word-of-mouth communications amongst individual consumers, which has had a minimal impact on the dynamics of the marketplace due to its limited dissemination (Mayzlin, 2006). This paradigm has served as the framework for developing IMC strategies (Muniz & Schau, 2007). Its long shelf life appears to be largely due to the high degree of control over the communications process it affords to businesses.

However, in the era of social media, marketing managers' control over the content, timing and frequency of information is severely being eroded. In the new paradigm, information about products and services also originates in the marketplace. This information is based on the experiences of individual consumers and is channelled through the traditional promotion mix. However, various social media platforms, many of which are completely independent of the producing/sponsoring organization or its agents, magnify consumers' ability to communicate with one another. This "groundswell" has profoundly affected all aspects of consumer behaviour, and has bestowed consumers with a power they have not previously experienced in the marketplace (Li & Bernhoff, 2008). In the new communications paradigm (see Figure 1.), marketing managers should recognize the power and critical nature of the discussions being carried out by consumers using social media.

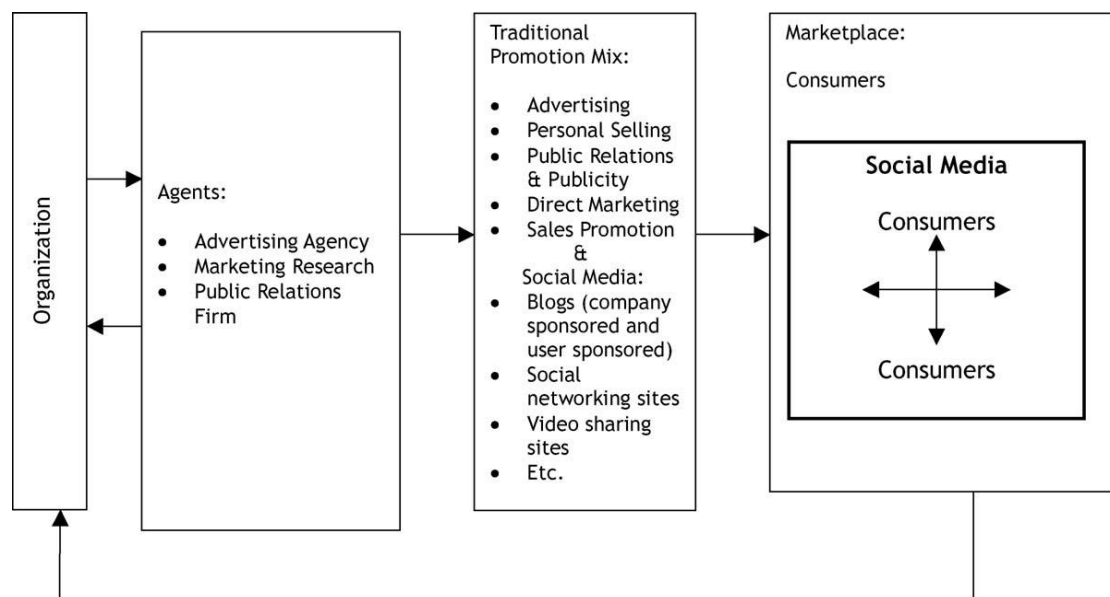


Figure 1. The new communications paradigm
Li, C., Bernhoff, J. (2008). *Groundswell: Winning in a world transformed by social technologies*. Boston: Harvard Business Press.

The impact of the interactions among consumers in the social media space on the development and execution of IMC strategies is illustrated by the following points:

- The Internet has become a mass media vehicle for consumer-sponsored communications. It now represents the number one source of media for consumers at work and the number two source of media at home. The Internet reaches more than 60% of all United States consumers for an average weekly usage rate of more than 100 minutes (Rashtchy, et al., 2007)
- Consumers are turning away from the traditional sources of advertising: the radio, the television, magazines, and newspapers. Consumers also consistently demand more control over their media consumption. They require on-demand and immediate access to information at their own convenience (Vollmer & Precourt, 2008).
- Consumers are turning more frequently to various types of social media to conduct their information searches and make their purchase decisions (Lempert, 2006; Vollmer & Precourt, 2008).

Social media is perceived by consumers as a more trustworthy source of information regarding products and services than corporate-sponsored communications transmitted via the traditional elements of the promotion mix (Foux, 2006)

The above trends have severely diminished the usefulness and practicality of the traditional communications paradigm as a framework for developing IMC strategies. The new communications paradigm, on the other hand, requires several important changes in management's attitudes and assumptions about an IMC strategy formulation. First, marketing managers must accept the reality that a vast amount of information about their products and services is being communicated by individual consumers to other consumers via social media forums. Second, consumers are responding to this information in ways that directly influence all aspects of consumer behaviour, from information acquisition to the post-purchase expressions of satisfaction and dissatisfaction. Third, consumers are turning away from the traditional elements of the promotion mix; in particular, they are reducing their reliance on advertising as a source of information to guide their purchase decision-making. Finally, managers who are accustomed to exerting a high level of control over company-to-consumer messages must learn to talk with their customers, as opposed to talking at them, therefore influencing the discussions taking place in the social media space.

6. CONCLUSION

The web has become social and made communication between companies and customers much easier. The social media marketing is a new way for promoting products and services. Instead of a one-way communication, social media give opportunity for company to talk and discuss with consumers, in order to improve offer. Services often focused on today are blogs, Facebook and Twitter, even though there are a lot more useful services. The underlying aspects of IT and the Internet are of a technical nature; however, the usage is not. Social media is not even about which tools someone uses. Social media is about communication, attitude, honesty, participation and relations. Using social media as a marketing tool, company have an ability to talk with customers. If she talks friendly and generously to customers and consumers, simultaneously is appearing to be more humane than a traditional marketing is. This will improve customer relationship and may give a free marketing, through the word-of-mouth.

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EFFICIENCY MEASUREMENT OF INSURANCE COMPANIES IN SERBIA USING DEA

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Abstract: The paper presents the results of a relative efficiency evaluation, performed on the data collected from 19 insurance companies which operate in Serbia, covering a reference period of two consecutive years – 2009 and 2010. The Data Envelopment Analysis (DEA) method was used to evaluate relative efficiency of each insurance company from its operating and financial aspects. The companies' ranking was made taking into consideration the obtained index of efficiency. In addition, DEA provided information of inputs that need to be reduced in order to improve the efficiency of the analysed companies.

Keywords: Data Envelopment Analysis, insurance companies, operating efficiency, financial efficiency

1. INTRODUCTION

One of the most important principles in every business is the principle of efficiency, which consists in achieving the highest possible output with minimal input or investment. The most obvious example of efficiency is ratio between one output and one input. Data Envelopment Analysis (DEA) allows simultaneous consideration of more than two ratios and calculates the relative efficiency for every observed unit. (Bulajić, Savić and Savić, , DEA is an increasingly popular management tool and is widely applied in solving real business problems. At the beginning, DEA has been used for the efficiency evaluation of the non-profit units. Later on, the area of application has spread to profit sector such as banking and insurance industry.

In this paper, the efficiency of the 28 insurance companies in Serbia is assessed using DEA method. The insurance sector in Serbia is one of the least developed insurance sectors in Europe. However, in past few years, there have been some indicators and signals of improvement in this field. The purpose of this research is to evaluate and compare efficiency from the different aspects of business in the whole industry. The first approach concerns assessing operating efficiency as ability of companies to produce financial income using the available resources. The second approach is developed to assess the financial efficiency as a ratio that combines different types of income and costs. Furthermore, within the approach there is a comparison of the efficiency in the insurance industry in Serbia in 2009 and 2010.

The paper is organized as follows. The first section describes the theoretical background of Data Envelopment Analysis. Afterwards, the problem and data set were described. Results are obtained using EMS software (EMS DEA Software, 2012). Furthermore, the paper presents the ranking of the companies and the comparison of operating and financial efficiency. Conclusion and remarks are given in the last section.

2. BACKGROUND OF DATA ENVELOPMENT ANALYSIS (DEA)

American economists Charnes, Cooper and Rhodes (1978) introduced the CCR DEA model in 1978 with assumption of constant returns to scale. The proposed approach was further developed by Banker, Charnes and Cooper (1984) known as BCC DEA model that includes variable returns to scale.

Data Envelopment Analysis (DEA) is a linear programming methodology, which is used to measure the efficiency of multiple decision-making units (DMUs) using multiple inputs for producing multiple outputs. DEA has been successfully applied in efficiency assessment of hospitals, schools, libraries, banks, insurance companies, university departments and police stations.

The basic CCR DEA model (Savić & Martić, 2012):

$$(Max) h_k = \sum_{r=1}^s \mu_r y_{rk}$$

s.t:

$$\sum_{i=1}^m v_i x_{ik} = 1 \quad (1)$$

$$\sum_{r=1}^s \mu_r y_{rj} - \sum_{i=1}^m v_i x_{ij} \leq 0, \quad j = 1, 2, \dots, n$$

$$\mu_r \geq \varepsilon, \quad r = 1, 2, \dots, s,$$

$$v_i \geq \varepsilon, \quad i = 1, 2, \dots, m$$

The basic BCC DEA model:

$$(Max) h_k = \sum_{r=1}^s \mu_r y_{rk} + v^*$$

s.t:

$$\sum_{i=1}^m v_i x_{ik} = 1 \quad (2)$$

$$\sum_{r=1}^s \mu_r y_{rj} - \sum_{i=1}^m v_i x_{ij} + v^* \leq 0, \quad j = 1, 2, \dots, n$$

$$\mu_r \geq \varepsilon, \quad r = 1, 2, \dots, s,$$

$$v_i \geq \varepsilon, \quad i = 1, 2, \dots, m$$

where:

h_k is the efficiency of unit k ,

x_{ij} is quantity of input i used by observed DMU j ($j = 1, 2, \dots, n$),

y_{rj} is quantity of output r produced by observed DMU j ($j = 1, 2, \dots, n$),

μ_r is the weight given to output r by base DMU k ,

v_i is the weight given to input i by base DMU k ,

n is the number of DMU ($j = 1, 2, \dots, n$), m is the number of inputs ($i = 1, 2, \dots, m$), s is the number of outputs ($r = 1, 2, \dots, s$), and ε is a very small positive number.

The v_i and μ_r are the variables in both problems presented above. They are determined as weights assigned to the inputs and outputs. These variables need to be greater than or equal to some small positive number ε , in order to avoid any input or output being ignored in determining the efficiency. Each DMU is allowed to adopt the most favourable set of weights. The unit is efficient if the efficiency is equal to 1, otherwise if it is less than 1 it is considered inefficient.

The performance of a DMU was evaluated by comparing its performance with the best performing DMUs of the data set. The best performing DMUs form the efficiency frontier. If DMU is enveloped by frontier (e.g. not lay on the frontier), it is considered as inefficient. DEA provides information on what are the changes required in input and output data for inefficient DMU to reach the efficiency frontier. After the evaluation of the relative efficiency of every DMU, the analysis shows how inputs and outputs need to be changed in order to reach the efficiency of the target DMU (Stancheva & Angelova, 2004).

Data Envelopment Analysis (DEA) is becoming an increasingly popular management tool, which is applied in solving of the real business problems.

The advantages of DEA method:

- Proven to be useful in uncovering relationships that remain hidden for other methodologies
- Capable of handling multiple inputs and outputs measured in different units
- Applicable with any input-output measurement
- The sources of inefficiency can be analyzed and quantified for every evaluated unit.

The disadvantages of DEA method:

- Results are sensitive to the selection of inputs and outputs
- The number of efficient DMUs on the efficiency curve tends to increase with the number of inputs and output variables
- DEA is good at estimating "relative" efficiency of a DMU but it converges very slowly to "absolute" efficiency
- Since DEA is a nonparametric technique, statistical hypothesis tests are difficult and are the focus of on-going research
- Since a standard formulation of DEA creates a separate linear program for each DMU, large problems can be computationally intensive.

This paper describes the usage of the Data Envelopment Analysis (DEA) method in estimation and comparison of the efficiency of the insurance industry in Serbia.

Insurance company is a legal entity that is obliged by a contract to repay certain amount of money if the unwanted (risked) circumstances occur. There are different types of insurance companies considering the company size, type and volume of the risk they cover. Generally, there are life and non-life insurance companies. The efficiency has been evaluated by DEA method in the area of life and non-life insurance together.

In the paper (Tone & Biresh, 2005) authors applied a new variant of data envelopment analysis model to examine the performance of Life Insurance Corporation (LIC) in India. For these analyses, they used data for the period of 19 years. Insurance inputs, which they have selected, can be classified into four groups: business services, number of employees, debt capital and equity capital. In this study, they used present value of real losses and the ratio of liquid assets to liabilities as outputs.

Few years later (Wu, Yang, Vela & Liang, 2007), authors analyzed production and investment performance of the life and health insurance companies in Canada. They used data for over 70 companies in 3-years period. Authors of "Compare the Performance of Private and Public Insurance Companies in Using Data Envelopment Analysis" (Saedy & Kazemipour, 2011) used DEA to examine and compare the technical efficiency, allocation and economic public and private insurance companies in Iran.

3. PROBLEM DESCRIPTION

As it was already mentioned above, the insurance sector in Serbia is among the least developed sectors on the insurance map of Europe. Comparison of indicators coming from 2009 until now shows a slow growth and improvement of the insurance sector in Serbia. The most representative measurements show an increased capital by 3,3% and increased technical reserves by 7,9%. Technical reserves cover the whole life insurance sector, and large number of nonlife insurance. The whole amount of premium is increased at the level of 57.300.000.000 RSD, which present the growth rate of 1,4%. The involvement of life insurance in the whole premium is dominant and takes 82,6%. Nonlife insurance premium has a slow growth of 0,3%, while life insurance premium has a growth of 0,9%.

The number of insurance companies in Serbia has increased. Today there are 28 insurance companies operating in Serbia. The main areas where insurance companies should pay attention nowadays are corporate management, which consider adequate management of internal control systems, improvement of risk management and techniques for risk estimation. Furthermore, the companies should improve the techniques of investment evaluation, strengthening good business practices and fair treatment to customers (National Bank of Serbia, 2012).

The aim of this paper is to present one possible way of evaluation of the relative efficiency of insurance companies in Serbia. Furthermore, the paper presents the ranking of the companies and the comparison of operating and financial efficiency. The paper illustrates the changes in ranking companies regarding financial efficiency from 2009 to 2010. Some efficient companies become inefficient because of the economic crises. On the other hand, some inefficient companies become efficient with a tendency to improve their ranking in the future.

Criteria (inputs and outputs) selection was made based on the available data and the data that present the company operations in the best way. For determining the operating efficiency of the companies, the following inputs was used: insurance costs, capital and reserves, number of employees, number of insurance types and number of branches. Total income was used as output. Considering total cost in income statement of

insurance companies, insurance costs have the biggest share, which is why they were chosen as an input. On the second place are costs of employees. The number of employees were chosen as input for this analysis because of the high correlation between number of employees and costs of employees. Numbers of insurance types and branches show the diversity of the company. They are connected with the customer satisfaction and affect the amount of income directly. Capital and reserves were chosen as input because total income as output can present the real condition of the company only if it is compared with capital and reserves.

Moreover, additional analyses were used in order to present changes from 2009 to 2010. Only financial indicators were used for this analysis. There were three inputs: insurance costs, capital and reserves and costs of employees and two outputs: income from insurance and other income.

Two out of 19 companies, Basler and Uniqa present data for life and nonlife insurance separately in their reports. For the sake of the analyses, this data were consolidated, because nonlife insurance has a small impact comparing to life insurance. The same approach was applied for companies Delta Generali and Wiener Stadtische with a small difference of consolidating data for insurance and reinsurance.

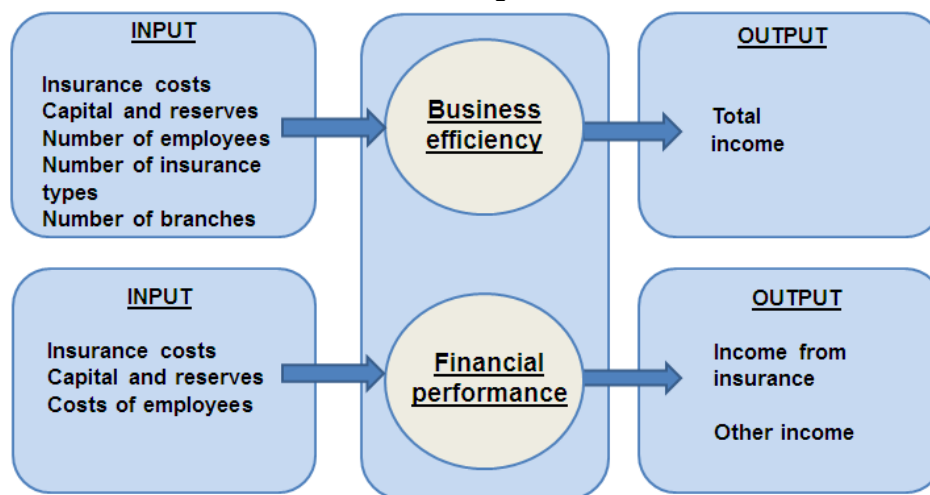


Figure 1: Model for analysis of operating and financial efficiency

4. RESULTS AND DISCUSSION

The ranking of insurance companies was obtained using the output-oriented modification of CCR DEA model. The modification was introduced by Andersen and Petersen (1993). In order to differentiate the observed units and enable their full ranking, Andersen-Petersen model for measuring super-efficiency was used (Andersen & Petersen, 1993). This model excludes the DMU under evaluation from the reference set, which allows efficient DMUs to become super-efficient and to have different super-efficiency score under the 100% for output-oriented model (Lovell & Rouse, 2003).

The output orientation was chosen in accordance with the goal of companies to maximize the outputs by using the existing inputs. Such orientation means that efficiency index (h_k) is reciprocal to input-oriented DEA model presented in section 2. Consequently, DMUs with efficiency index less or equal to one were assessed as efficient. If efficiency index, h_k , is greater than one than the observed DMU is inefficient, and some output increases are needed in order to become efficient.

Results were obtained using EMS software (www.dea.com). Table 1 and Table 2 present ranking of efficient and inefficient companies.

Table1: Results of operating efficiency – Efficient Insurance companies

DMU	Dunav	GRAWE	Merkur	Wiener Stadtische	AMS	Delta Generali	DDOR Novi Sad	Triglav	Takovo
Score	37,68%	47,25%	53,71%	71,59%	85,10%	88,39%	92,20%	92,86%	99,98%

Table 2: Results of operating efficiency – Inefficient Insurance companies

DMU	Energoprojekt Garant	SAVA	UNIQA	Milenijum	AS	AXA	Globos
Score	102,86 %	120,98 %	126,76 %	137,09 %	137,78 %	147,21 %	242,25 %

The efficient companies have score less than 100%. The most efficient is Dunav insurance company. The following companies: GRAWE, Merkur, Wiener Stadtische, AMS, Delta Generali, DDOR Novi Sad, Triglav and Takovo are also efficient. Six from these eight companies (GRAWE, Merkur, Wiener Stadtische, AMS, Delta Generali and DDOR Novi Sad) were used as benchmarks for 8, 4, 3, 4, 1 and 4 times, respectively. Dunav is the biggest insurance company and has never been used as a benchmark, because of high values of inputs and outputs. Looking backward Dunav has the longest presence in insurance sector in Serbia, highest reputation and tradition, and it was expected to be ranked at first place.

Inefficient companies score is greater than 100%. Insurance company Energoprojekt Garant is inefficient. In order to become efficient as Grawe and Merkur, it has to decrease capital and reserves for 685080600 RSD and number of insurance types for 29. Comparing to inputs (capital and reserves are 685080600 and insurance types 30) this recommendation is hardly achievable.

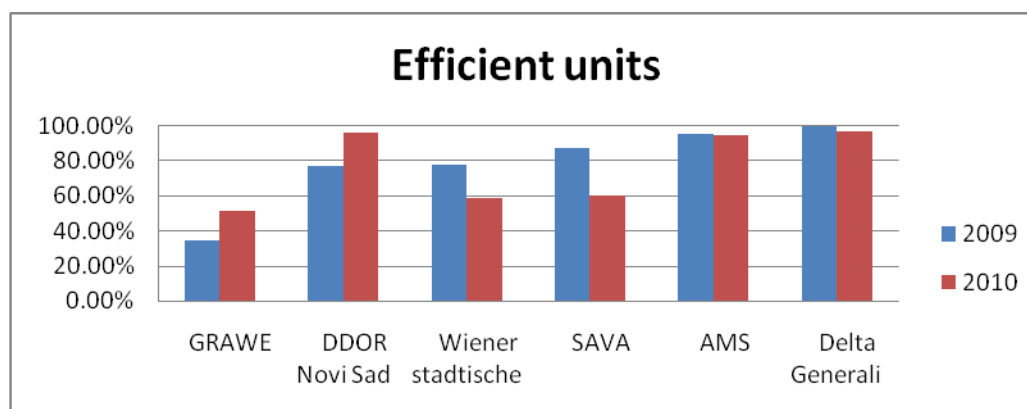
Insurance company SAVA is inefficient and has to decrease insurance costs for 250418900 RSD, number of branches for 2 and number of types of insurance for 28 in order to become as efficient as DDOR Novi Sad and Delta Generali.

Milenijum and AS have to decrease insurance costs for 10 RSD and 178963200 RSD, respectively. In order to become efficient this companies need to decrease number of insurance types for 25 and 11, respectively. Benchmarks for these two companies are DDOR Novi Sad, GRAWE and AMS, with addition for Milenijum that has one more benchmark Wiener Stadtische insurance company.

The last two insurance companies AXA and Globos are also inefficient and need to decrease capital and reserves for 106203200 RSD and 472582500 RSD, number of branches for 1 and 6, number of types of insurance for 11, respectively, in order to become as efficient as GRAWE and Merkur insurance companies. Insurance companies Basler, Alico and Societe Generale are too inefficient, so these companies were excluded from further analysis.

Comparison of 2009 and 2010

Further analyses showed the comparison of financial efficiency in insurance sector in Serbia for 2009 and 2010. Correlation coefficient between number of employees and costs of employees in 2009 and 2010 is close to 1 (0,94 and 0,92 respectively). Because of financial assessment and high correlation only costs of employees were used.


Figure 2: Financial efficient insurance companies in 2009 and 2010

The chart shows the compared results of only efficient insurance companies in 2009 and 2010. The smaller percentages present better result, and efficient insurance companies have scoreless or equal to 100%. GRAWE is more efficient in 2009 (with score 34,51%) compared to 2010 (51,5%). DDOR Novi Sad was in

the second place in 2009, and in the fifth place in 2010, decreasing his score for 18,45%. This is the result of increased costs of insurance, reduced costs of employees and reduced income from insurance and other income. The chart shows that Wiener Stadtische, SAVA, AMS and Delta Generali have improved their scores in 2010, comparing with the results from 2009. The improvement is particularly noticeable for Winner Stadtische and SAVA companies. The data for both companies show the growth of the business, which was presented by increased inputs and outputs. This improvement is probably the result of a minor economy improvement and a slight hint of overcoming the crises. AMS and Delta Generali have almost the same score in 2009 and 2010.

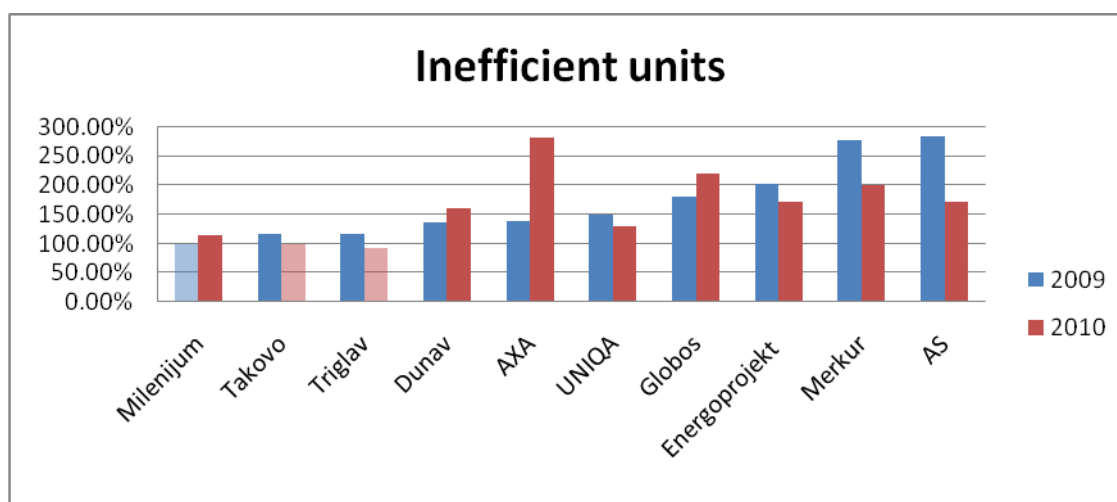


Figure 3: Financial inefficient insurance companies in 2009 and 2010

The chart presents scores of inefficient insurance companies. Milenijum had been efficient in 2009, but due to smaller increase of income compared to increased costs, it became inefficient. On the other hand, Takovo and Triglav become efficient in 2010. Dunav, AXA and Globos have better scores in 2009 compared to 2010. UNIQA and Energoprojekt show better results in 2010 than in 2009 with low rate of improvement in resource usage. Merkur and AS improved their business in 2010 by increasing income much more than costs, but still not enough to become efficient.

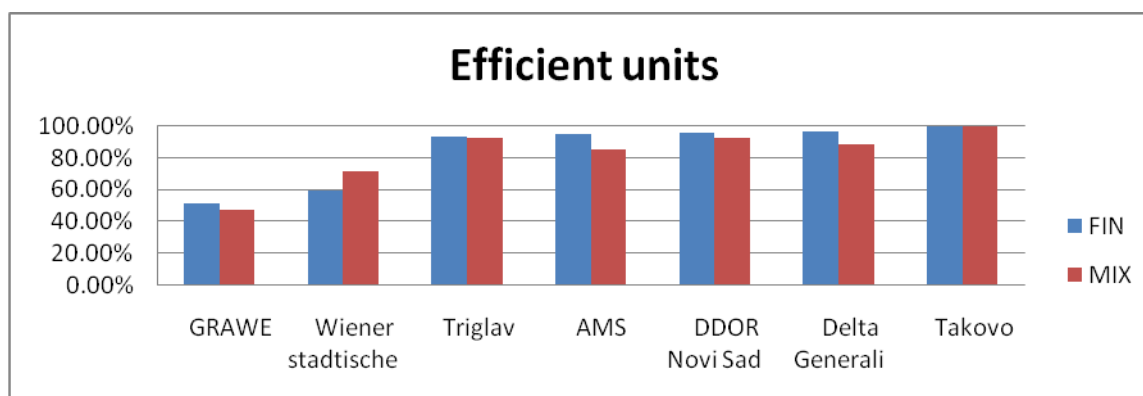


Figure 4: Financial and operating efficient insurance companies in 2010

The chart shows the changes in scores for operating and financial efficiency of insurance companies when in the analysis are used only financial indicators and mix of financial and nonfinancial indicators (number of insurance types, number of branches and number of employees). Only Wiener Stadtische has greater financial efficiency than the operating efficiency. Measured by financial indicators, Wiener Stadtische is used as a benchmark 8 times, compared to 5 times when measured with mixed indicators. The differences in scores can be explained by relatively low costs of employees. All other units shown in the chart have greater operating efficiency than financial efficiency. Takovo and Triglav show almost the same scores.

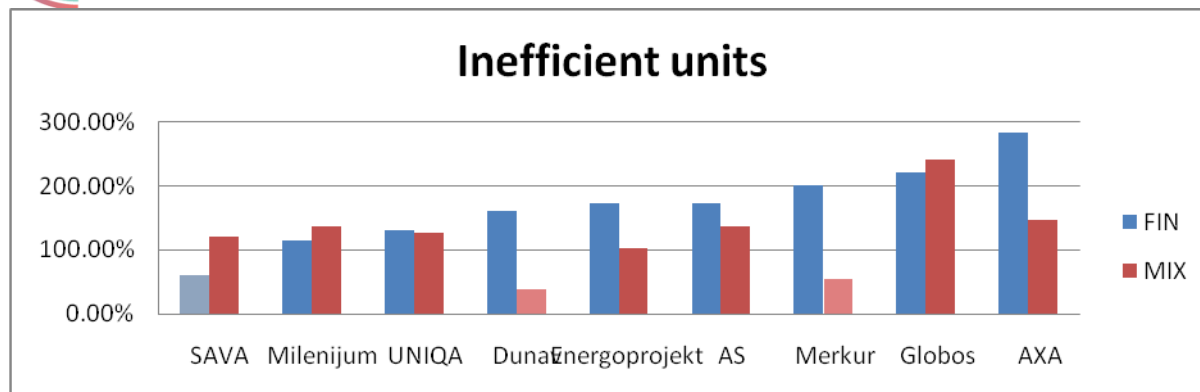


Figure 5: Financial and operating inefficient insurance companies in 2010

Sava is only financially efficient while operating efficiency is greater than 100%. Dunav and Merkur have the opposite tendency and are inefficient considering financial indicators. Dunav has the highest number of employees, but not the highest level of the cost of employees. The value of income from insurance, other income and total income is the largest compared with other companies. Milenijum and Globos have better financial efficiency than the operating efficiency, but they are inefficient in both cases. UNIQA, Energoprojekt, AS and AXA have better operating efficiency than financial efficiency, but they are inefficient in both cases.

5. CONCLUSION

This paper presents the efficiency measurement of insurance companies in Serbia. Leaders in the insurance industry, companies that follow them and those that are inefficient were identified using DEA. In order to survive in the market inefficient companies have to change their business principles. The first analysis includes financial and non-financial aspects and measure operating efficiency of insurance companies in Serbia, and offers suggestions related to the performance improvement. The following analysis includes only financial data, and the financial efficiency was measured using a data available for the years 2009 and 2010. Results shows that GRAWE, Wiener Stadtische, AMS, Delta Generali and DDOR Novi Sad are the only companies that are financial efficient in 2009 and financial and operating efficient in 2010. SAVA is only operating inefficient, while Dunav and Merkur are financial inefficient for both years. Triglav and Takovo are only financial inefficient in 2009.

Future research in this industry can include data for the upcoming years and the recent changes in insurance industry. Moreover, further research can monitor the developing trends and growth of the insurance companies in Serbia. Re-ranking can show which insurance company has survived, has grown and developed, has sustainable business and increased earnings.

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DEA WINDOW ANALYSIS APPROACH FOR MEASURING THE EFFICIENCY OF SERBIAN BANKS WITH PANEL DATA

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Abstract: *Efficiency assessment based on multiple inputs and outputs which are not necessarily financial is considered to be a complex process. Data envelopment analyses (DEA) is firstly introduced in the purpose to evaluate the efficiency of non-profit units. In this paper, an extended DEA – Window analysis is used for the efficiency assessment of banks in Serbia based on panel data for the period from 2005 to 2011. This analysis provides trends of efficiency and rank of each bank evaluated in terms of its profit and operating effectiveness. Furthermore, the obtained results allow an analyses of trends of the overall banking sector efficiency.*

Keywords: *Window analysis, banks efficiency, DEA and panel data, Serbian banking*

1. INTRODUCTION

In this paper, we analyze the performance of twenty-eight commercial banks in Serbia over period 2005 – 2011. Available data before 2005 are not comparable because in Serbian banks' reports were not regulated by the law. In 2005 independent institution "National Bank of Serbia" implemented the regulation for banking system in Serbia.

The evolving process of a banking system started in 2001 along with the transition of the Serbian economy when the country had approximately 90 banks. From that year, until now, some banks were liquidated. Some merged with others, and the remainders were privatized.(SS BOFOS)

Banking system of The Republic of Serbia consists of the Central Bank (National Bank of Serbia) and commercial banks. Banks in Serbia are independent in their pursuit of profit-oriented business activities based on the principles of solvency, profitability and liquidity. At this moment, there are thirty-three banks in Serbia fighting for customers in a market with 7.12 million citizens (except province Kosovo and Metohia). Among banks in Serbia (33 banks), we can find a number of banks that are still (or at least partially) owned by The Republic of Serbia (8 banks). Some of them are foreign banks (21 banks) and there is also domestic-privately owned banks (4 banks) (NBS | Banking Sector, 2012).In our analysis, we excluded five banks because these five banks were not operating during the whole analyzed period. Alternatively they did not enter Serbian market before 2005, either they don't work now (proclaimed the bankruptcy). We excluded Opportunity banka a.d.Novi Sad, Moskovska banka a.d. Beograd, Dunav banka a.d. Zvecan, Jugobanka a.d. Kosovska Mitrovica, Poljoprivredna banka Agrobanka A.D. Beograd. We have used annual panel data for this research.

The extended version of data envelope analysis (DEA) – Window analysis designed for assess the efficiency of decision making units (DMU) based on panel data is used for efficiency evaluation of selected banks operating in Serbia. Reviewing the literature, the authors mainly found studies dealing with a similar principle of approaches in measuring the efficiency of banks over period of time. In mentioned literature, there are several differences in used methods (DEA Windows analysis or Malmquist Index analysis) and several differences in considered models, i.e. considered aspect and goals of analyses.

The main objective of the paper is to evaluate the efficiencies of Serbian banks in order to follow dynamics of efficiency of each banks and the banking sector as whole. Furthermore, banks' management can identify trend of annual efficiency, which can help them to improve their business results.

It would be interesting to see how Global Financial Crisis (GFC) affected Serbian bank sector. Particularly, we tend to determine a difference between the period before, and period after GFC beginning. This could be done by DEA Time series, i.e. Window analysis.

The paper is organized as follows. In the next section, Section 2, we introduce the methodologies which are used, namely DEA analysis with a main focus on Window analysis. Section 3 describes the approach used for this particular study, and discusses the data used, while the Section 4 identifies and discusses results. Finally, in Section 5 the conclusions are given.

2. THEORY AND METHODOLOGY

About Data Envelopment Analysis

Data Envelopment Analysis (DEA) was originally introduced by Charnes, Cooper and Rhodes (1978) and is a non-parametric linear programming approach, capable of handling multiple inputs as well as multiple outputs (Paradi, Asmild, Aggarwall, & Schaffnit, 2004). Precisely, this approach allows handling different type of input and output together.

A DEA model can be constructed either to minimize inputs or to maximize outputs. An input orientation aims at reducing the input amounts as much as possible while keeping at least the present output levels, while an output orientation aims at maximizing output levels without increasing use of inputs. (Cooper, Seiford, & Tone, 2000)

Window analysis

Economists especially insist that the efficiency is changeable category, and that depends on the time! Regarding of previous sentence, we decided to use appropriate technique - Window analysis technique. Window analysis technique works on the principle of moving averages (Cooper et al. 2007) and is useful to detect performance trends of a decision making unit over time. Each DMU in a different period is treated as if it were a „different“ DMU (more accurate independent) but remain comparable in the same window (Cooper, Seiford, & Zhu, 2011). *“Such capability in the case of a small number of DMUs and a large number of inputs and outputs would increase the discriminatory power of the DEA models.”* (Cooper, Seiford, & Zhu, 2011). Formally, it is necessary to observe n DMUs and they represent the number of decisions making units in a given time period t , while P denotes the total number of time periods, and of course the given time period in time range $t=1, \dots, P$. Window size in the label W denotes the number of included time periods, which applies throughout the whole analysis, from where we can calculate the number of analyzed windows(AW) using the simple formula: $AW = P - W + 1$.

It is clear that this procedure implies AW separate analyses, where each analysis examines $n \times W$ DMUs. Using Window analysis we make sample size of $n \times P$ observations where an observation j in particular time period t , (referring to DMU_t^j) has an m -dimensional input vector: $x_t^n = (x_{1t}^n, x_{2t}^n, \dots, x_{mt}^n)^T$ and an s -dimensional output vector: $y_t^n = (y_{1t}^n, y_{2t}^n, \dots, y_{st}^n)^T$. Then a window IW with $n \times W$ observations is denoted starting at time I , $0 \leq I \leq P-1$ with width W , $1 \leq W \leq T-I$. So the matrix of inputs is given as:

$$X_{IW} = (x_1^1, x_1^2, \dots, x_1^n, x_{I+1}^1, x_{I+1}^2, \dots, x_{I+1}^n, x_{I+W}^1, x_{I+W}^2, \dots, x_{I+W}^n)$$

and the matrix of outputs will be:

$$Y_{IW} = (y_1^1, y_1^2, \dots, y_1^n, y_{I+1}^1, y_{I+1}^2, \dots, y_{I+1}^n, y_{I+W}^1, y_{I+W}^2, \dots, y_{I+W}^n).$$

The input oriented DEA window analysis problem with constant returns to scale (CRS) assumption is given by solving the linear program illustrated in Equation 1 below, also similar to the basic DEA models, it is possible to create a DEA window model with output orientation illustrated in Equation 2.

Equation 1: Input oriented DEA Window analysis

$$(Min) Z_{kl_w}^t$$

s.t.

$$Y_{l_w} \lambda \geq y_{kl_w}^t$$

$$Z_{kl_w}^t \times x_{kl_w}^t - X_{l_w} \lambda \geq 0$$

$$\lambda_s \geq 0; s = 1, 2, \dots, n \times W$$

Equation 2: Output oriented DEA Window analysis

$$(Max) Z_{kl_w}^t$$

s.t.

$$X_{l_w} \lambda \leq x_{kl_w}^t$$

$$-Z_{kl_w}^t \times y_{kl_w}^t + Y_{l_w} \lambda \geq 0$$

$$\lambda_s \geq 0; s = 1, 2, \dots, n \times W$$

3. DATA AND METHODOLOGY

There are few approaches which could be used for measuring efficiency in banking sector:

- In bank analyses, **The Production Approach** commonly views banks as producers of services and products using labour and other resources as inputs and providing deposits, loans and others (in value or number of transactions) as outputs. (Cooper, Seiford, & Zhu, 2011)
- Under **The Intermediation Approach**, as the name suggests, the bank's intermediary role is mainly studied to examine how efficient the bank is in collecting deposits and other funds from customers (inputs) and then lending the money in various forms of loans, mortgages, and other assets (i.e., investments, etc.). (Cooper, Seiford, & Zhu, 2011)
- **The Profitability Approach** is designed to examine the process of how well a bank uses its inputs (expenses) to produce revenues. (Paradi, Rouatt, & Zhu, 2010)

We have decided to use the intermediation approach because the idea of intermediation approach is to look more technically at what banks do. *The bank's production process is a black box whose efficiency is simply judged by the amount of output produced from a certain amount of input.*(Jemrić & Vujčić, 2002).

Different sets of input and output data are used for follows two models in estimating efficiency. In this paper, two analyses are carried out. The first is related to banks' profit efficiency and second one is relate to banks' operating efficiency. For the profit efficiency model all available data are taken from banks' income statements. Description of input and output data is shown in Table 1.

Table 1: Profit efficiency model from intermediation aspect

Inputs		Description
1	Interest expenses	Accrued normal and default interest expenses for the reporting period irrespective of the time it falls due.
2	None-interest expenses	Sum of two positions from income statement: fee and commission expenses and other operating expenses.
Outputs		Description
1	Interest income	Accrued normal and default interest income for the reporting period irrespective of the time it falls due.
2	None-interest income	Sum of two positions from income statement: fee and commission income and other operating income.

For the operating efficiency model all available data are taken from banks' balance sheets. Description of input and output data is shown in Table 2.

Table 2: Operating efficiency model from intermediation aspect

Inputs		Description
1	Number of employees	Based on data collected from National Bank of Serbia.
2	Fixed assets and intangible investments	Sum of two positions from balance sheet: intangible assets (investments in identifiable non-monetary assets without physical substance to serve for the production or delivery of goods and services, to be leased out to other parties or used for administrative purposes) and fixed assets and investment property (land, buildings, equipment, other fixed assets, investment property and equipment provided by finance leases, as well as investments in acquiring fixed assets and investment property).(NBS Accounting Regulations, 2012)
3	Capital	Position from balance sheet (consists of equity and other capital, reserves, revaluation reserves, unrealized losses in respect of securities available for sale, accumulated profit / loss).
4	Deposits	Sum of two positions from balance sheet: transaction deposits (banking deposits that have immediate and full liquidity, with no delays or waiting periods) and other deposits.
Outputs		Description
1	Granted loans and deposits	Position from balance sheet.
2	None-interest income	Sum of two positions from income statement: fee and commission income and other operating income.

Descriptive statistics for the performance variables used in the analyses are given below in Table 3 for profit model and in Table 4 for operating model. Data in the following two tables is expressed in thousands of Serbian Dinars (RSD), except number of employees.

Table 3: Overall descriptive statistics for data used in profit efficiency model

Statistic	Inputs		Outputs	
	Interest expenses	None-interest expenses	Interest income	None-interest income
Mean	1,800,499.52	2,075,078.63	4,563,408.30	2,088,448.86
Median	1,140,674.50	1,363,187.00	2,918,808.00	1,226,145.50
S.D.	2,019,229.97	1,725,054.70	4,980,425.77	2,471,197.93
I Quartile	379,256.00	776,947.25	1,283,059.50	558,694.75
III Quartile	2,468,261.25	2,879,555.00	5,953,639.25	2,586,256.75
Minimum	15,786.00	193,041.00	202,239.00	80,715.00
Maximum	11,652,708.00	8,820,418.00	31,090,463.00	16,190,122.00

Regarding of previous table, we could conclude that interest income is much higher than non-interest income. Based on conducted more detailed analyzes we can see that after 2007. only Postanska stedionica had higher none-interest income than interest income, and the difference between this two position is melting every year. Among all banks, the smallest standard deviation is for none-interest expenses input.

At the end of 2011.inSerbian banking sector, half of the banks were operating with less than 679 employees. In general, distribution of used data has positively skewed, which means that extreme scores are larger or in other words there are more low scores than high scores. In Table 4 we can see average number of employees for whole period and more descriptive statistics.

Table 4: Overall descriptive statistics for data used in operating efficiency model

Statistic	Inputs				Outputs	
	Number of employees	Fixed assets and intangible investments	Capital	Deposits	Granted loans and deposits	None-interest income
Mean	992.76	2,218,608.27	12,445,773.77	38,626,804.57	35,858,694.78	2,088,448.86
Median	702.50	1,410,922.00	6,823,957.00	22,650,330.00	20,625,058.00	1,226,145.50
S.D.	803.21	1,966,413.96	13,722,122.87	44,456,351.29	41,607,388.60	2,471,197.93
I Quartile	396.25	773,837.50	3,230,344.50	9,765,784.75	8,266,978.75	558,694.75
III Quartile	1,376.25	2,960,685.75	15,496,964.50	52,113,694.25	46,174,798.50	2,586,256.75
Min	107	250,154.00	895,976.00	1,884,923.00	999,658.00	80,715.00
Max	3,209	9,093,120.00	80,414,325.00	236,510,888.00	249,337,726.00	16,190,122.00

4. FINDING AND ANALYSIS

In order to obtain the following results, we used the software EMS 1.3 (Scheel, 2000)for academic purposes. The banks' performance over a seven-year period of time is considered, and then a three-year window is selected. The window length was determined by experimenting with different length size without using formula given by Sun (1988) according to which window length should be four years. We suggest that our panel with 28 banks is large enough to provide adequate discriminatory power in the process of ranking.

We exclude obtained efficiency for DMUs inside every window and in next summarized tables (Table 5 for Profit model and Table 6 for Operating model) give the super-efficiency scores for each bank within each year. In order to calculate results of overall super-efficiency we used average of super-efficiency in five windows (for each bank separately), and average of annual super-efficiency. We rank the all banks by average annual super-efficiency.

Mentioned super-efficiency in the following tables is calculated in the same way as with Anderson-Peterson model, with the note it's about input orientation and CRS assumption. In the following text efficiency and super-efficiency will be considered as synonyms.

Profit model

Based on the analysis of the average efficiency (by years) only two banks are efficient (Agroindustrijska komercijalna banka and JUBMES banka) while all other banks show some kind of inefficiency. Even 11 banks out of 28 have efficiency score between 60% and 70%.The least efficient bank overall was Privredna banka Beograd. As much as seventh-teen bank have efficiency lower than average. It's interesting that Raiffeisenbanka and Volksbanka, since 2005 until today have constant efficiency increase, from previous 43.26% to 95.42% and from 27.74% to 99.63% respectively. JUBMES banka is the most dynamic in efficiency changes. If we want to determine which banks have the biggest inter-annual increase in efficiency

we can see that those banks are JUMBES banka and Banka Postanska stedionica. Their peaks took place between 2007. and 2008. At the contrary the largest decreases in efficiency belong to KBC banka (between 2005. and 2006.) and Agroindustrijska komercijalna banka (between 2007. and 2008.)

Table 5. Superefficiency according to profit model

Rank	Bank name	Average efficiency per year [%]							Overall super-efficiency	
		2005	2006	2007	2008	2009	2010	2011	by windows	by years
1	Agroindustrijska komercijalna banka	154.70	199.29	223.52	150.56	111.74	86.69	94.63	151.92	145.87
2	JUBMES banka	137.07	105.79	71.59	149.68	100.53	78.61	112.19	105.56	107.92
3	KBC banka	262.82	109.77	38.59	49.34	57.52	56.64	66.51	73.23	91.60
4	Banka Postanska stedionica	40.96	40.99	27.21	84.93	116.96	99.71	101.42	74.07	73.17
5	Čacanska banka	77.79	56.50	56.73	67.66	78.60	84.05	85.45	70.22	72.40
6	Srpska banka	68.45	67.46	59.82	72.55	61.40	77.85	88.75	68.61	70.90
7	Unicredit Bank Srbija	39.04	59.51	44.56	75.15	83.35	82.08	103.53	68.99	69.60
8	Raiffeisen banka	43.26	43.41	52.53	74.15	78.57	91.52	95.42	68.28	68.41
9	ProCredit Bank	50.99	38.62	40.31	63.94	91.61	87.21	99.71	65.99	67.48
10	Banca Intesa	43.90	36.27	45.65	74.22	85.12	91.04	92.28	67.05	66.92
11	Société Générale banka Srbija	57.25	49.50	44.12	62.61	79.65	87.63	82.89	64.90	66.24
12	OTP banka Srbija	75.64	55.15	45.60	52.63	51.36	58.70	112.30	57.63	64.48
13	Volksbank	27.74	38.72	44.78	59.73	83.89	91.91	99.63	63.59	63.77
14	Eurobank EFG	25.78	38.56	41.37	77.62	85.04	82.96	82.20	64.21	61.93
15	Univerzal banka	44.87	50.86	49.90	75.57	71.71	73.59	64.68	63.33	61.60
16	Razvojna banka Vojvodine	53.86	47.68	48.38	63.94	72.01	79.84	63.89	61.72	61.37
17	Komercijalna banka	42.78	42.08	40.45	62.78	67.30	77.74	89.35	58.89	60.35
18	Hypo Alpe-Adria-Bank	50.95	43.07	44.75	66.83	72.62	69.82	70.77	60.01	59.83
19	Erste Bank	35.49	27.43	44.87	55.57	66.42	75.50	83.87	55.05	55.59
20	Credybanka	63.09	37.08	32.29	50.20	57.62	64.04	75.10	50.72	54.20
21	NLB banka	40.14	27.84	35.02	60.79	65.30	72.24	75.66	53.28	53.85
22	Findomestic banka	40.42	35.60	43.92	51.39	60.20	64.88	52.77	50.71	49.88
23	Crédit Agricole banka Srbija	38.38	25.17	32.49	43.38	60.57	70.43	76.13	47.67	49.51
24	Marfin Bank	31.52	30.97	40.08	46.32	49.36	83.49	59.58	48.49	48.76
25	Piraeus Bank	44.09	31.66	34.19	59.54	60.94	53.17	49.71	48.50	47.61
26	Alpha Bank Srbija	48.60	34.73	34.88	59.13	38.37	50.78	55.52	44.82	46.00
27	Vojvodjanska banka	33.01	23.64	33.39	54.69	53.24	56.17	64.11	45.38	45.46
28	Privrednabanka Beograd	35.58	42.71	39.76	49.61	45.28	50.73	48.65	45.01	44.62

Operating model

Erste banka can be considered as bank on the right path because in the whole analyzed period, except 2006. its efficiency score never fell. The same conclusion is made for Findomestic bank. All the other banks have more dynamic efficiency changes. Five banks that have the biggest amount of efficiency decrease are: ProCredit Bank, Hypo Alpe-Adria-Bank, Univerzal banka, Komercijalna banka and Srpskabanka. In operating model we can see that there is no bank with efficiency lower than 50%, while four banks have efficiency score above 100% (Agroindustrijska komercijalna banka, Banka Postanska stedionica, Volksbank, ProCredit Bank). As mentioned in the previous model, seven banks, in the case of this model, have efficiency between 60% and 70%, which also represents the range with most banks. In the case of operating model the least efficient bank overall was Razvojnabanka Vojvodine. Banks which have the biggest inter-annual increase in efficiency are Banka Postanska stedionica (between 2006. and 2007.) and Agroindustrijska Komercijalna banka (between 2005. and 2006.). It's interesting that these two banks also had the largest decrease in efficiency between 2007. and 2008.

Table 6. Superefficiency according to operating model

Rank	Bank name	Average efficiency per year [%]							Overall super-efficiency	
		2005	2006	2007	2008	2009	2010	2011	by windows	by years
1	Agroindustrijska komercijalna banka	134.66	251.51	244.52	102.03	89.36	147.92	85.42	155.11	150.77
2	Banka Postanska stedionica	120.03	78.67	296.72	83.83	109.74	101.78	94.99	136.45	126.54
3	Volksbank	85.41	84.59	79.04	123.96	105.54	171.67	112.02	109.04	108.89
4	ProCredit Bank	119.47	97.23	118.13	104.52	96.86	95.44	92.67	103.73	103.47
5	Hypo Alpe-Adria-Bank	144.70	98.99	102.92	90.77	88.11	86.51	85.60	96.45	99.66
6	Piraeus Bank	87.91	143.23	85.99	101.59	81.49	93.73	80.94	96.67	96.41
7	Société Générale banka Srbija	93.00	66.30	71.23	84.03	118.27	115.25	79.58	90.42	89.67
8	Erste Bank	90.44	59.05	84.83	89.16	89.54	101.47	111.34	87.56	89.40
9	Unicredit Bank Srbija	94.61	65.70	83.19	74.55	99.18	96.40	102.23	86.12	87.98
10	OTP banka Srbija	91.60	60.82	64.26	88.85	93.25	84.45	99.93	81.41	83.31
11	Crédit Agricole banka Srbija	86.75	79.39	81.83	75.77	74.20	81.71	97.19	80.10	82.40
12	Marfin Bank	88.24	66.28	71.74	58.11	71.15	118.79	87.47	76.59	80.25

		Average efficiency per year [%]							Overall super-efficiency	
Rank	Bank name	2005	2006	2007	2008	2009	2010	2011	by windows	by years
13	Privrednabanka Beograd	57.67	39.36	45.80	76.55	93.25	128.82	113.29	76.94	79.25
14	Cacanskabanka	86.79	60.21	60.47	80.51	79.19	100.21	79.66	76.52	78.15
15	Bancalntesa	71.20	66.77	71.21	88.46	71.97	75.17	68.95	74.60	73.39
16	Raiffeisenbanka	114.22	77.29	76.54	61.59	53.84	57.35	57.74	67.81	71.22
17	NLB banka	79.41	50.17	71.80	85.80	74.99	64.44	64.05	71.36	70.09
18	Findomesticbanka	36.75	53.96	61.25	78.43	76.62	87.45	93.79	70.82	69.75
19	Univerzalbanka	74.70	66.78	80.66	75.17	67.13	65.92	57.09	71.07	69.64
20	KBC banka	88.00	60.00	47.99	48.57	56.38	85.45	90.91	61.91	68.18
21	Komercijalnabanka	64.49	61.01	79.69	76.42	70.23	58.66	58.22	69.40	66.96
22	Alpha Bank Srbija	64.82	68.89	80.76	44.72	56.65	80.75	71.57	65.47	66.88
23	Eurobank EFG	74.34	51.96	71.02	76.56	56.72	62.54	61.73	65.20	64.98
24	Credybanka	128.41	60.30	47.18	56.46	67.85	46.02	47.64	60.21	64.84
25	Vojvodjanskabanka	83.49	61.09	55.59	55.37	45.83	48.89	51.02	54.99	57.32
26	JUBMES banka	84.76	45.17	67.74	38.86	50.03	49.10	50.46	52.91	55.16
27	Srpskabanka	86.12	58.95	53.34	41.73	50.46	47.28	37.44	51.51	53.62
28	Razvojnabanka Vojvodine	54.28	56.35	57.86	61.93	46.85	45.51	47.79	53.72	52.94

Analysis of the entire banking sector

Based on previous analysis, Table 7 shows banks' participations in different aspects of efficiency within whole banking sector (given in percentages). Separately looking at profit and operating aspects we can conclude that the largest percentage of the banks have efficiency between 60% and 70%. In profit model 92.86% of the banks have efficiency below 100% and the same goes for 88.89% of banks in operating model.

Table 7. Frequency distribution for overall super-efficiency by years separately according to used models

Overall super-efficiency by years						
Statistic	Profit model			Operating model		
	Frequency	Percentage	Cumulative Percentage	Frequency	Percentage	Cumulative Percentage
$E < 0.4$	0	0.00%	0.00%	0	0.00%	0.00%
$0.4 \leq E < 0.5$	7	25.00%	25.00%	0	0.00%	0.00%
$0.5 \leq E < 0.6$	4	14.29%	39.29%	4	14.81%	14.81%
$0.6 \leq E < 0.7$	11	39.29%	78.57%	7	25.93%	40.74%
$0.7 \leq E < 0.8$	3	10.71%	89.29%	5	18.52%	59.26%
$0.8 \leq E < 0.9$	0	0.00%	-	6	22.22%	81.48%
$0.9 \leq E < 1.0$	1	3.57%	92.86%	2	7.41%	88.89%
$1.0 \leq E < 1.1$	1	3.57%	96.43%	2	7.41%	96.30%
$1.1 \leq E < 1.2$	0	0.00%	-	0	0.00%	-
$1.2 \leq E < 1.3$	0	0.00%	-	1	3.70%	100.00%
$1.3 \leq E < 1.4$	0	0.00%	-	0	0.00%	-
$1.4 \leq E < 1.5$	1	3.57%	100.00%	0	0.00%	-

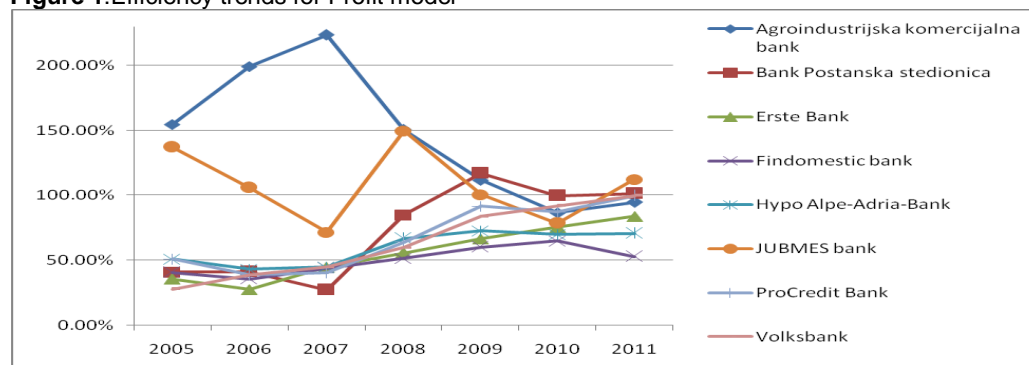
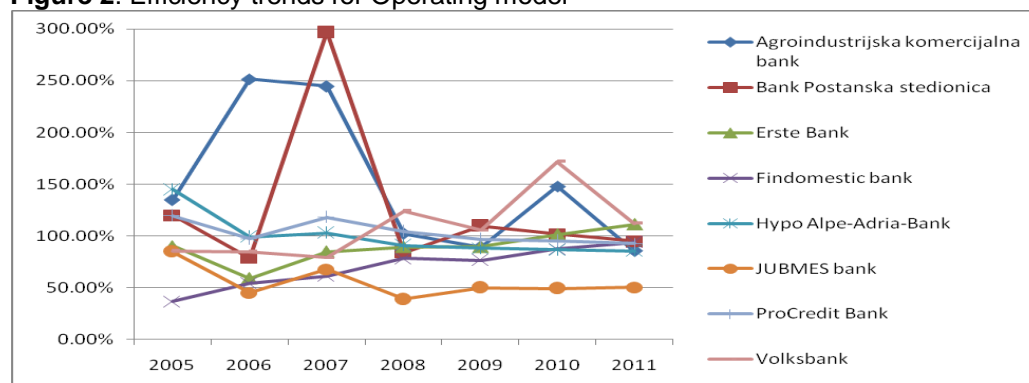
Looking at banks' operating efficiency through their annual operations (Table 8) for the period from 2005. to 2011. we can see that the banking sector had its highest peak in 2005 (88.80%), and after that it oscillated between 74.64% – 88.80%, with average value of 80.75%. If we look at profit model, the average annual efficiency increased every year, so it had its highest peak in 2011. (80.24%). Reason for this may be found in banking sector's situation, which is that the banks are more oriented at income from already given loans. Reasons for banks' orientations at already given loans may be found in the lack of payment capable clients or in the long-term impacts of GFC.

Table 8. Banks efficiency over years separately according to used models

Banks super-efficiency by years [%]							
Models	2005	2006	2007	2008	2009	2010	2011
Profit	61.01	51.43	49.67	68.38	71.65	74.96	80.24*
Operating	88.80*	74.64	86.19	75.87	76.24	85.67	77.88

Note: Asterisk (*) indicates the best average

Efficiency trends for some mentioned banks, are shown on the following figures: (Profit model – Figure 1) and (Operating model – Figure 2).

Figure 1:Efficiency trends for Profit model

Figure 2: Efficiency trends for Operating model


5. CONCLUSIONS

This paper employs a window DEA to evaluate the efficiency from the profit and operating aspects of the bank sector in Serbia during from 2005 to 2011 period. Using panel data and Window analysis we got the opportunity to realize efficiency trends in the banking sector in Serbia, and to perform the same ranking as in the Anderson-Peterson model.

Further analysis revealed that the majority of banks are located in the range of efficiency from 60% to 70%, regardless of whether it is a profit or operating efficiency of the banks. Only one bank (Agroindustrijska komercijalna banka) exceeds efficiency of 100% in both observed aspects, in fact, only five banks exceed the efficiency of 100% in some of the analyzed models. During the period in which banks were analyzed, if we are looking at profit model, it is evident that the banking sector has the annual constant increase in efficiency. In the operational model minor fluctuations are observed, that can't be clearly connected with GFC, we only can assume that there is a potential impact of GFC's long life, but if we want to confirm the impact GFC it would be necessary to conduct additional analyzes. In the case of operating model, the banking sector firstly shows the effects of bank privatization and saturation in the issuance of loans.

Based on this example it's very clear that when the goal of future analysis is set properly, and used inputs and outputs are appropriate, then the Window analysis can be used on panel data.

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EVALUATION OF STUDYING EFFICIENCY APPLYING DATA ENVELOPMENT ANALYSIS

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Summary: By introducing the Bologna Declaration, Serbia has aligned itself among countries with modernized and contemporary higher education system. The old, under-functional and flexible system has been replaced by new one that should facilitate and accelerate education. Therefore, there is a need to analyze that system as well as the effects of its introduction. This paper measures the efficiency of studying at faculties of Belgrade University. As a method for measuring efficiency, DEA (Data Envelopment Analysis) will be used, which is usually used in education and generally in the non-profit sector. For the purposes of further analysis, extensions of a basic model have been applied: bilateral CCR model and CCR model with categorical variables. The obtained results indicate that declaration is not equally well implemented at all faculties, and that there is a lot of space for increasing the studying efficiency. The faculties that represent the benchmarks for inefficient ones are isolated, with the aim to enable more successful and more efficient studying and further adjustments and adoption of Bologna Declaration.

Key words: Data Envelopment Analysis, Faculties, Efficiency, Bilateral model, Categorical variables, Ranking

1. INTRODUCTION

The main question that most of pupils of final years of secondary schools ask themselves is "Which faculty should I enroll", but also "Which faculty is best for me". Along the profession they want to deal with, the factor that can influence on a selection of the future faculty is equipment, method and quality of studies and more. This topic is therefore shown interesting to a number of authors which tried to establish what distinguishes one faculty from the other, but also which are the key factors that influence on their work quality and efficiency. Data envelopment analysis is one of the techniques that is widely used to analyze faculties and universities with the aim of their comparison and efficiency evaluation.

For example, Jill Johnes (2005) writes about efficiency evaluation of the universities in the UK using the DEA method. Her paper deals with efficiency evaluation of universities keeping in mind the most important input – quality of students at the beginning of studying. The factors that are relevant in the efficiency evaluation she observed the gender, school type and number of graduates.

Other authors (Kuah & Wong, 2011) in their paper mentioned two models of which one is refers to evaluation of teaching efficiency, and the other one to research efficiency. As concerns the first model, inputs are: number of academic staffs, number of taught course students, average students' qualifications, University expenditures, and outputs: number of graduates from taught courses, average graduates' results, graduation rate, graduates' employment rate. As for the other model, inputs are: University expenditures, number of research staffs, average research staffs' qualifications, number of research students, research grants, and outputs: number of graduates from research, number of publications, number of awards, number of intellectual properties.

Abbott & Doucouliagos (2001) observe and measure technical efficiency of Australian University system. In this context, technical efficiency is refers to the fact that institution cannot produce more output based on existing input. This means that technical efficiency of university cannot provide more output that refers to teaching and research based on labor, capital and other inputs. Efficiency proportion is a range to which institution has advantage of returns to scale by tampering its size according to the optimum. For inputs and outputs they took: inputs – total number of academic staff, number of non-academic staff, expenditures of all other inputs other but labor inputs, value of non-current assets; outputs: number of equivalent full-time students, number of post-graduate and under-graduate degrees enrolled, number of post-graduate degrees conferred, number of under-graduate degrees conferred.

Breasley (1989) dealt with the same subject matter and he stated the following inputs: general expenditure, equipment expenditure, research income; and outputs: number of undergraduates, number of postgraduates on taught courses, number of postgraduates who are doing research, research income.

Especially interesting paper for this study is paper by Avkiran (1999). Using three models with different combinations of inputs and outputs, he performed the efficiency evaluation of universities (Table 1).

Table 1: Three Avkiran's models

Model 1	Input	Academic staff; Non-academic staff
	Output	Undergraduate enrolments; Postgraduate enrolments; Research quantum
Model 2	Input	Academic staff; Non-academic staff
	Output	Student retention rate; Student progress rate; Graduate full-time employment rate;
Model 3	Input	Academic staff; Non-academic staff
	Output	Overseas fee-paying enrolments; Non-overseas fee-paying enrolments

Based on experiences of these authors, similar analysis was applied on faculties of Belgrade University. The aim of research is the efficiency analysis of studying at faculties. The reason for this type of analysis is lack of data that could be used for determining the scientific and research efficiency, technical efficiency and others. University of Belgrade is made of 31 faculties of which 24 faculties are included in the analysis because of data availability. All these faculties can be divided into two groups, with regard of scientific field to which they belong, thus there are technical-technological, nature and mathematics (14 faculties) and faculties of social sciences and humanities (10 faculties). The second division is by number of years of undergraduate studies: four-years (19 faculties) and three-years (5 faculties). All data were collected from the official web site of the University of Belgrade (University of Belgrade, 2012) and refer to the generation of students enrolled in 2006/2007, four years after enrollment. This is one of the first generations that are enrolled on studies compliance with Bologna Declaration which aims to accelerate schooling and increase student passing. Still, there is not enough the information on whether the Declaration was well carried out, but with this analysis of the studying efficiency will get a little bit more information on this subject.

According the availability of data (University of Belgrade. (2012)) the following input-output factors are selected:

Input	Output
<ul style="list-style-type: none"> Number of academic staff Number of non-academic staff Number of students enrolled for the first time 	<ul style="list-style-type: none"> Number of graduated students Quality of students (average score of generation)

In the first phase of analysis, all faculties are divided into two groups: faculties of technical-technological group and faculties of social sciences and humanities group, with aim of finding the differences in the studying efficiency these two groups. In the second phase, these faculties are divided on four-year and three-year faculties, to avoid the impact of duration of studies at the ultimate outcome.

Paper is conceptualized so the second chapter provides an overview of the methodology which was applied in this paper, and the third chapter gives the analysis of obtained results.

2. METHODOLOGY

Efficiency, as one of the basic assumptions of economy, represents the quotient of output and input of certain entity, and tendency is to make this quotient larger, so the business results of this entity surpass the investment in it. In the case of one entity, that has one input and one output, calculation of the efficiency can be easily performed using the formula:

$$\text{Efficiency} = \text{output} / \text{input} \quad (2.1)$$

However, in reality this is not a case, so usually there are a number of entities or DMUs (Decision Making Unit) which should compare and which has a number of inputs and outputs. In this case, the following formula can be implemented:

$$\text{Efficiency} = \text{sum of weighted outputs} / \text{sum of weighted input} \quad (2.2)$$

In solving these problems is used DEA (Data Envelopment Analysis). DEA is specially designed non-parametric technique for measuring the efficiency of complex entities with diverse inputs and outputs. DEA become for a very short time the leading method for efficiency measurement, which is indicated by a number of papers in this field (Emrouznajed et al, 2008). DEA method is presented in 1978 by Charnes, Cooper and Rodes (Charnes et al, 1978). The basic characteristic of the DEA method is that each DMU is estimated as relative efficient or relative inefficient. By the same authors, DMU can be considered as efficient only if these two conditions are not fulfilled:

- It is possible to increase any output without increasing any input and without decreasing any other output
- It is possible to decrease any input without decreasing any output and without increasing any other input

Beside the fact that for each DMU it can be showed whether it is efficient or not, DEA for inefficient DMUs define benchmarks, i.e. efficient units on which the inefficient should look up to and towards to them to improve its performance so it becomes the efficient.

DEA has proved to be especially useful for application in nonprofit sector (health, education, sports...) that is characterized by their diverse inputs (technical, technological, ecological, social and other). It should be mentioned that DEA is not a tool for prediction and it can just provide the insight into current or past state of efficiency of certain entities.

General advantages and flaws of the DEA method can be represented as follows (Table 2):

Table 2: Advantages and disadvantages of the DEA method

Advantages	Disadvantages
It can operate with diverse inputs and outputs	Even the smallest error in data can disrupt the results
Inputs and outputs can be diverse	DEA measures the relative efficiency, i.e. entities compares to each other, not with the theoretical maximum
Great flexibility	Great sensitivity on changes of input-output data sets
Indicates to inefficient units on which efficient units they should look up to	It doesn't provide concrete solution for increasing the efficiency, but only the exemplary units

There are several different models that are used for solving the problem, and basic factors that affect to which model will be chosen:

- Returns to scale (if it is constant or variable)
- Orientation (input or output)
- Limiting the weights
- Exogenous variables, etc.

CCR (Charnes-Cooper-Rhodes) DEA model assumes constant returns to scale (with increasing/decreasing the input, the outputs proportionally increases/decreases). Suppose that x_{ij} represents input i ($i=1, \dots, m$) and y_{rj} represents output r ($r=1, \dots, s$) of DMU _{j} ($j=1, \dots, n$). The primal form of DEA model for relative efficiency evaluation is as follows:

$$(\text{Max}) h_k = \sum_{r=1}^s \mu_r y_{rk} \quad (2.3)$$

s.t.

$$\sum_{i=1}^m v_i x_{ik} = 1 \quad (2.4)$$

$$\sum_{r=1}^s \mu_r y_{rj} - \sum_{i=1}^m v_i x_{ij} \leq 0, \quad j = 1, 2, \dots, n \quad (2.5)$$

$$\mu_r \geq \varepsilon, \quad r=1, 2, \dots, s, \quad v_i \geq \varepsilon, \quad i=1, 2, \dots, m \quad (2.6)$$

Dual model:

$$(\text{Min}) Z_k - \varepsilon \left(\sum_{r=1}^s s_r + \sum_{i=1}^m s_i \right) \quad (2.7)$$

s.t.

$$\sum_{\substack{j=1 \\ j \neq k}}^n \lambda_j y_{rj} - s_r^+ = y_{rk}, \quad r=1, 2, \dots, s \quad (2.8)$$

$$Z_k x_{ik} - \sum_{j=1}^n \lambda_j x_{ij} - s_i^- = 0, \quad i=1, 2, \dots, m \quad (2.9)$$

$$\lambda_j, s_r^+, s_i^- \geq 0; \quad j=1, 2, \dots, n, \quad r=1, 2, \dots, s, \quad i=1, 2, \dots, m, \quad Z_k - \text{unrestricted} \quad (2.10)$$

where:

h_k, Z_k – relative efficiency of k -th DMU

n – number of DMU

m – number of inputs

s – number of outputs

μ_r – weighting coefficient for the output r

v_i – weighting coefficient for the input i

s_i^- and s_r^+ – show how much is possible that k -th DMU individually reduce the i -th input and increase r -th output to become efficient

λ_j – is the dual weight indicating the importance assigned to DMU $_j$.

Generally, all models can have dual orientation: input and output. In input-oriented model efficiency is improved through a proportional reduction in inputs, and output-oriented model requires proportional increase in outputs. Specifically, the input-oriented model project inefficient DMU to the left (horizontal) side of limit point, and output-oriented model make vertically projection. Solutions that provide output and input oriented models are connected.

One extension of the basic model allows us to compare the efficiency of two groups of entities and it is called bilateral model. This model is suitable in a situation where we have two groups of entities A and B and when it is necessary to analyze the differences between two groups. Each DMU from A (B) group should be compared with respect to all entities from another group and thus to further highlight the differences between groups. Model is shown below (Cooper et al, 2006):

$$\min \theta \quad (2.11)$$

s.t.

$$\sum_{j \in B} x_j \lambda_j \leq \theta x_A \quad (2.12)$$

$$\sum_{j \in B} y_j \lambda_j \geq y_A \quad (2.13)$$

$$\lambda_j \geq 0, (\forall j \in B) \quad (2.14)$$

The null hypothesis of this model is that two groups have the same distribution of efficiency results. The obtained results can be used for further statistical tests.

In real situations we encounter the case that there are certain categories of entities that are mutually more similar than others (they have similar behaviour, circumstances of the business, etc.). In this case, it is not appropriate to compare each DMU with all entities, but only to those entities that belong to the same category or group.

These problems are solved by introducing categorical variables (Banker & Morey, 1986). They introduced L new binary variables d_i^k for each DMU, and $L+1$ is the total number of values which one categorical input can have. The model itself remains the same with the addition of the following limitations:

$$\sum_{j=1}^n \lambda_j d_j^l \leq d_k^l \quad (2.15)$$

$$d_k^l = \{0,1\}, l = 1, 2, \dots, L \quad (2.16)$$

These restrictions ensure that the reference group for each DMU_k consists of only those units that have m -th input in the same or lower category than themselves.

3. RESULTS

Since some faculties don't have publicly available information about inputs and outputs referred to in this paper, these faculties will be excluded from our study. These faculties are missing information of the number of graduates, as well as the quality of students at output (average score), and these faculties are:

- Faculty 15
- Faculty 16
- Faculty 17
- Faculty 18
- Faculty 19
- Faculty 20
- Faculty 21

For the purposes of the first analysis, faculties were divided into two groups:

Table 3: Groups of faculties in bilateral CCR model

Technical, Technological, Natural and Mathematical Faculties - TTNM	Faculties of Social Sciences and Humanities - SSH
<ul style="list-style-type: none"> ▪ Faculty 1 ▪ Faculty 2 ▪ Faculty 3 ▪ Faculty 4 ▪ Faculty 5 ▪ Faculty 6 ▪ Faculty 7 ▪ Faculty 8 ▪ Faculty 9 ▪ Faculty 10 ▪ Faculty 11 ▪ Faculty 12 ▪ Faculty 13 ▪ Faculty 14 	<ul style="list-style-type: none"> ▪ Faculty 22 ▪ Faculty 23 ▪ Faculty 24 ▪ Faculty 25 ▪ Faculty 26 ▪ Faculty 27 ▪ Faculty 28 ▪ Faculty 29 ▪ Faculty 30 ▪ Faculty 31

To solve this problem we used already mentioned bilateral CCR model, which is specialized in comparing two groups of entities. Basic statistics for these two groups of faculties is represented in the following table:

Table 4: Descriptive statistics of bilateral CCR model

	TTNM group	SSH group
Number of DMU	14	10
Maximal efficiency	6.260412918	1.291367127
Minimal efficiency	0.537950189	0.292222496
Average efficiency	2.274124596	0.780333299
Standard deviation	1.701689542	0.253606038

Presented descriptive statistics of efficiency of the two groups shows significant differences between them. The null hypothesis (the two groups have the same distribution of efficiency results) is rejected by Wilcoxon rank-sum test (Cooper et al, 2006). It is shown that the TTNM group came out with much better results than the efficiency of SSH group. This conclusion sharply reduces further possible applications of statistics in order to have more detailed analysis of the two groups.

Considering that studies on certain faculties lasts three and on certain faculties four years, there is a need to point that important factor, because the data relate to a period of four years from the time of enrollment, and thus are favored three-year faculties (students had a year longer to finish faculty). CCR model with categorical variables and with output orientation is thus especially suitable in this case. In order to eliminate the influence of that additional year, a comparison of faculties will be made as follows: four-year faculties will be compared only to themselves while the three-year with all faculties (three-year and four-year).

First group of faculties (three-year) include: Faculty 1, Faculty 5, Faculty 6, Faculty 7 and Faculty 14, while all others belong to other group (four-year). The results are shown in the following table:

Table5: The results of CCR model with categorical variables

Rank	DMU	Score	Cat.
1	Faculty 1	1	2
1	Faculty 8	1	1
1	Faculty 23	1	1
1	Faculty 22	1	1
1	Faculty 28	1	1
1	Faculty 14	1	2
1	Faculty 4	1	1
1	Faculty 2	1	1
9	Faculty 3	0.909402	1
10	Faculty 27	0.900031	1
11	Faculty 25	0.875592	1
12	Faculty 24	0.858403	1
13	Faculty 26	0.81863	1
14	Faculty 31	0.761941	1
15	Faculty 9	0.643958	1
16	Faculty 7	0.636014	2
17	Faculty 29	0.588564	1
18	Faculty 10	0.534048	1
19	Faculty 11	0.475185	1
20	Faculty 13	0.465358	1
21	Faculty 6	0.440676	2
22	Faculty 12	0.417451	1
23	Faculty 30	0.377182	1
24	Faculty 5	0.256675	2

Table6: Descriptive statistics of categorical CCR model

	Four-year faculties	Three-year faculties
Number of DMU	19	5
Maximal efficiency	1	1
Minimal efficiency	0.377182	0.256675
Average efficiency	0.769776	0.666673
Standard deviation	0.222182	0.297431

The results indicate that eight faculties are efficient and 16 are not. Also, efficient faculties appear as benchmarks to inefficient units with following frequencies:

Table7: Number of appearances as benchmark unit

Faculty	Number of appearances as an benchmark unit	Category
Faculty 2	15	1
Faculty 8	4	1
Faculty 22	4	1
Faculty 1	3	2
Faculty 4	3	1
Faculty 23	1	1
Faculty 28	0	1
Faculty 14	0	2

It is particularly important that efficient faculties are among those found in the first and those from second group, so none group is favoured. Faculty 1 is one of efficient faculties. The reason for its good position is the high percentage of students who have finished faculty in four years – 80.52% of enrolled students graduated, which is far better than all others (the first after him by the percentage of graduates is Faculty 7 with 37.21%). In addition, faculty have a relatively small number of employees (especially non-academic staff) which means that with fewer people they achieved results which other faculties achieve with significantly higher number of employees (Faculty 7, Faculty 6 and Faculty 5). Faculty 14 is one more efficient faculty from group of three-year faculties and main reason is his average mark (score) of 9.46. On the other hand, Faculty 23 and Faculty 2 which are also efficient due to the small number of employees. For each DMU, DEA is looking for reasons for its efficiency, and in this case number of academic and non-academic staff is highlighted as most important. Also, Faculty 2 appeared 15 times as benchmark unit to other inefficient units, which puts it on first place regarding that criterion. Faculty 8, Faculty 4 and Faculty 28 deserve their place among efficient units because of large number of students who completed studies for four years.

Faculties that are close to the efficiency frontier are Faculty 27, Faculty 3 and Faculty 25. Benchmark for Faculty 3 is Faculty 2, and it should reduce the number of academic staff for 24.88% and non-academic for 23.62%, while increasing the number of graduates for 179.61% to become efficient. Important factor which influence Faculty 27 to be inefficient is the number of enrolled students. In order to become efficient it should reduce the number of enrolled students for 67.25%, to reduce number of non-academic staff for 13.82% and to increase for 11.11% both, number of graduate students and their average score (benchmarks for this faculty are Faculty 8 and Faculty 22). Faculty 25 has three benchmarks: Faculty 8, Faculty 22 and Faculty 2. In order to become efficient he needs to reduce number of non-academic staff for 9.84%, to increase the number of graduates for 14.21% and to increase average score from 8.49 to 9.69.

Faculties with lowest ranks are Faculty 30 and Faculty 5, one from each category. The reasons are mainly due to the extremely low percentage of graduated students (11.33% and 6.11% respectively), low average score (7.57 and 8.88 respectively) and relatively large number of employees.

4. CONCLUSION

Data Envelopment Analysis, as non-parametric approach for evaluating efficiency of different entities, proved to be very successful in applications in the non-profit sector. Since education belongs to that sector, there is number of methods and applications of DEA in education, especially in high education. State faculties are largely financed from the budget, and therefore a lot of their success depends on the quality of studies and how to attract students. Following the example of the analysis of many foreign authors, in this paper we analyze efficiency of studying at University of Belgrade. Faculties were first grouped into two categories: technical and technological faculties and faculties of social sciences and humanities and it were observed that there is a significant difference in efficiency among these groups. In order to make further analysis and to neutralize impact of number of years (three or four), we divided faculties to those with three-year and four-year studies. There were efficient faculties in both groups, but much more were inefficient.

Implementation of the Bologna Declaration in Serbia was officially started in 2005. Now we have first graduates of that new system, and the effects and results of a new system of high education may be considered more accurate and reliable than previous years. Now we have situation that on the one hand we have faculties who have managed to achieve the primary goal: to reduce the time of studying and increase passing from one year to another. On the other hand, there are faculties which struggle with new system. So we can conclude that high-educational system of University of Belgrade can still improve. The goal of this research was to measure only the efficiency of studying while some other aspects of performance are ignored (scientific research, equipment, etc.). Also, we exclusively observed time period of four years after enrolment of the base generation. There is a need for further perfecting and implementing of Bologna system of high education if we want to make our studies more efficient and qualitative.

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AHP-DEA MEASURE FOR STUDY PROGRAM SELECTION*

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Abstract: Data Envelopment Analysis (DEA) is an objective method which assigns weights to criteria for each decision making unit (DMU) separately. This flexibility in assigning can lead to wrong estimates of DMUs as a result of neglecting certain inputs (outputs) that have too large (or too small) values in comparison with other units. On the other hand, multicriteria methods assign weights based on a subjective opinion of decision makers. A new aggregated measure calculated as normalized production of DEA and AHP is introduced to overcome weaknesses of both methods. Furthermore, the aggregated measure is used for the evaluation of the first-year study subjects' relevance for the assessment of future students' success.

Keywords: DEA, AHP, aggregated measure.

1. INTRODUCTION

This paper attempts to make an evaluation of criteria based on their weights, obtained by combining the results of one objective and one subjective approach. Data envelopment analysis (DEA) is an objective method for determining the relative efficiency of Decision Making Units -DMUs. The relative efficiency is calculated as a ratio of the weighted sum of outputs and weighted sum of inputs. At the same time, criteria weights (inputs and outputs) are variables in the model and they are obtained as its solution. When solving DEA models, the complete flexibility in the process of choosing weights is assumed, so it is possible that some criteria might be assigned as highly important only because of their appropriate values (very low for inputs or very high for outputs in comparison with other DMUs under evaluation). This may lead to misjudgement of the importance of the criteria that do not correspond to practical experience. In literature this problem is solved by the combination of the results of subjective and objective methods such as integration of DEA and multicriteria method TOPSIS in (Chen, Li, Xui & Lui, 2009). The authors developed DEA-based optimization models to facilitate identifying parameter information regarding criterion weights and quantifying qualitative criteria in TOPSIS. The weight determination model that incorporates subjective information provided by the Analytic Hierarchy Process (AHP) and objective information to form Data Envelopment Analysis is given in (Liu, 2003).

In this paper, comparative analyses of DEA and AHP and their aggregation are carried out, according to the importance of the first-year study subjects for choosing an appropriate study program on the example of FOS (Faculty of Organizational Sciences). The approach based on DEA for user-oriented ranking that is developed to help students select an appropriate college is shown in (Eff, Klein, & Kyle, 2012). Multicriteria AHP method is used in higher education for selection of candidates for teaching positions (Saaty & Ramanujam, 1983). AHP method was applied to determine the complicity and priority of selection criteria. In the paper (Delibašić, Suknović & Stanačević, 2005) authors have created the system of knowledge management that determines the minimum distance between existing and new cases and gives a recommendation to a student where he/she would be most efficient.

The paper consists of four sections. Apart from the introduction, theoretical basis of DEA and AHP is given. Afterwards, the methodology for study program selection according to the first- year subjects is illustrated on hypothetical examples. The methodology is based on the aggregate AHP-DEA measure. In the fourth section, concluding remarks and further research directions are given.

2. BACKGROUND

The aggregated measure as a combination of one objective and one subjective measure are used to determine the importance of the criteria. The DEA method is used for obtaining objective measures, while AHP method is used for obtaining subjective measures. The bases of these methods are given in this section.

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2.1 DEA

DEA has been widely used for evaluating the relative performance of similar decision making units (DMUs) with multiple inputs and outputs. The original DEA model was given by authors, Charnes, Cooper and Rhodes (1978), who tried to generalized single-input to single-output ratio definition of efficiency to ratio of sum of weighted outputs to sum of weighted inputs. Suppose that DMU_j ($j = 1, \dots, n$), within set of n units, uses inputs x_{ij} ($i = 1, \dots, m$) to produce outputs y_{rj} ($r = 1, \dots, s$), absolute efficiency measure (Podinovski, 1999) model is as follows:

$$E_j = \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \quad (1)$$

where v_i ($i = 1, \dots, m$) are input multipliers and u_r ($r = 1, \dots, s$) are output multipliers (weights).

The above definition corresponds to a discrete multicriteria decision making (MCDM) method. The determination of weights is a very sensitive and complicated process. The weights selected a priori, as in MCDM models, can significantly affect the results of the efficiency calculation. Following that idea, the authors of DEA model (Charnes, Cooper, & Rhodes, 1978) allowed each DMU to choose the most appropriate set of weights in order to become as efficient as possible in comparison with the other units in the observing set. Relative efficiency ratio is scaled between 0 and 1, and all efficient units have the same ratio equal to 1. The LP weighted form of the basic CCR model is as follows:

$$(\max) h_k = \sum_{r=1}^s u_r y_{rk} \quad (2)$$

st.

$$\sum_{i=1}^m v_i x_{ij} = 1 \quad (3)$$

$$\sum_{r=1}^s u_r y_{rj} - \sum_{i=1}^m v_i x_{ij} \leq 0, \quad j = 1, \dots, n \quad (4)$$

$$u_r \geq \varepsilon; \quad r = 1, 2, \dots, s, \quad (5)$$

$$v_i \geq \varepsilon; \quad i = 1, 2, \dots, m,$$

The optimal values of efficiency scores h_k are obtained by solving the linear model (2)-(5) n -times (once for each DMU in order to compare it with other DMUs). As a solution of basic CCR DEA models, efficiency score h_k is 1 for all efficient units and lower than 1 for all inefficient units. All inefficient units are enveloped by production frontier, consisted of efficient DMUs, and for each of them an analyst could find benchmark (real-efficient or virtual-composite peer unit lying on efficiency frontier).

2.2 AHP

A subjective model which is widely used in decision-making is the analytic hierarchy process (AHP) introduced by Saaty (1980). Every problem is treated in terms of hierarchies - a system of stratified levels, each consisting of several elements. AHP views the problem as a system and decomposes it into elements. It involves pairwise comparisons of decision variables (e.g., objectives, alternatives according to some attribute they share or a criterion they should meet. Preference is denoted by a vector of weights following an AHP scale of relative importance which is the basis for calculation of a relative weight for each decision variable. Furthermore, inconsistent comparisons are addressed by means of an internal procedure which detects inconsistencies according to an arbitrary consistency ratio of 10%. Remarks on AHP with review of basic axioms and ways of altering weights and rankings are given in detail in (Dayer, 1990). The procedure, however, is limited by the number of factors that can be compared. An individual cannot simultaneously compare more than nine objects without being confused (Saaty, 1980). A comprehensive overview of the AHP method and its application in different areas is given in (Vaidya & Kumar, 2006).

3. CRITERIA WEIGHTINGS

There are four study programs at the Faculty of Organizational Sciences (FOS): Information systems (IT), Management (ME), Quality management (KV), and Operations management (OM). On completion of the first year, which has common subjects for all programs, students choose one of these four programs. The aim of this work was to develop a methodology for determining the weights of these subjects on each of four programs to help in prediction of students' final achievement. For that purpose, comparative evaluation of the first-year subjects based on DEA method, AHP method, Aggregate AHP-DEA measure is done on the data collection as in (Delibašić, Suknović & Stanačević, 2005). The data used here were obtained from the Faculty of Organizational Sciences Students' Service database. The data on 847 graduates who enrolled FOS 2002

and 2006 were selected to be analyzed. For each student, we have collected information on 11 subjects' marks*: Economics (EC), Mathematics1 (MA1), Management (MN), Fundamentals of Information Communication Technology (OIKT), Sociology or Psychology (S/P), Foreign Language 1 (SJ1), Mathematics 2 (MA2), Fundamentals of Organization (OO), Production systems (PS), Introduction to information Systems (UIS), Foreign Language 2 (SJ2). The Average mark (GPA) was used as a key performance that indicates students' success. These data were used in all approaches. Descriptive data statistics is given in Table 1.

Table 1. Descriptive statistics of entry data

		Subjects											Average			
Program	No. of students		EK	MA1	MN	OIKT	S/P	SJ1	MA2	OO	PS	UIS	SJ2	Marks in first year	Marks in the end	
IT	322	Average	7.2	8.02	7.75	8.29	8.02	7.5	8.09	8.48	8.48	8.13	7.66	7.97	8.36	
		SD	1.27	1.24	1.22	1.02	1.28	1.26	1.17	1.17	1.19	1.03	1.32	0.74	0.63	
MN	350	Average	7.12	7.43	7.79	7.75	8.09	7.51	7.49	8.4	8.06	7.72	7.59	7.72	8.35	
		SD	1.2	1.14	1.26	0.99	1.21	1.18	1.2	1.22	1.25	1.08	1.27	0.67	0.62	
KV	144	Average	6.92	7.27	7.44	7.68	7.53	7.11	7.39	8.03	7.92	7.63	7.16	7.46	8.12	
		SD	1.11	1.13	1.23	0.99	1.18	1.08	1.13	1.33	1.24	0.93	1.13	0.65	0.66	
OM	31	Average	7.29	7.84	7.87	8.03	8.23	7.13	8.16	8.13	8.55	7.74	7.26	7.84	8.57	
		SD	1.2	0.81	1.36	0.9	1.21	1.1	0.92	1.1	1.04	0.84	1.16	0.54	0.45	

Table 1 shows that study programs are not unified in terms of the number of students. Students usually choose to study one of the two major programs, IT with 38% and MN - 41.3%. Next on the list is program KV with 17%, while only 3.7% of students choose study program OM. Looking at the average marks in the first year and at the end of the studies it can be seen that students of all study programs tend to improve their results towards the end of studies.

Based on the average marks per subject, we can distinguish three groups of subjects. The first group consists of subjects PS-OO, where students of all study programs achieve similar, high average marks. Another clearly distinctive group consists of subjects where students of all study programs achieve average low marks (EC, SJ1). The third group consists of subjects where no apparent laws could apply to all study programs. Therefore, in-depth analyzes are performed for determining the impact of individual first- year subjects on a particular study program success using DEA and AHP methods.

In determining the priority of the first year subjects that are relevant for predicting future students' success, one objective (DEA) and one subjective (AHP) method are used. The final grade is obtained by aggregating the results of objective (DEA) and subjective methods (AHP). The selection of the first-year subjects that are relevant for choosing a study program, is done based on average weights using DEA method. The value of weights can be reached in two steps. First, we evaluate the relative efficiency of each student. In doing so we determine such a weight for each subject that will show a student as efficient as possible, considering the results during studying, (average mark) compared with other students. In the next step, we determine the average weight for each of 11 first- year subjects.

For assessing the relative efficiency of each student, they are observed as units (DMA). The first-year subjects present 11 inputs, while average mark represents output. Considering the nature of input, information about first- year subject marks are transformed so that they present a deviation of full mark (10). Since the aim of the analysis is to determine the weight of a subject, the input-oriented DEA model (2-5) is selected. Descriptive statistics of DEA results, which are obtained by using specialized software DEA - solver (Cooper, Seiford, & Tone, 2006), divided into study programs according to students' affiliation, is given in Table 2.

Table 2 shows the average values related to efficiency, standard deviation, maximum and minimum values of the efficiency index by study programs. Measured by average efficiency, the OM students are the most successful ones, followed by IT, ME and KV. Approximately equal standard deviation values indicate that homogeneity of all students in all study programs is similar. Maximum efficiency index 1, in the IT study program, is given to the most successful student (with average mark 10) and he/she is the only efficient one and the reference for all other students.

Table 2. Descriptive statistics of DEA results

* Belgrade University ranking system: 5 to 10, where 5 means fail and 10 means full mark.

Program	No. of students	Efficiency			
		Average	SD	Max	Min
IT	322	0.51	0.40	1	0.02
ME	350	0.46	0.40	0.99	0.02
KV	144	0.36	0.38	0.98	0.02
OM	31	0.52	0.40	0.96	0.04

As it is already mentioned, the relative efficiency is calculated as the ratio of weighted sum of outputs and the weighted sum of inputs (eq. 1). This analysis is not focused on determining the efficiency of the student, as is usually the case when applying DEA, but on the weights. One of the DEA output is a matrix of weights for the inputs (outputs). As the ultimate goal of the research is evaluation of subjects which are inputs of DEA, we shall look at the matrix of inputs weights ($v_{ij}, i = 1, \dots, 11, j = 1, \dots, n_k$) with dimensions $11 \times n_k$, where n_k presents the number of students in observed study program ($k=1, \dots, 4$). Based on weights, for every student we calculate average input weights for each study program as follows $z_{ik} = \left(\sum_{j=1}^{n_k} v_{ij} \right) / n_k, i = 1, \dots, 11, k = 1, \dots, 4$.

Their normalized values are given in the table 3.

AHP is used for attribute weightings (determining the weight of subject) of the first- year study subjects, for each study programs. The hierarchy of problem in is set on two levels with a third, pseudo level, similar to (Tadisina, Troutt, & Bhasin, 1991). The described main goal is on the first hierarchy level. As all subjects have different importance (weights) for different study programs ($S_k, k=1, \dots, 4$), the main goal will be observed from different perspectives, that is, for each study program separately. As shown in Figure 1, the study programs are set as pseudo levels below the main goal.

The importance of subjects for each of the study program is determined on the third level criteria: two objective and one subjective criterion ($C_i, i=1,2,3$). The objective criteria are ECTS credits (ECTS) and the average mark. The value of ECTS credits is official information specified in the accreditation program. The values are taken from the Faculty's Student Service database. The subjective criterion is an expert evaluation of relevant subject importance for each study program. It is obvious that subjects are evaluated as set alternatives ($A_i, i=1, \dots, 11$), for each study program separately.

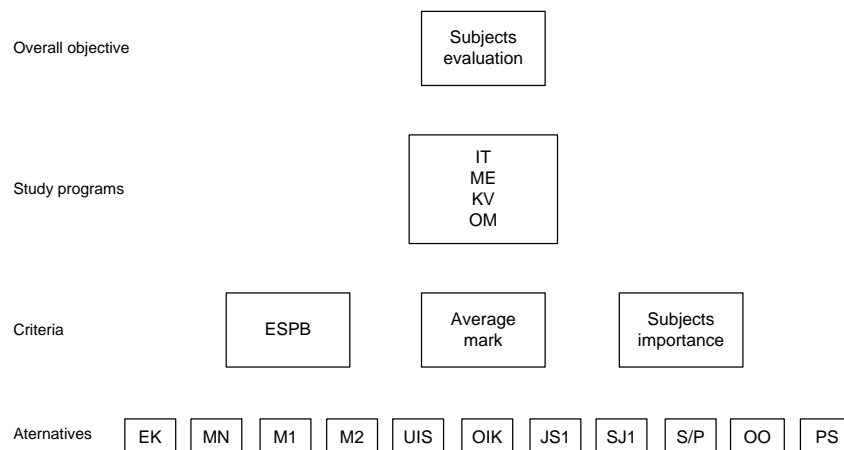


Figure 1. Subject weighting hierarchy

In the first stage of evaluation, the comparisons matrix (pairwise comparison matrix) is created for each study program, based on a subjective expert assessment. In the second phase we enter grades for each alternative, per each criterion. The final result of evaluation is weights of all alternatives (subjects) for each study program separately in relation to the set goal. Weights, which represent the synthesized importance of subjects in choosing study program process ($w_{ik}, i=1, \dots, 11, k = 1, \dots, 4$) are shown in Table 3.

Aggregate AHP-DEA measure

Flexibility in assigning weights when solving DEA model, as an objective approach, can lead to wrong estimates of individual units (students) under consideration. This is the result of neglecting certain inputs (outputs) that have too large (or too small) values in comparison with other units.

In addition, Table 2 shows that standard deviations of subject marks are different. This leads to the situation that DEA cannot make discrimination for subjects with a low standard deviation and that it assigns them very low weights.

On the other hand, when determining the importance of alternatives, AHP does not take into account the information about individual marks, but only the average values and subjective values of decision makers. Since in this research the importance of subjects is crucial, it is necessary to combine objective and subjective assessments. On the one hand, AHP corrects the impact of student marks in some subjects and includes a subjective evaluation of a decision maker and the importance of the subject from the ECTS perspective. On the other hand, the DEA grade brings about objectivity obtained solely only on the basis of empirical values.

The objective weights, determined by DEA and subjective weight w_{ik} determined by AHP, are combined into an aggregate weight ag_{ik} as follows:

$$ag_{ik} = z_{ik} w_{ik} / \sum_{i=1}^{11} z_{ik} w_{ik}, i = 1, \dots, 11, k = 1, \dots, 4.$$

Their values are shown in Table 3.

Table 3. Weighs obtained by DEA, AHP and aggregated DEA-AHP measure

Study program	Method	Subjects										
		EK	MA1	MN	OIKT	S/P	SJ1	MA2	OO	PS	UIS	SJ2
IT	DEA	0.116	0.239	0.089	0.093	0.126	0.076	0.034	0.104	0.105	0.001	0.017
	AHP	0.071	0.109	0.085	0.125	0.075	0.038	0.111	0.104	0.103	0.129	0.050
	AHP-DEA	0.090	0.282	0.082	0.126	0.103	0.031	0.041	0.118	0.117	0.001	0.009
MN	DEA	0.118	0.051	0.192	0.062	0.235	0.062	0.040	0.129	0.074	0.014	0.023
	AHP	0.103	0.082	0.122	0.082	0.084	0.044	0.083	0.141	0.117	0.089	0.053
	AHP-DEA	0.121	0.042	0.235	0.051	0.197	0.027	0.033	0.182	0.087	0.012	0.012
KV	DEA	0.090	0.142	0.163	0.047	0.116	0.060	0.057	0.213	0.109	0.000	0.003
	AHP	0.087	0.082	0.122	0.082	0.084	0.044	0.083	0.141	0.133	0.089	0.053
	AHP-DEA	0.075	0.111	0.189	0.036	0.093	0.025	0.045	0.286	0.138	0.000	0.002
OM	DEA	0.066	0.008	0.344	0.123	0.273	0.005	0.060	0.005	0.115	0.000	0.000
	AHP	0.085	0.096	0.119	0.081	0.084	0.044	0.097	0.123	0.130	0.088	0.053
	AHP-DEA	0.055	0.008	0.402	0.098	0.225	0.002	0.057	0.007	0.146	0.000	0.000

The first thing that can be noticed by weights analysis from Table 3, is that the range of their values is smaller with AHP then with DEA method and that, unlike with DEA, using AHP method, none of the subject has been marked as insignificant.

Normalized weights, according to DEA method, presented in Table 3, show that S/P marks had influence on efficiency of students in all study programs, while subjects ME and OO had significance in determining the efficiency of the students in three out of four student programs. This shows that almost all first-year students have achieved good results from these subjects. The students in IT program have shown good results in MA1. As it was expected this subject will have the biggest influence (0.239) in assessing capability of students to enroll the IT program. The same situation is with the subject of MN in OM study program whose weight is 0.34. But subjects OIKT and UIS, which are expected to be important to IT students, got small weights (below 0.1) which are the result of low standard deviations, that is, there are other subjects that make students more distinctive.

On the other hand, as AHP includes expert evaluation of a subject importance as one of the criteria, subjects OIKT and UIS got highest weights (0.129 and 0.125). The same situation refers to the subject OO in the study program OM. Thus, using DEA method, this subject was given a small value of weighting, while with AHP, where the expert importance grade is high, it was declared as the second most important (0123). By looking at the values in the same table, similar analysis can be made for study programs MN and KV.

Since the aggregated measure is a normalized product of two measures, the objective measure of DEA will have the greater impact on its value because of its wider range of weight values. AHP was able to correct results only for subjects where DEA method has not assigned extremely small weights. Normalized weights of DEA-AHP in Table 3 can be used for predicting future students' success, after completion of the first year of study, resulting in the recommendation which study program they should select. New students' success is estimated by aggregate weight. Potential achievement of five randomly chosen students' on each of four study programs is evaluated based on marks after first year of study as it is given in Table 4.

Table 4.

New student	Subjects' marks											Final mark	Study programs' predictions			
	EK	MA1	MN	OIKT	S/P	SJ1	MA2	OO	PS	UIS	SJ2		IT	ME	KV	OM
DMU1	8	7	8	8	9	9	7	9	9	8	8	IT-8.36	8.05	8.42	8.39	8.32
DMU2	6	6	6	8	7	6	6	9	7	7	7	ME-7.00	6.84	6.96	7.17	6.59
DMU3	7	8	8	7	8	6	7	10	8	7	6	KV-8.09	7.90	8.07	8.36	7.80
DMU4	9	8	10	9	10	8	10	10	10	8	10	OM-9.64	9.15	9.67	9.62	9.83
DMU5	10	10	10	10	10	10	10	10	10	10	10	ME-10.00	10.00	10.00	10.00	10.00

Table 4 shows that the predictions of the students' success are different enough to enable ranking and selection of the most appropriate study program. It can be concluded that some students have not made the right decision, e.g. DMU1 and DMU2, while the above-average students can be successful at each of the study programs, e.g. DMU5. Many students do not opt out of personal interest only, but also for other reasons. The final decision can be made out based on: obtained prediction, students' academic experience, motivation and expectation regarding future career.

4. CONCLUSION

Most students select study programs based on personal preferences related to the subjects the study program includes and career qualification. However, if the study program is to be selected after the first-year of study, we can predict students' success based on the first-year grades evaluation and help them select the most appropriate study program.

In this paper, the prediction of success in each of the four study program is based on the weights assigned to the first-year subjects. First, we have estimated 847 students efficiency using DEA. Subject weights were calculated as the average weight assigned to each subject. Then, using AHP the subjects were evaluated as alternatives based on three criteria: ECTS, average mark, and an expert evaluation of a subject importance to different study programs. Subject weights were identified as synthesized weight alternatives.

Finally, we got weights obtained by aggregate measure which combines the objective DEA and subjective AHP measures. In that way we have reduced the subjectivity of information obtained using AHP, and we have reduced DEA flexibility in assigning weight only on empirical data basis.

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INTEGRATED APPROACH OF SWOT AND MULTI-CRITERIA ANALYSIS IN STRATEGIC DECISION MAKING

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Abstract: One of the most popular techniques in strategic planning is the SWOT analysis. The aim of this analysis is to integrate and manage information related to the strengths, weaknesses, opportunities and threats, which the company faces in business. By analyzing this information, we created a basis for selecting the best market positioning strategy for the company. The classical approach to SWOT analysis, however, does not take into account the estimates of the relative importance of these four categories of information, as well as the relative preference of alternative strategies available to the company. Analytical Hierarchy Process (AHP), as a method of multi-criteria analysis, is used to determine the weights for multi-criteria decision making models, and to determine the preferences of the final series of possible alternatives. This method allows defining a quantitative framework for decision making by enabling decision makers to model complex problems of strategic decision making through a hierarchical structure, forming a clear picture about the relationship between objectives, criteria, sub-criteria and alternatives. The integration of algorithms of Analytic Hierarchy Process and SWOT analysis has created a new approach. This approach is known in literature as A'WOT method for making strategic decisions. The procedure of A'WOT method application is presented in this paper.

Keywords: SWOT analysis, Analytical Hierarchy Process, decision making, development strategy of a company

1. INTRODUCTION

The SWOT analysis is a powerful tool in developing and confirming corporate goals and marketing strategy. SWOT is a widely accepted technique used in strategic planning for analysis of internal and external factors relevant for strategic decisions (Wheelen and Hunger, 1995; Hill and Westbrook 1997). The primary purpose of the SWOT analysis is to identify and assign each significant factor, positive and negative, to one of the four categories, allowing decision makers to take an objective look at their business.

SWOT analysis is offering good results, especially for developing and formulating corporate strategies in terms of sudden changes in the business environment. SWOT is a qualitative technique for decision support which relies heavily on the skills and expertise of decision makers, and gives a qualitative overview of internal and external decision-making factors.

However, it appears that there are some problems in the application of SWOT analysis (Hill and Westbrook 1997). Some authors are also proposing more efficient ways of SWOT usage (McDonald 1993). Main problem of the classical SWOT analysis usage is the inability of the analytical approach in assessing the relative importance of the SWOT factors, which results in the problem of evaluating alternative courses of action against those factors.

A promising attempt to support strategic decision-making is combined use of the AHP (Analytic Hierarchy Process) method and SWOT analysis. There is a great potential for strategic decision making in combined usage of AHP (Analytical Hierarchical Process) and SWOT analysis. The main idea is to use AHP for comparison of decision-making factors and determining their relevance, which enables modelling and describing situation in more detailed manner. There are numerous researches about possibilities of using AHP method in the evaluation of SWOT factors, so as alternatives based on that evaluation (Kurtilla et al. 2000; Kangas et al. 2001; Pesonen et al. 2000; Osuna and Aranda 2007). SWOT analysis is offering formal framework for decision making with analytical support of AHP. Combination of these two methods is hybrid algorithm well-known as A'WOT (Kangas et al. 2001, 190). This hybrid method is not so widely accepted, although there are numerous cases confirming advantages of combined method over the classical SWOT analysis.

2. THE SWOT ANALYSIS

One of the most popular techniques used in strategic management is the SWOT analysis. This analysis is used for understanding the current position of the company and defining the strategy to be applied in order to achieve the desired outcome and business goals. SWOT analysis provides detection of positive and negative factors affecting the achievement of strategic goals and provides an opportunity, due to factors affecting, to adapt the ways of achieving strategic goals.

Merits for SWOT analysis is attributed to the research team, consisting of: Albert Humphrey, Marion Doshier, Otis Benepe and Birger Lie from the Stanford University. Also, framework for the SWOT analysis was presented in 1969 by researchers from Harvard University. This framework has become popular in the 1970s due to the assumption that it was built, and which reads as follows: managers can plan the harmonization of enterprise resources with its business environment.

SWOT analysis is commonly carried out within the so-called SWOT matrix in which they are presented qualitative and quantitative dimensions of the enterprise position on the market. SWOT matrix is composed of four elements - field: **S** – *Strengths*, **W** – *Weaknesses*, **O** – *Opportunities* and **T** – *Threats*. Strengths are positive and weaknesses are negative internal factors. Opportunities are positive, while the threats are negative external factors. SWOT analysis is a set of analytical methods by which are possible to compare the strengths and weaknesses with opportunities and threats in the environment (Figure 1). In this way, the SWOT analysis provides a balance between internal capabilities and external possibilities of enterprises.

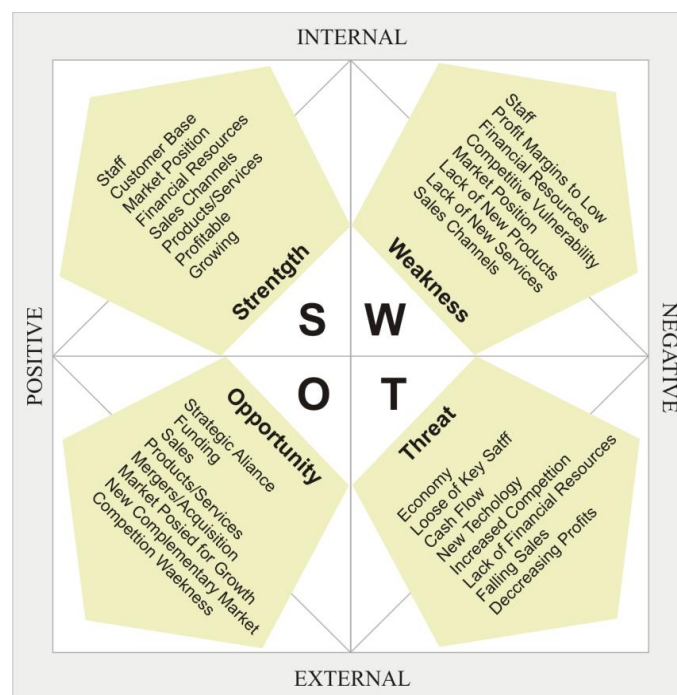


Figure 1: The basic factors in the SWOT analysis

The internal factors (strengths and weaknesses) can be systematized in the following categories:

- 1) Management and organization,
- 2) Operations,
- 3) Finance and
- 4) Other factors

Defining the strengths of the company includes the determination of the “strong points” of the company and answering the following questions:

- Are there unique advantages that make specified company better from the competition?
- Why do clients choose particular company rather than competitors?
- Are there products and services that competitors can not imitate (now and in the future)?

The weaknesses are the weak points of companies. Some of the questions to be answered in defining the weaknesses of the company are:

- Are there any operations or procedures that can be pronounced?
- What and how competitors works better?

Many different factors must be taken into account in the analysis of external environment. These factors, either threats or opportunities, can be grouped into the following categories: economic, social, political - legal, technological, environmental, ethical, and others. The most important part of the external environment is so called industrial environment (customers, suppliers, competitors).

Key issues which must be taken into account in defining the opportunities are:

- What are the attractive opportunities on the market?
- Does the new trends occurring?
- What new opportunities can be predicted for the future?

Threats are external factors beyond the control of the company. It is important that the company is ready to face the threats, even in turbulent situations. Issues to be kept in mind in that case are:

- What competition's actions suppress the development of the enterprises?
- Are there changes in consumer demand, for which they need new features of products and services?
- What harm or change the position of the company on the market?

SWOT analysis has a time dimension too. The time dimension is an extremely important factor in conducting this analysis, and in this context, strengths and weaknesses are treated through the prism of the present based on past business operations, while the opportunities and threats represent the future of a company.

Application of SWOT analysis leads to one of four main conclusions:

1. Strengths overcome weaknesses and opportunities overcome threats - supports the growth strategy,
2. Strengths overcome weaknesses while threats overcome the opportunities – supports the strategy of maintenance,
3. Weaknesses overcome strengths while opportunities overcome threats – supports the strategy of "harvesting".
4. Weaknesses overcome strengths and threats overcome the opportunities – supports the containment strategy.

SWOT can be used for the purpose of wider observing a strategy by the formula: $SA=O/(S-W)$. It provides an answer to an important question- should we invest more in the power company to be stronger (distinctive competence) or to invest in the weakness to do so competitively.

Bearing in mind the above mentioned, it is necessary to emphasize the key benefits of SWOT analysis:

- A key element of strategic options formulation is the alignment of strengths and weaknesses of companies with the opportunities and threats that exist on the market,
- When is used correctly, the SWOT analysis can provide a good basis for the strategy formulation,
- SWOT analysis is widely recognized in the literature as a systematic way to achieve the objective.

However, the SWOT analysis has certain disadvantages:

- According to Mintzberg (1994.), SWOT analysis is rarely effective method, because it is based on the current perception of the company,
- In practice this is often an activity that is not implemented well. After identifying all important "points", decision makers often do not know what to do with the generated data,
- SWOT analysis is not prescriptive, regarding the use of information generated in order to deliver the strategy.

3. ANALYTIC HIERARCHY PROCESS

Analytic Hierarchy Process - AHP is the one of the most popular method of multi-criteria analysis and a tool for decision making on the selection of optimal alternative(s), especially in cases where there is a possibility of a hierarchical structuring of relevant criteria. AHP method is the kind of quantitative technique that can incorporate in the model both qualitative and quantitative criteria (Saaty, 1977, 1994). Multi-criteria decision making problems are those where it is implied that a decision maker suppose to identify the optimal course of action, considering a set of conflict criteria. Complexity in decision making situations involves quantitative and qualitative criteria, different measurement scales, and multiple comparisons. The ability to assign a preference rank for general decision making situations is needed as well as simplicity of methods (Saaty, 1986). The AHP is a suitable method that provides a logical and scientific basis for such multi-criteria decision making problems (Harker, 1988) and has been widely applied to both individual and group decision making scenarios from the early 1980s (Wind & Saaty, 1980; Saaty & Vargas, 1994). AHP is quantitative tool that has been used in almost all problems related to multi-criteria decision making and its application includes about 150 different kinds of problems (Vaidya & Sushil, 2006).

AHP is a method for formulating and analyzing decisions that can successfully be used to measure the influence of many factors relevant to the possible outcomes of decisions made and for forecasting and

performance of relative probability distribution of these outcomes. Applications of AHP can be categorized into two main groups (Saaty, 2010):

- 1) Problems selection, which include evaluation of possible alternative actions for a given decision problem and
- 2) Problems prediction, where it is performed the evaluation future outcomes of alternative for decisions that are taken.

The problem of choice usually involves the evaluation of available alternatives, in terms of fulfillment of the criteria that are considered relevant for the decision. The prediction, by contrast, focuses on evaluating the relative probabilities of future outcomes.

As well, AHP method is well-known subjective approach in determination of relative weights of criteria for other multi-criteria decision-making methods. According to Saaty (1986), the AHP was founded on three design principles: (i) decomposition of the goal-value structure where a hierarchy of criteria, sub-criteria, and alternatives is developed, with the number of levels determined by the problem characteristics; (ii) comparative judgments of the criteria on single pairwise comparisons of such criteria with respect to an upper criteria; and (iii) linear-based synthesis of priorities where alternatives are evaluated in pairs with respect to the criteria on the next level of the hierarchy, and criteria can be given a priority (e.g. preference) expressed as a weight in the AHP matrix.

Let the problem is defined as a general problem of multi-criteria analysis, where it is necessary to evaluate the m of available alternatives, on the basis on n relevant criteria. On the stage of decomposition, the problem is viewed as a hierarchical structure, where the goal is on the top, while the criteria by which a decision is made are treated at the lower levels. At the lowest hierarchical level is a range of alternatives, which comparisons is necessary to make.

The next phase involves, in addition to collecting data and its peer evaluation. There is, first of all, makes pair-wise comparison of criteria and alternatives at a given level of hierarchy, but also in relation to the criteria of the directly higher level. Pairwise comparison of alternatives is done in response to the question of which of the two observed attributes that characterize an alternative to the given criteria, is better in terms of meeting the criteria and contribution to the certain objective. Strength of preference is expressed by the ratio scale with increments of 1-9. The preferential level of 1 shows equality of observed attributes, while the level of 9 indicates absolute, the strongest preference of one attribute over another (Ma & Zhang, 1991, Leskinen, 2000). Such a scale was formed by Saaty (Saaty, 1977) and it is used in essential AHP method and for its entire later advanced variant (revised AHP or ANP). Thus, defined scale allows comparisons in a limited scope, while the perception is a sensitive enough to make a difference in the alternatives importance. Based on pairwise comparison of alternatives, the reciprocal matrix can be formed (dimension $n \times n$ on the criteria level, or $m \times m$ on the alternatives level), where the elements $a_{ii} = 1$, while the elements a_{ji} are the reciprocal of the elements a_{ij} , i.e. $a_{ji} = 1 / a_{ij}$, $i \neq j$ and $i, j = 1, 2, \dots, n$.

The reciprocal matrices of comparison, defined in this way, are the basis for identifying priorities using AHP method. The final result of AHP method application is determination of the priority vectors of alternatives for each criterion, as well as the final ranking of all alternatives with respect to the criteria in the model.

4. A'WOT AS AN INTEGRATED APPROACH OF SWOT ANALYSIS AND AHP METHOD

The integration of SWOT and multi-criteria analysis is based on the fact that the elements of the SWOT analysis can be treated as criteria in the multi-criteria analysis model. In this way they are built on the second level of the hierarchy problem. In that sense, the A'WOT method, which represents a combined technique of SWOT analysis and AHP method, assumes the following procedure (Kangas et al. 2001, 190):

- 1) The SWOT analysis implementation, which includes identification of relevant internal and external factors that are included in the SWOT analysis,
 - 2) Determination of the relative importance of the SWOT groups by pairwise comparison,
 - 3) Implementation of the AHP pairwise comparisons of factors within each SWOT group in order to identify their priorities,
 - 4) Determination of the priorities of each alternative and the alternative strategy for the company, in respect to each SWOT group, as in the classical procedure of AHP method application,
 - 5) Calculation of the global priorities of alternatives in accordance with A'WOT decision making hierarchy.
- From the aspect of decision-making hierarchy supported by AHP method, the A'WOT decision hierarchy is usually structured in three or four levels:

- 1) The goal of the problem is identified at the highest level. Specifically, the goal is the determination of the optimal development strategy of the company.
- 2) The second level is the level of defining the relevant criteria and it consists of a standard four groups of factors in the SWOT analysis : strengths, weaknesses, opportunities and threats.
- 3) At the third level, which is essential for the sub-criteria definition, there are factors which are included in the four groups of previous levels.
- 4) On the fourth level, i.e. the level of alternatives, there are alternatives related to the development strategies of the companies. These alternatives should be evaluated and compared in order to choose the optimal strategy.

The aim of the classical application of SWOT analysis in strategic planning is not always to compare alternative strategic decisions, but the analysis of internal and external factors affecting the companies business. (Arp, R., 2008). The essential characteristic of SWOT analysis is that it is an established method for assisting the formulation of strategy (Dyson, 2004). On the other hand, the ultimate goal of any strategic planning process is to develop and formulate strategies that will be the result of balance between internal and external factors. In this sense, the application of A'WOT method assumes the identification of internal and external factors within the operating environment (SWOT analysis), then a comparison of alternative strategies in relation to the strengths, weaknesses, opportunities and threats (AHP method).

5. MODEL FORMULATION AND RESULTS OBTAINED BY A'WOT PROCEDURE

Suppose that the company by using scenario planning (Montibeller et al., 2007) found that there is a choice of five possible strategies:

Strategy 1: Maintain the existing business with marginal increase of profit in next 5 years period,

Strategy 2: Grow existing business which means the increase of current business and volume of production or services,

Strategy 3: Buy an other company and trough that action find new areas for current business diversification,

Strategy 4: Merge with another company and gain larger market share,

Strategy 5: Sell part of business which means cut of expenses.

The relevant criteria in the model derived from the SWOT analysis are: strengths, weaknesses, opportunities and threats. Graphical representation of the hierarchy for the problem of choosing the optimal strategy is shown in Figure 2.

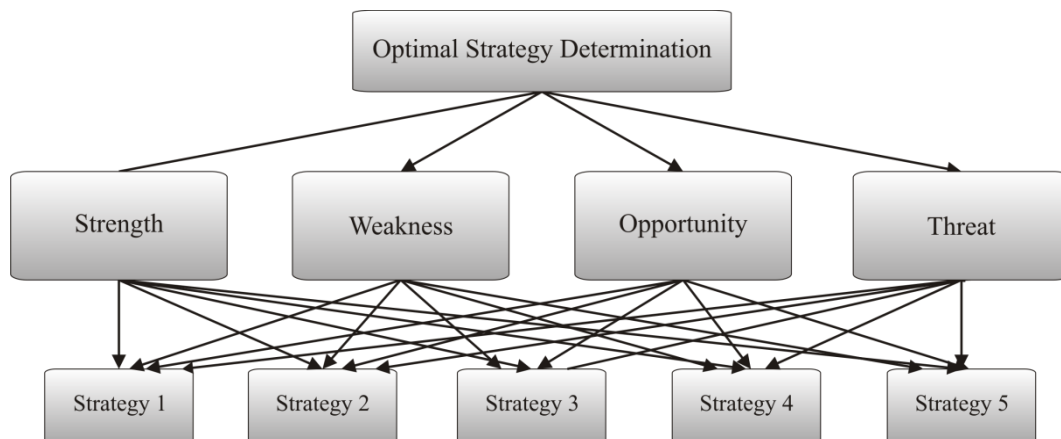


Figure 2: Hierarchy for the problem of choosing the optimal strategy

The further assumption of A'WOT application procedure requires that the management of the company conducted the evaluation of all mentioned strategies in relation to established criteria, and according to their own preferences and perceptions. Such an evaluation provides a basis for comparing pairs of criteria and alternatives and, therefore, it is possible to form the corresponding pairwise comparisons matrices. The AHP method represents a subjective approach to decision making, and according to that, it incorporates the subjective views of decision-makers - managers, or board of managers in the model. The management opinion about interrelated significance criteria in the model, evaluated using Saaty scale, is presented in Table 1. Items marked with brackets represent the reciprocal value of the number in brackets.

Table 1: Pairwise comparison matrix of criteria

	Strengths	Weaknesses	Opportunities	Threats
Strengths	1	2	(2)	4
Weaknesses	(2)	1	(4)	2
Opportunities	2	4	1	8
Threats	(4)	(2)	(8)	1

Similarly, pairwise comparison matrices were formed at the hierarchical level of alternatives, in relation to all the relevant criteria: Strengths (Table 2), Weaknesses (Table 3), Opportunities (Table 4) and Threats (Table 5).

Table 2: Pairwise comparison matrix of strategies according to Strengths

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5
Strategy 1	1	(2)	(5)	(2)	4
Strategy 2	2	1	(3)	1	8
Strategy 3	5	3	1	3	8
Strategy 4	2	1	(3)	1	8
Strategy 5	(4)	(8)	(8)	(8)	1

Table 3: Pairwise comparison matrix of strategies according to Weaknesses

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5
Strategy 1	1	2	3	2	3
Strategy 2	(2)	1	2	1	2
Strategy 3	(3)	(2)	1	(2)	3
Strategy 4	(2)	1	2	1	2
Strategy 5	(3)	(2)	(3)	(2)	1

Table 4: Pairwise comparison matrix of strategies according to Opportunities

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5
Strategy 1	1	(3)	(4)	(5)	3
Strategy 2	3	1	(2)	(3)	5
Strategy 3	4	2	1	(2)	6
Strategy 4	5	3	2	1	8
Strategy 5	(3)	(5)	(6)	(8)	1

Table 5: Pairwise comparison matrix of strategies according to Threats

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5
Strategy 1	1	3	5	5	2
Strategy 2	(3)	1	3	3	(2)
Strategy 3	(5)	(3)	1	1	(4)
Strategy 4	(5)	(3)	1	1	(4)
Strategy 5	(2)	2	4	4	1

The software package Superdecisions (<http://www.superdecisions.com>) was used in order to provide the problem solution. The structure of the described problem, generated by this system supporting the AHP method is shown in Figure 3.

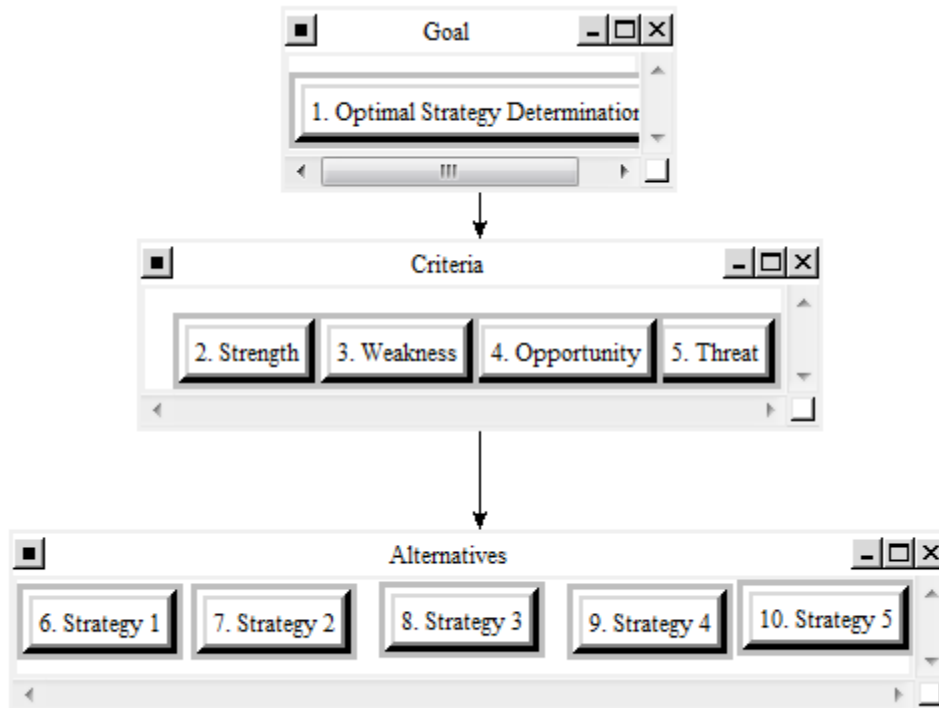


Figure 3: Structure of the problem (designed by Superdecisions decision support system)

The priority vectors of criteria and alternatives are given in Figure 4. It can be seen that management assigned the highest importance to the category Opportunities (weight 0.533). Then follows a group of factors within the criteria Strengths, with the relative importance 0.267, Weakness with weight 0.133, and at the end Threats with 0.067.

Name	Normalized by Cluster	Limiting
6 Strategy 1	0.14657	0.073286
7 Strategy 2	0.18399	0.091997
8 Strategy 3	0.29461	0.147306
9 Strategy 4	0.31543	0.157717
10 Strategy 5	0.05939	0.029694
4 Opportunity	0.53333	0.266667
2 Strength	0.26667	0.133333
5 Threat	0.06667	0.033333
3 Weakness	0.13333	0.066667

Figure 4: Priority vectors of criteria and alternatives

The final order of alternatives by all of the above criteria is presented in Figure 5.






Name	Graphic	Ideals	Normals	Raw
6 Strategy 1		0.464668	0.146572	0.073286
7 Strategy 2		0.583307	0.183995	0.091997
8 Strategy 3		0.933991	0.294612	0.147306
9 Strategy 4		1.000000	0.315434	0.157717
10 Strategy 5		0.188272	0.059387	0.029694

Figure 5: Ranking of alternatives

The solution, obtained using the software package Superdecisions, contains a priority vector, according to the AHP method, in the Raw column. Normalized vector of priorities, where can be read out the relative importance of all strategies observed, is given in column Normals. The strategy with the highest value of relative importance can be considered as the optimal strategy. In the column Ideals are presented linearly normalized values of relative importance, so that the strategy with the value 1.000 in this column can be considered as optimal. According to the data in the Figure 5 it is evident that the Strategy 4 has greatest importance (0.315434) in terms of observed criteria. Thus, taking into account the preferences and perceptions of management expressed through pairwise comparison of criteria and alternatives, it can be concluded that the company should implement the Strategy 4 - Merge with another company and gain larger market share.

6. CONCLUSION

In the decision making process, application of the SWOT analysis, as an analytical method, provides a balance between internal capabilities and external possibilities of enterprises. Therefore, this method can be used in order to define the market positioning strategy of the company. The Analytic Hierarchy Process, as the one of the most popular method of multi-criteria analysis and a tool for decision making. This method provides selection of optimal alternative(s), especially in cases where there is a possibility of a hierarchical structuring of relevant criteria. The A'WOT method represents a combined technique of SWOT analysis and AHP method. Its application assumes the identification of internal and external factors within the operating environment (SWOT analysis), then a comparison of alternative strategies in relation to the strengths, weaknesses, opportunities and threats (AHP method). The advantages of the A'WOT method application in the decision making process are confirmed in this paper.

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THE CLASSIFICATION OF COMMERCIAL PROPERTY USING ELECTRE MULTI-CRITERIA DECISION MAKING METHODS

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Abstract: *This paper considers the problem of classifying commercial property in relation to the real market criteria. The method used for solving this problem is the ELECTRE 1 multi-criteria decision making method which allows the grouping of alternatives into different qualitative levels (ELECTRE MLO). The analysis was carried out using the example of commercial property in Belgrade.*

Keywords: *commercial property, multi-criteria decision making, ELECTRE method, multi-level outranking*

1. INTRODUCTION

When one of the more successful foreign companies decides to carry out its commercial activity in another country, which of course includes Serbia, one of the most important prerequisites is high quality commercial space in which to begin its business operations.

Making the right choice is not simple, since in the area of leasing commercial properties, as in other spheres of commercial life in Serbia, the situation is rather technicolour. Namely, at this moment, commercial space can be leased from the state, commercial companies and individuals. As far as the state is concerned, a good knowledge of the subject matter is important, in order to understand all aspects and modalities related to leasing commercial space. There are specialized public companies (and agencies), whose basic function is leasing publicly owned commercial space and collecting its rent as public revenue. Also, as lessors, in the name of the state, there are other subjects who have ownership of commercial premises which they do not use to carry out their own activities (for example, the Ministry of defence has a large number of commercial premises in the Belgrade area, in addition to a public company for the maintenance of air-raid shelters). There are still also non-privatized companies which appear on the market offering their available commercial premises.

With regard to companies, those who most commonly appear as renters are once state-owned and now private companies which have significant assets (in the form of buildings, offices and retail premises), either owned by them directly, or in their possession on a different basis (right of use, long-term lease etc.). Of course, although to a lesser extent, companies do lease out commercial property which came into their possession either by means of construction or purchase.

There are also private individuals who rent out commercial space, thus creating additional income for themselves. Most commonly this is by means of the owner constructing a property, one part of which (usually on the ground floor) takes the form of business or retail premises. In the coming period, it will become more and more common for private individuals to lease properties on the market due to the new restitution law, which when applied will result in a large amount of property, currently owned by the state, being returned to the descendants of those from whom it was confiscated or nationalized.

The purpose of this paper is the classification of commercial space into qualitative levels, in order for the decision maker to make an easier choice in this area. The ELECTRE 1 multi-criteria decision making method, which allows the grouping of alternatives into levels, was used in solving this problem.

2. METHODOLOGY

The ELECTRE 1 multi-criteria decision making method was used for grouping the (commercial space) alternatives into qualitative levels (Anić&Larichev, 1996; Bojković, Anić&Tarle, 2010).

ELECTRE is a group of multi-criteria decision making methods that originated in Europe in the mid-1960s. ELECTRE is an acronym of the French words *E*limination *E*t *C*hoix *T*raduisant la *R*éalité. This approach was first introduced to the theory of decision making by the French mathematician Bernard Roy, along with his colleagues in the consultation company SEMA (Roy, 1968; Kini&Raifa, 1981). The need for such a system of multi-criteria analysis arose because of the unavoidable risk in conventional methods of analyzing usefulness functions. By using ELECTRE methods, the subjectiveness of the decision maker is to a great extent eliminated. These methods gained particular significance in the 70s after psychological research gave preference to qualitative methods (Larichev, 1992; Slovic, Kahneman & Tversky, 1982). Due to their widespread application, ELECTRE methods were later developed in different directions, resulting in the variations ELECTREI, ELECTREII, ELECTREIII, ELECTREIV, ELECTREIS, ELECTRETRI and others.

Labels and Hypotheses

The alternatives to be studied will be known as: A_1, A_2, \dots, A_n . Let them be ranked according to the criteria K_1, K_2, \dots, K_m with weights $\omega_1, \omega_2, \dots, \omega_m$ and scoring scale I_1, I_2, \dots, I_m . Each scoring scale is a subset of the set of natural numbers and their cardinal numbers are: $|I_1|, |I_2|, \dots, |I_m|$. The scoring of the alternatives will be labelled as $a_{1k}, a_{2k}, \dots, a_{nk}$ by the k criteria.

We now consider two alternatives with indices i and j introduce the following signs: $K_{ij}^+ = \{k \mid a_{ik} > a_{jk}\}$, $K_{ij}^- = \{k \mid a_{ik} < a_{jk}\}$, $K_{ij}^= = \{k \mid a_{ik} = a_{jk}\}$

Concordance and discordance indices

In ELECTRE methods, the arguments in favour of the hypothesis that alternative is better than alternative B are included in the so-called index of agreement with that hypothesis, that is, with the concordance index. In the original ELECTRE 1 method the concordance index takes into account the set of criteria by which alternative A is not ranked below alternative B . In this paper, a modification of the ELECTRE 1 method is used (Anić&Larichev, 1996; Bojković, Anić& Tarle, 2010) in which the definition of the concordance index only takes into account criteria in which alternative A is better than alternative B .

Thus, let A_i and A_j be the alternatives which we are comparing. Then the index of agreement with the hypothesis that A_i is better than A_j is defined by the equivalence

$$C_{ij} = \frac{\sum_{k \in K_{ij}^+} \omega_k}{\sum_{k=1}^m \omega_k}$$

What is new in the ELECTRE methods is the principle that a hypothesis for which there is a high enough agreement index is not accepted if there is strong opposition to that hypothesis. The reasons for not accepting the hypothesis are contained in the so-called disagreement or discordance index.

If we examine the hypothesis that alternative A_i is better than alternative A_j we define the disagreement index with this alternative by means of the following relation

$$d_{ij} = \max_{k \in K_{ij}^-} \frac{a_{jk} - a_{ik}}{|I_k|}$$

We also introduce thresholds of agreement and disagreement. They are, in order, numbers p and q so that $0 < q < p < 1$. We will say that the i -th alternative is better than the j -th if it is true

that $C_{ij} \geq p$, $d_{ij} \leq q$. We will mark this with $A_i \succ A_j$. In this way we form a relation between the alternatives. In the original ELECTRE 1 method, this relation is not transitive; what is more, cycles can appear. Modification of the use here gives a relation of strict partial order, which enables the alternatives to be grouped into qualitative levels. This is contained in the following theorem:

Theorem 1 (Anić, Laričev) If the parameter p is chosen so that $p > \frac{l_{ij}}{l_{ij} + 1}$ where $l_{ij} = \frac{d_{ij} \sum_{k \in K_{ij}^+} \omega_k^*}{\sum_{k \in K_{ij}^+} \omega_k^* (a_{ik}^* - a_{jk}^*)}$ for

each i and j then the relation \succ is transitive.

One alternative of which there is none “better”, that is, the maximal elements of the relation \succ are the so-called core of the relation.

Multi-level outranking

The logic behind the performance-level construction is in the specific iterative procedure, which involves repeated identification of preferable alternatives. Namely, in the first stage, the alternatives from the core subset are identified. These are the first-level alternatives and they are not out-dominated. Subsequently, the alternatives from the core subset are excluded and the method is again applied to the remaining alternatives. The new core subset consists of the second-level alternatives. These alternatives are out-performed only by some alternatives from the first level. The procedure is repeated until a core is a non-empty set. The number of iterations corresponds to the number of levels. The mathematical expression of the levels construction is described below.

The definition of the levels is inductive: the first level L_1 consists of the alternatives from the core subset. The alternative A_i which is outside the core subset, belongs to the level L_k if $\max\{t \mid (\exists A_j \in L_t) A_j \prec A_i\} = k - 1$ is fulfilled. This upgrade of the outranking relations, i.e. introduction of the levels in a qualitative way, has several advantages over the classical determination of the levels based on quantitative evaluation.

3. SELECTION OF CRITERIA FOR DECISION-MAKING

Foreign companies, when selecting the commercial space in which they will begin their business, as a rule, and as the key factor, take into account the location of the subject property. If they are in the retail business, the favoured locations are streets and squares with a high flow of pedestrians. In Belgrade this would be Knez Mihajlova street, as well as Kralja Aleksandra boulevard, Kralja Milana street etc. However, if the business in question is some kind of manufacture or craft, priority is given to locations with easy access for delivery vehicles.

After the locality, great importance is placed upon legal assurance, in terms of the long-term planning of the business in a particular location. This, above all, relates to the secure and long-term lease of the chosen property. In Serbia, the highest degree of legal assurance is gained from leasing commercial space in public ownership. Namely, after concluding the lease agreement, according to pre-determined criteria and conditions, the public company which leases the commercial space in public ownership takes care of collecting the public revenue, in which security of tenure (on the side of the lessee) is ensured by regular payment of the agreed rent and respecting the contract provisions (prohibition of subleasing the property, conducting the specified activities, fulfilling maintenance obligations etc.). There is no danger that the owner (the state or local government), as is the case with individuals who lease commercial property, should decide independently to cancel the lease agreement and continue conducting the business that the lessee had developed. Public companies, acting on behalf of the state or local government, in accordance with the Law on public property, simply collect the revenue from the rent, without the legal possibility of carrying out any commercial activity in the property they are leasing out. Also, the price of leasing commercial property in public ownership is decided per square metre by the competent authority (the City Assembly of Belgrade, The Assembly of a city municipality etc.), at most once a year, so there is no danger, as there would be if the

property were in private ownership, of the owner regularly increasing the price if it is seen that the lessee is conducting successful business activities with a high volume of sales.

Because the mentioned restitution law has now come into force, by which a significant number of commercial properties, now in public ownership, will be returned to the original owners, the preferred choice for commercial space will be newly built properties, since they will not be the subject of restitution.

With regard to the area of renting commercial space from private individuals, the possible problem of legal uncertainty, in terms of cutting short the leasing agreement, changes in price or other conditions of use, can be prevented by signing a long-term lease agreement, with clearly defined bases for changes in the rent or unilaterally cancelling the agreement.

After selecting the location where the business will be conducted, as well as carefully studying the situation regarding the right of use for particular commercial properties, foreign investors take into account the structure and location of the premises they want to rent. Even if the commercial space is in a good location (for example in Knez Mihajlova) and is leased by a public company, the ability to successfully conduct commercial activity is significantly reduced if the premises are in a passage or are on a higher floor. The most suitable retail or catering facilities are those which are on the ground floor, which have large windows, and which open directly onto the pavement. The structure of the retail space is also important, since it is better to have a large sales area, as opposed to those premises which have a small sales area with large hallways, shared space and utility rooms.

An important criterion for choosing adequate commercial space is its condition. It is much easier to rent commercial space that is ready to use and in good condition, or which only requires a small amount of adaption in order to make it suitable for a particular business, as opposed to those premises which require a lot of intervention in order to maintain the investment.

The ideal commercial space, according to all of the above, would be that which meets the following criteria:

- It is situated in a good location (city centre or pedestrian zone),
- It is managed by a specialized company for leasing commercial space,
- It is situated on the ground floor, with large windows and an entrance directly onto the street,
- It is in good condition, i.e., it does not require any large investment in adaptations before the business can begin.

On the basis of this, the following criteria for decision making have been recognized

1. Zone (location) – This criterion is given the highest importance (weight 10). The ratings are from 1 to 7 and correspond with the zones in the city of Belgrade (7 is the most desired zone, and 1 refers to suburban residential areas).
2. Surroundings (position) – It is not only the location of the zone which is important when it comes to the position of commercial property, but also the actual position within that zone (building access, the elements surrounding it, orientation, ...). The rating is from 1 to 3, where 3 corresponds to the best position.
3. Legal status – The rating is from 1 to 3, where 1 is for a property owned by an individual, 3 is for publicly owned property and 2 is for all other (e.g. it is owned by a firm whose primary function is not leasing commercial space).
4. Commercial activity – The rating is from 1 to 4, where a rating of 4 is for retail space, 3 for craft space, 2 for office space and 1 for warehouse space.
5. Condition of the property – The rating is from 1 to 4, 1 being for neglected property, 2 for property which needs some adaption, 3 for space which needs no adaption and 4 for luxuriously equipped space.
6. The possibility of carrying out more activities – The rating is from 0 to 2, where 0 is for premises that cannot be adapted for any other function, 1 is for where significant investment is needed to adapt the space for any other function and 2 is for commercial space which is easily adaptable for different purposes.
7. Storey – A rating of 3 is for space on the ground floor, a rating of 2 is for that which is partly on the ground floor, and partly on the lower ground or first floor, and a rating of 1 is for a property which is completely on the lower ground or first floor.

8. Structure of the space – A rating of 1 is for poorly structured space, 2 is for a medium structure and 3 is for property with a structure which completely fulfils its required function.

4. EXAMPLE – CLASSIFICATION OF COMMERCIAL SPACE IN BELGRADE

This section contains an actual example of how the ELECTRE MLO method classifies the alternatives into qualitative levels. In the example, 12 commercial units in the wider centre of Belgrade are considered. Table 1 shows how the alternatives are rated according to the criteria given in the previous paragraph.

Table 8: Scores of alternatives

Title	Weight	Ranking scale	CS1	CS2	CS3	CS4	CS5	CS6	CS7	CS8	CS9	CS10	CS11	CS12
Zone (location)	10	1- 7	6	6	6	6	6	4	5	7	7	5	6	4
Surroundings (position)	5	1-3	2	3	1	2	3	2	3	3	2	3	3	2
Legal status	8	1-3	1	3	3	1	3	2	3	3	1	3	3	2
Activity	5	1- 4	4	4	4	4	2	4	3	4	4	4	4	4
Condition of property	3	1- 4	4	2	3	3	2	3	3	3	3	2	2	2
Possibility for change of use	2	0- 2	1	0	0	0	0	2	1	2	0	2	2	2
Storey	2	1 - 3	3	3	2	3	2	2	3	2	3	3	2	2
Structure of space	2	1- 3	3	3	2	2	3	1	2	2	2	2	2	3

By applying the ELECTRE MLO method with the thresholds $p=0,6$ and $q=0,4$ the following multi-level graph of the preference relations between the alternatives is obtained, shown in figure 1.

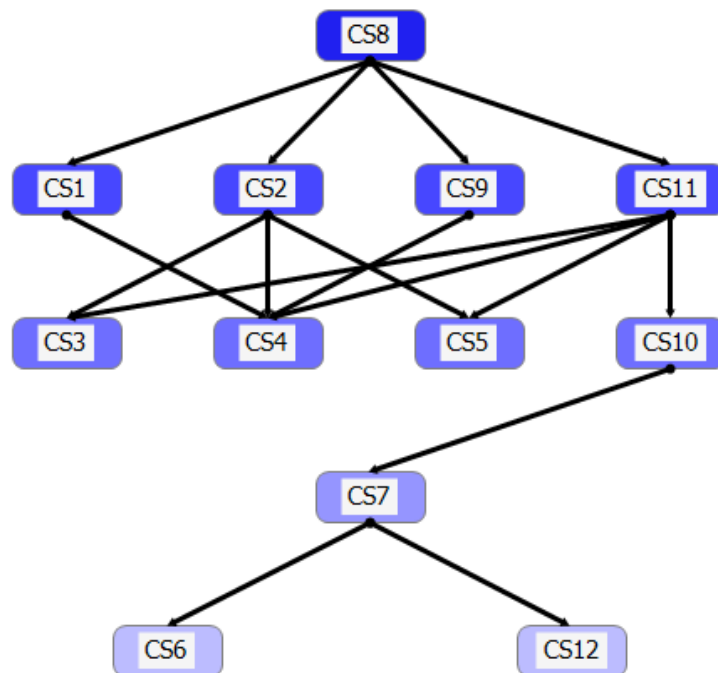


Figure 2: Multilevel graph of the preference relations between the alternatives

It can be clearly seen from the multi-level graph that on the first level is commercial space number 8. That is the space with the best characteristics from the luxury zone. On the second level are those facilities of which only CS8 is better, which are commercial spaces 1,2, 9 and 11. These four commercial spaces cannot be compared with each other, which is one of the characteristics of the qualitative method in multi-criteria decision making, i.e., the relation created here is not linear but partial order. Simply, the other levels differ, too.

The decision maker in this situation has a clear picture of the qualitative levels on which the commercial premises are found. The price of leasing commercial space from state firms is fixed within each zone. In this paper, the zone in which the commercial space is situated is the criterion with the greatest weight, but alongside it are other criteria which are important for making a decision, so that if a lessee decides to lease commercial space from a state firm, the choice should be made from those on higher levels, but in the same zone. So, for example CS9 is in an excellent location, but due to its other characteristics it is not on the level above 1,2 and 11 which are in zone 6. Commercial space CS8 which is found in the same zone is a better choice.

6. CONCLUSIONS

In this paper is a presentation of how using the qualitative ELECTRE 1 method of multi-criteria decision making, that is its modification which enables the classification of alternatives into levels, successfully solves a practical problem of choice. It is unlike the quantitative approach, in which each alternative, in this example commercial space, is assigned a number which indicates its value and where there is the possibility of a particular commercial property being very bad according to some of the criteria, but to be highly ranked anyway. In the qualitative approach described here, that kind of space will remain incomparable with others.

The modification of the ELECTRE 1 method which was used in this study establishes a relation of strict order which enables the distribution of alternatives according to levels. These levels are natural, i.e. the alternatives on the same level cannot be compared with each other, which is not the case with the quantitative approach, so this characteristic can be taken as an advantage of the qualitative approach.

This paper proposes the classification of commercial space, not only according to the zone in which it is situated, but also according to other market characteristics. The expert system which is offered can be of significant help to lessees of commercial space, especially in a situation where there are many offers available.

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MULTI-CRITERIA ANALYSIS IN THE SELECTION OF ECONOMICALLY MOST ADVANTAGEOUS TENDER FOR PUBLIC WORKS

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Abstract: *By virtue of the 2008 Decree V, the EU set the conditions for awarding public works contracts, suggesting optimal criteria of the economically most advantageous tender. The establishing of the economically most advantageous tender is based on the plurality of integrated evaluation criteria which imply solving the problem of comparison among the same criteria due to different quantitative or qualitative units of measurement, such as are the complex operations of a realistic tender evaluation. In order to facilitate the work of bodies deciding on awarding a certain concession or public works, in applying this criterion in public tendering and procurement procedures, it was decided to develop guidelines offering information on legal and operational aspects of the most problematic criteria in awarding such contracts. This paper is aimed at highlighting the role of the multi-criteria analysis method in making a decision on the selection of public work contractors on the grounds of economically most advantageous bid. In order to make the evaluation method transparent, consistent and controlled, so as to be able to identify among the alternatives of proposed projects the ones which are the most suitable and which meet the needs of the contracting authority, the multi-criteria decision-making method is used.*

Keywords: *multi-criteria, tender, public works*

1. INTRODUCTION

The Legislative Decree of the European Communities of 12 April 2006 number 163 and the subsequent amendments (hereinafter: the Code), in line with the EU practice, established that there is full equality and fairness between the two criteria when selecting the economically most advantageous tender. This has liberalized the selection of criteria and decisions of bodies with contracting powers, which by extension means that it is an independent decision which type of procedure will be conducted.

In inviting tenders for project development it may involve:

- total project development,
- execution of works only, or
- granting concessions to private companies for a certain period of time.

In order to save time and money, an administrative body inviting tenders for public works frequently instead of inviting tenders for each of the above three elements, does so by seeking entities able to implement all three. This means that the tenderers should be capable of developing a project from its design stage over implementation to its operation and maintenance.

However, given the special procedure for awarding public work concessions, as referred to in Article 142 and onwards, and in project financing, by virtue of Article 153 and other legislative acts 163/2006, given the specific nature of contract and type of services awarded to a private company, the same body introduced the obligation on the part of the body with contracting authorities (the decision-maker) to use the criterion of the economically most advantageous tender.

Such a choice is based on the fact that the economically most advantageous tender enables awarding public contracts not purely on quantitative economic evaluation. It is highly suitable since by a complex integration of economic data, of technical and quantitative nature, it gives the possibility of selecting a private contractor and contract awarding, such as public work concessions, in which contracted services include also work design, its performance, and execution through functional and economic management.

This criterion is characterized by greater flexibility, thus enabling the tendering companies to better express their innovativeness, and thus increase their competitiveness, even as regards addressing the needs of the contracting authority (concession grantor).

Establishing the economically most advantageous tender is based on the plurality of integrated evaluation criteria implying the need to address the problem of comparisons among the same criteria, due to different quantitative or qualitative units of measurement, such are complex real tender evaluation operations.

By the Decree number 5 from 2008, the EU authorities defined the terms for awarding public works contracts, proposing the use of economically most advantageous tender as the optimal criterion.

In order to facilitate the work of the contracting authority for a certain concession or public works, in applying this criterion in public contracts and supplies as referred to in Article 13 of the Code, the designated authority, after hearing the relevant institutions and interest groups, decided to draft guidelines offering information on legal and operational aspects of the most problematic criteria for awarding such contracts.

The analysis of some of the most relevant “multi-criteria decision-making” methodologies towards identifying economically most advantageous tender in the tendering process for all three stages is attached to the document. Based on the above, the EU Council supports the guidelines: “for the application the criteria of economically most advantageous tender in procedures envisaged in Article 153 of the Code”.

The economically most advantageous tender, as mentioned earlier, is based on the plurality of evaluations, given the nature, purpose and features of specific contracts. Article 83.1 of the Code briefly illustrates such criteria.

2. METHOD FOR DECISION MAKING

The contracting authority, seeking to protect the public interest, has a wide discretion in selection of tender evaluation criteria. Thus, the authority may focus on evaluation of criteria relevant from aesthetical point of view more than, for instance, maintenance or efficiency, service management, etc, or even the use of environment-friendly technologies, since the tender may be aimed at meeting specific and anticipated goals.

However, this freedom of choice on the part of the contracting authority must be balanced to ensure the observance of the principles of transparency, non-discrimination, equal treatment, and avoid any risk of abuse.

To that effect, transposing the established EU principles, the selection of evaluation criteria remains a task, although ultimately discretionary, which is strictly controlled by the methodology, in the sense that the contracting authority is obliged to give a clear account of its own choices in the tender dossier, and thus it is “self-binding” for evaluation of future tenders based on the established objective criteria.

The same freedom enjoyed by the contracting authority is seen in the selection of criteria, hence even in weight quotients (“weight quotients” or “score”). Each criterion is assigned the level of importance regarding the goals aspired by the project. “Weight quotient” or a “score” is posted in the tender announcement for each criterion and is publicly available. The Decree no 554/99 stipulates the total sum of “weights” or “scores” awarded to criteria in a tender and it must equal 100. In essence, a “weight” or a “score” reflects the relative importance of certain elements (technical solution, price, maintenance, etc) that the contracting authority considers important in deciding on the final tender evaluation.

As for the selection of “weights” or “scores” awarded to each criterion, the discretion of the contracting authority is, according to the case law, the sole limit or “reflection of irrationality” on the distribution of results given the purpose. This presumption may affect the legitimacy of the tender procedure when, for instance, a certain score is awarded to a certain element or a criterion which is of such weight that all other criteria, by comparison, do not have any special or vital importance, i.e. a large score is awarded to one sole evaluation criterion which is of such weight that practically all others become superfluous.

The complexity of selecting evaluation criteria, possible division of criteria into sub-criteria and awarding of relative “weights” or “scores” have guided the legislator to ensure fairness in Article 83(4) of the Code with the possibility of designating one or more experts that may be entrusted with the identification of such elements.

In an appendix to these guidelines, a methodology is considered which, although with discretionary assessments, aims at directing the contracting authority towards the identification of weight quotients in line with the goals to be pursued.

In order to make the evaluation methodology transparent, consistent and controlled, so that among the alternatives of proposed projects it is possible to identify those best suiting and fulfilling the needs of the contracting authority (Annex B to the EU Directive 554/1999), the possibility of using certain methods, the so-called “multi-criteria decision-making” methods, is given.

The need to use the scientific methodology of “multi-criteria decision-making” stems, as already stated, from two important reasons, which are as follows: the aggregate assessment referring to criteria expressed in different measures and measurement units should be done, preventing mutual comparisons of tenders (such as price, time, technical capabilities), and on the other hand, different weights, i.e. *importance* which the contracting authority awards to certain criteria should be taken into account.

The **multi-criteria decision-making** methodology is a system to support decision-making, i.e. tools enabling explanation of preferences in order to intentionally achieve the adoption of the appropriate solution for the problem.

It is usually stated in literature that multi-criteria decision-making does not aim at replacing human decision with fully automated decision-making tools, but to provide support to decision-makers that is under their full control, i.e. they are able to extend the analysis options, without imposing solutions and predefined choice.

In principle, the multi-criteria analysis is regarded as an “economic optimum” of Vilfredo Pareto, based on the assumption of taking into account the plurality of interests (criteria), many of which are conflicting. The “Pareto optimum” as a criterion offers indeed the plurality and comparability of goals, each of which has certain importance. Hence, it is intended to be of assistance to decision-makers in selection of the appropriate and consistent solution, based on the actual state of affairs, regarding the goals pursued and based on opportunities available (to that effect, these are called “*regulations*”).

Generally, literature explains that multi-criteria analysis has a multi-disciplinary approach, oriented towards problem analysis of modern technological society from different perspectives: economic, social, managerial, ethical and aesthetical. They intend to offer a reasonable basis for the problem of selection characterized by several criteria. The assumption is that in a societal context the goals (for instance, the urban infrastructure and services restoration project, labor market etc.) are characterized from the multidimensional profile, called “vector (w)” i.e. the element including all essential attributes for their full specification.

According to literature, the multi-criteria analysis methods may be classified into three sub-groups:

- a) multi-criteria methods developed primarily in the area of spatial planning, management and environmental management, by authors such as Nijkamp, Rietveld, Voogd, Hinloopen;
- b) methods developed in the area of Operational Research and Decision-making Theory by economists, mathematicians, statisticians and psychologists, such as: Keeney and Raiffa, Roy, Miles, (value analysis) etc.;
- c) hierarchical methods based on basic mathematical principles and axioms (pair-wise comparisons, priority synthesis) and self-evaluation and self-assessment techniques developed mostly by Saaty and Vargas.

According to P. Nijkamp and H. Voogd, the multi-criteria analysis techniques may be categorized among those suitable for evaluation of alternatives changed in a continuous way and those suitable for evaluation of alternatives changed discretely. In addition, they may be classified into those in which the alternatives are characterized by only quantitative or only qualitative data or mixed ones. In case of contracts and concessions, only the multi-criteria analysis techniques which evaluate alternatives characterizing mixed data are appropriate.

The EU Directive 554/99 proposes the use of multi-criteria analysis methods in determining the economically most advantageous tender with the possibility of using any of the methods found in literature. Nevertheless, some are recommended, including: “aggregate compensator” or “weighted amount” method, ELECTRE method, “analytic hierarchy process” (AHP) method, “evamix” method, “technique for order preference by similarity to ideal solution” (TOPSIS) method.

All methods are based on evaluation criteria of weighted quotients or scores awarded to each criterion. For the proper use of methods, it is noteworthy that there is a clear difference between the tender features with which the authority believes to identify the economically most advantageous tender (e.g. price, time of execution, technical and aesthetical advantage, operation or maintenance costs) and weights or scores, i.e. the numerical data of evaluations, expressing the degree of importance of some element in relation to the overall evaluation. These are designed so as to guarantee the ratio between price, quality and technical aspects as essential elements for the contracting authority stipulated in the call for proposals.

Each method, starting from the set criteria and weights, develops a special procedure for determining the best tender.

The evaluation criteria, considered necessary for determining the economically most advantageous tender, must be established based on thorough analysis of contents of public project dossier (feasibility study) so as to anticipate allowable changes in the tender.

Essentially, it is necessary to mark also the functional goals important for the contracting authority in order to provide to the tenderers full and accurate information for completion of tender.

Considering the criteria stipulated in the Code, the table 1 contains several elements indicating their nature (quantitative and/or material or qualitative and/or non-material) whose goal is to reduce or increase.

Table 1: Elements indicating their nature (quantitative and/or material or qualitative and/or non-material) whose goal is to reduce or increase

Evaluation criteria	Nature		Goal	
	Measurable	Immeasurable.	Measurable	Immeasurable.
a) price	X		X	
b) shortened time	X			X
c) quality		X		X
d) technical advantage		X		X
e) aesthetical and functional characteristics	X	X		X
f) environmental qualities and reduced consumption of energy and other resources towards environmental protection	X	X	X	X
g) operation and maintenance costs	X		X	
h) profitability	X			X
i) after-sale services	X	X		X
j) technical support	X	X		X
k) delivery or hand-over date	X		X	
l) responsibility for spare parts	X			X
m) security of supply	X			X
n) concession period	X		X	
o) management support		X		X
p) level and criteria for price adjustment borne by the user	X		X	
r) preliminary draft		X		X
s) economic and financial value		X		X

3. FLOW CHART – ECONOMICALLY MOST ADVANTAGEOUS TENDER

The multi-criteria decision-making methods described in the Directive currently in force in EU, as well as those in new decree no 163/06 are the following: aggregate compensator, ELECTRE methodology, such as the analysis hierarchy process (AHP) methodology, Evamix methodology, methodology of preferences as per similarities to ideal solution (TOPSIS).

In aggregate compensator, the alternatives are classified according to the total score as a weighted sum of values of the tender features. ELECTRE methodology is based on indexes of appropriateness or inappropriateness of the tender characteristics, as well as limit values of appropriateness and inappropriateness. There are several versions of this method. The AHP method is based on prioritizing evaluation criteria by performing pair-wise comparisons at each hierarchical level, as well as the reconstruction of decision-making problem. In the TOPSIS method, alternatives are ranked as per the criterion of minimum distance from the “ideal” desired solution and maximum distance from the worst “ideal” solution.

This paper does not aim at presenting methods so no further details of different methods will be presented here. We will briefly present an illustrative example of problem-solving by using TOPSIS method.

Table 2: Stages of tender analysis may be shown as follows:

Stage one: Transform entry tender parameters by variable quotients between zero and one.		
<div> <div> <p>The evaluation criteria and sub-criteria of qualitative nature (good-quality design, quality of service) are conducted using any of the procedures (should be stated in the tender dossier)</p> <p>a) pair-wise comparison is based on comparison with the data of the main contractor in the comparison matrix;</p> <p>b) pair-wise comparison based on guidelines;</p> <p>c) discretionary awarding.</p> </div> <div> <p>Aiming for a proper definition of the dossier quotient, the criteria need to be stated which determine it (the rules must state, for instance, that the quotients are determined based on discretionary right).</p> </div> </div>		
<p>Quantitative evaluation criteria and sub-criteria (price discount, price, concession period, etc) are determined using mathematical formula (should be stated in the tender dossier):</p> <p>a) the quotient equals one for the most advantageous tender;</p> <p>b) the quotient equals zero if the set value equals the value given in the tender;</p> <p>c) the quotients ranging from zero to one for various tenders obtained by linear interpolation between the two values (the most advantageous and the value given in tender).</p>		
<p>Assuming that percentage-wise decrease is accepted as tender, the values in the formula corresponding to that principle would then be: (offered decrease/ maximum possible decrease); however, the inverse formula (maximum offered decrease/ offered decrease) would not correspond to the principle.</p> <p>Both formulas are fractions, (a/b), but the first envisages that the (a) numerator is a variable, and (b) the denominator a fixed value so as to form linear dependency; the other, however, envisages that (a) the numerator is a fixed value, and (b) the denominator is a variable value, i.e. not a linear function, but an asymptotic function on Cartesian axes x and y.</p>		
<p>Stage two: determining the economically most advantageous tender using the methodology stated in the tender dossier that should be some of those stated in the Annex to the EU directive 554/1999;</p> <p>The economically most advantageous tender is established based on quotients awarded (varies between zero and one) (after division into criteria and sub-criteria - reparameterization). Reparameterization implies that the competitor (tenderer) is awarded a quotient based on weighted sum of quotients of criteria and sub-criteria; quotient one is awarded to the competitor where the offered amount is maximum, and others are determined linearly in proportion to the sum for each evaluation criterion.</p>		
<p>METHOD: TOTAL COMPENSATOR</p> <p>Ranking is decided using the following formula:</p> $P_i = C_{ai} \cdot P_a + C_{bi} \cdot P_b + \dots + C_{ni} \cdot P_n$ <p>where:</p> <p>P_i – is the competitor score;</p> <p>C_{ai} – is quotient criterion a of competitor i;</p> <p>C_{ni} = quotient of criterion n, of competitor i;</p> <p>P_a – weight criterion a;</p> <p>P_n – weight criterion n</p>	<p>ELECTRE</p> <p>Ranking is decided based on the procedure described in Annex to the EU Directive EU 554/1999, which starting from quotient matrix determines:</p> <p>a) differences among quotients;</p> <p>b) weighted indexes;</p> <p>c) unique dominant indicators;</p> <p>d) tender evaluation based on dominant indicators.</p>	<p>TOPSIS</p> <p>Ranking is determined based on calculation of quotient matrix of weighted quotients which gravitate to the ideal and non-ideal solution and identification of tender which is closest to the ideal solution, i.e. the one most distant from the non-ideal .</p>

4. ILLUSTRATIVE EXAMPLE

TOPSIS is a method of multi-criteria optimization. Its name is an acronym for *Technique for Order Preference by Similarity to Ideals Solution*, which means *a technique for confirmation of priority solutions based on similarities towards ideal solution*.

The application of this method requires making a matrix from “I” variants and “k” criteria. Every criterion is joined by certain weight coefficient w_k , where $k=1,2,\dots,K$. Then all criteria are sorted into “benefit” and “cost” types, where the former are maximized and the latter are minimized.

Input data:

	Reliability	Number of functions	Delivery time	Outlook	Price	Service and maintenance	Technical characteristics
WB	2	2	2	1	3	3	3
CB : 1 – max, 0 - min	1	1	1	1	0	1	1
Bidder 1	40	11.6	17	450	0.6	1	3
Bidder 2	45	16.5	15	134	0.7	6	5
Bidder 3	45	17.4	34	120	1	12	6
Bidder 4	35	15	17	310	0.3	1	5
Bidder 5	35	9	15	500	0.4	1	3

WK1	0.12500	0.12500	0.12500	0.06250	0.18750	0.18750	0.18750
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SUM	90.00000	31.86801	46.73329	762.20470	1.44914	13.52775	10.19804
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Concretely, TOPSIS method comprises the following steps:

Step 1:

$$r_{ik} = \frac{f_{ik}}{\sqrt{\sum f_{ik}^2}} \quad (1)$$

R(I,J)	0.44444	0.36400	0.36377	0.59039	0.41404	0.07392	0.29417
	0.50000	0.51776	0.32097	0.17581	0.48305	0.44353	0.49029
	0.50000	0.54600	0.72753	0.15744	0.69007	0.88707	0.58835
	0.38889	0.47069	0.36377	0.40671	0.20702	0.07392	0.49029
	0.38889	0.28241	0.32097	0.65599	0.27603	0.07392	0.29417

A matrix from “i” variants and “k” criterion which has to be normalized is formed, i.e. all its values have to come to an interval between 0 and 1. In that way, dimensionless quantity is provided. Step 2: in step 2 all values of the normalized matrix have to be multiplied with adequate weight coefficient w_k which are subjectively selected and normalized (2).

$$v_{ik} = \|w_k^{-1} \cdot r_{ik}\| \quad (2)$$

V(I,J)	0.05556	0.04550	0.04547	0.03690	0.07763	0.01386	0.05516
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The two quoted steps represent pre-processing of the task.

Step 3: Within this step, ideal and anti-ideal points I^* and I^- have to be defined, depending on the use of either criterion “benefit” or “cost” type (3 and 4). An ideal point has maximal value by all criteria of “benefit” type, and minimal value by all criteria of “cost” type.

$$I^* = \left\{ \max_i v_{ik} \mid k \in K_{\max}, \min_i v_{ik} \mid k \in K_{\min} \right\} = v_k^* \quad (3)$$

IZ(1,J)	0.06250	0.06825	0.09094	0.04100	0.03882	0.16632	0.11032
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An anti-ideal point has maximal value by all expenditure criteria, and minimal value by all income criteria.

$$I^- = \left\{ \min_i v_{ik} \mid k \in K_{\max}, \max_i v_{ik} \mid k \in K_{\min} \right\} = v_k^- \quad (4)$$

IZ(2,J)	0.04861	0.03530	0.04012	0.00984	0.12939	0.01386	0.05516
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Step 4: the point closest to the ideal one, and at the same time farthest from the anti-ideal point, is searched within this step.

$$S_i^* = \sqrt{(v_{ik} - v_k^*)^2} \quad (5)$$

$$S_i^- = \sqrt{(v_{ik} - v_k^-)^2} \quad (6)$$

Si*	SI*						
	0.00005	0.00052	0.00207	0.00002	0.00151	0.02325	0.00304
	0.00000	0.00001	0.00258	0.00090	0.00268	0.00692	0.00034
	0.00000	0.00000	0.00000	0.00097	0.00820	0.00000	0.00000
	0.00019	0.00009	0.00207	0.00024	0.00000	0.02325	0.00034
	0.00019	0.00109	0.00258	0.00000	0.00017	0.02325	0.00304

Si	SI						
	0.00005	0.00010	0.00003	0.00073	0.00268	0.00000	0.00000
	0.00019	0.00087	0.00000	0.00000	0.00151	0.00480	0.00135
	0.00019	0.00109	0.00258	0.00000	0.00000	0.02325	0.00304
	0.00000	0.00055	0.00003	0.00024	0.00820	0.00000	0.00135
	0.00000	0.00000	0.00000	0.00097	0.00603	0.00000	0.00000

Step 5:

$$C_i = \frac{S_i^-}{S_i^* + S_i^-} \quad (7)$$

	SOLUTION
Bidder 1	0.25566
Bidder 2	0.44626
Bidder 3	0.64449
Bidder 4	0.38641
Bidder 5	0.32453

Here, relative closeness representing a compromise between the proximity of the ideal and the distance of the anti-ideal is calculated.

For the ideal point, the value of closeness equals one, and for the anti-ideal point, its value equals zero. As it is really rarity to obtain the ideal point, ideal solution C_i is usually between zero and one.

Step 6: in accordance with obtained results, i.e. with C_i , a range of variations is formed. The best is the one where C_i is closest to 1. The point is to find a point (solution) which is closest to the ideal and most distant from the anti-ideal.

5. CONCLUSION

Aiming for transparency, consistency and the ability to control awarding public project and public procurement contracts, awarding concessions and their subsequent operation, the EU authorities have set precise criteria of economically most advantageous tender, as well as the methodology for its evaluation. The multi-criteria optimization methodology is proposed. The reason is the existence of the plurality of integrated evaluation criteria. Hence, there is a need to address the problem of comparison between the same criteria, different quantitative or qualitative units of measurement. The paper fundamentally aims at highlighting the role of multi-criteria analysis in making the decision on the selection of the economically most advantageous tender. In essence, the literature explains that the multi-criteria analysis has a multidisciplinary approach oriented at analyzing the problems of a modern-day technological society from various perspectives: the economic, social, management, ethical and aesthetic.

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AN APPLICATION OF LATTICE MCD-METHOD

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Abstract: *In this paper we will present one new method, the lattice method, which is developed by Žižović M. et al. (2011), and we will point to the application of the obtained method in one practical example of buying a car for a small private company.*

Keywords: *alternative, criteria, multi criteria analysis, lattice method.*

1. INTRODUCTION

Nowadays, there are a number of developed methods and techniques for multi criteria optimization (multi criteria analysis). If you ask an analyst who deals with this issue which of these methods is the best, you can get different answers depending on the type of the problem that is to be treated, as well as the type of solution that is required. On the other hand, if the same analyst is asked to recommend some method, then the answer could be similar as the answer to the previous question, but the best answer is to propose the method that can best be perceived by both the analyst and the decision maker.

In general, there exist two distinctive types of MCD problems due to the different problems settings: one type having a finite number of alternative solutions and the other type having an infinite number of solutions. In problems associated with selection and assessment, it is naturally assumed that the number of alternatives is limited. So, our focus will be on the problems with a finite number of alternatives. In that case, a MCD problem may be described using a decision matrix. Suppose there are m alternatives to be assessed based on n criteria, a decision matrix is a $m \times n$ -matrix with each element a_{ij} being the j -th criteria value of the i -th alternative.

All criteria in a MCD problem can be classified into two categories. Criteria that are to be maximized, for example the profit criteria category, and criteria that are to be minimized, for example the cost criteria category. An ideal solution to a MCD problem would maximise all criteria of the first type and minimise all criteria of the second type. In a natural way, any criterion of the second type can be transferred into a criterion of the first type.

Although MCD problems could be very different in context, they share the following common features: multiple criteria often form a hierarchy and criteria can conflict with one another. Due to lack of information, the conflict among criteria, the uncertainties in subjective judgment and different preferences among different decision makers, the final assessment results may not be conclusive. There are many methods available for solving MCD problems, and for an overview we refer to Hwang C. L. and Yoon K. (1981), and Radojičić M. and Žižović M. (1998).

Recently, the lattice MCD-method is introduced by Žižović M. et al. (2011). This new method is close to the category of compromising ranking methods, but it differs significantly from it. The compromising method first normalises the decision matrix of a MCD problem. Then based on the normalised decision matrix, it calculates the weighted distances of each alternative from an ideal (best) solution and a nadir (worst) solution. A solution relatively close to the ideal solution and far from the nadir solution is evaluated to be the best choice. The lattice method is also based on weighted distances of alternative to the hypothetically best and the worst alternative, but it includes in calculating both the weight between alternatives and the weight of alternatives themselves. Some examples which confirm that lattice method and compromise ranking methods induce two different order relations on the same set of alternatives are given in the previously mentioned paper.

In case that we are dealing with relatively small number of alternatives, then the lattice method has quite nice graphical interpretation, and it can be successfully applied to many practical problems (see for example Žižović M. et al. (2011)b and Damljanović N. et al. (2011)). In this paper we will consider the car selection

problem for one small private company. First, in Section 2., we will explain the basic concept of lattice method, and then, in Section 3, we will apply this method in practical example.

2. THE NEW METHOD

In this section we will give a brief overview on notions, notations and main results concerning lattice method developed by Žižović M. et al. (2011), that will be used in further work. The main intention of the authors of mentioned paper was to propose the method for calculating the preference of one alternative over another, with respect to a given set of criteria, which would include in the preference both the difference between these alternatives and the values of alternatives themselves. In this way, we get fruitful and more accurate information on the observed alternatives and corresponding preference.

Let $A = \{a_1, a_2, \dots, a_m\}$ be the *set of alternatives* and let $C = \{c_1, c_2, \dots, c_n\}$ be the *set of criteria*. We will assume that, for any $i \in \{1, 2, \dots, m\}$, the alternative a_i is represented as n -tuple $a_i = (a_{i1}, a_{i2}, \dots, a_{in})$, or equivalently $a_i = (a_{ik})_{k=1}^n$, where each coordinate a_{ij} , for $j \in \{1, 2, \dots, n\}$, is non-negative real number which can be interpreted as the degree to which the alternative a_i satisfies the criterion c_j . Also, we will assume that all members of the set A are mutually incomparable under standard order relation on A^n .

We will assume that all criteria don't have to be of the same importance and that the decision makers are aware of the degree of importance of each criterion. In other words, we will assume that each criterion c_k , $k \in \{1, 2, \dots, n\}$ is associated with a number $z_k \in (0, 1]$ that represents the degree of importance of that criterion.

Also, for each criterion, we will consider the function that measures the importance of the difference between two given alternatives, i.e., we will consider the specific functions $Z_k : A \times A \rightarrow [0, +\infty)$, for each criterion c_k , $k \in \{1, 2, \dots, n\}$, which joins a nonnegative real number $Z_k(a_i, a_j)$ to each pair of alternatives $a_i, a_j \in A$.

Now we will create two new sets of hypothetical alternatives. These new alternatives will be used as tools in calculation that will be preformed. So, for a given set of alternatives $A = \{a_1, a_2, \dots, a_m\}$, we define the sets \bar{A} and \underline{A} in the following way:

$$\bar{A} = \left\{ \left(\max_{i \in J} a_{ik} \right)_{k=1}^n \mid J \in P(\{1, 2, \dots, m\}) \setminus \emptyset \right\},$$

$$\underline{A} = \left\{ \left(\min_{i \in J} a_{ik} \right)_{k=1}^n \mid J \in P(\{1, 2, \dots, m\}) \setminus \emptyset \right\}.$$

By definition, we have that the set \bar{A} with natural ordering $\leq_{\bar{A}}$ forms an upward semilattice with the greatest element $\max A$ which will be denoted by 1 and which will be called the *best alternative*.

Dually, the set \underline{A} with natural ordering $\leq_{\underline{A}}$ is an downward semilattice with the least element $\min A$ which will be denoted by 0 and which will be called the *worst alternative*.

Then, on the set $L = \bar{A} \cup \underline{A}$, we can define an partial order preserving the orders on \underline{A} and \bar{A} , i. e. for $a, b \in L$ if $a \leq_{\bar{A}} b$ then $a \leq b$ and if $a \leq_{\underline{A}} b$ then $a \leq b$. In fact, (L, \leq) is a partially ordered set regarded as the sum of lower and upper semilattice.

Let $a, b \in L$ be such that a is covered by b , i.e., let $a < b$. Then for every criterion c_k , $k \in \{1, 2, \dots, n\}$, we define the *preference of the alternative b over the alternative a with respect to the criterion c_k* as follows

$$\delta_k(a, b) = Z_k(a, b) \cdot \frac{b_k - a_k}{1_k - 0_k}.$$

Let $a, b \in L$ and let $P: a = p_1 \prec p_2 \prec \dots \prec p_j = b$ be a path in L from a to b . Then the *running preference of the alternative b over the alternative a with respect to the criterion c_k through the path P* is defined as follows:

If $\delta_k(p_i, p_{i+1}) = 0$ for all $i \in \{1, \dots, j\}$, then $\delta_k^P(a, b) = 0$, otherwise we put

$$\delta_k^P(a, b) = \frac{1}{\sum_{i=1}^{j-1} Z_k(p_i, p_{i+1})} \sum_{i=1}^{j-1} \delta_k(p_i, p_{i+1}),$$

which is equivalent to

$$\delta_k^P(a, b) = \frac{1}{\sum_{i=1}^{j-1} Z_k(p_i, p_{i+1})} \sum_{i=1}^{j-1} Z_k(p_i, p_{i+1}) \frac{p_{k+1,i} - p_{ki}}{1_k - 0_k}.$$

Starting with alternative a , the alternative b can be reached via several different paths in L with corresponding running preference weights, so we will define the *preference of the alternative b over the alternative a with respect to the criterion c_k* as follows:

$$\pi_k(a, b) = \max \{ \delta_k^P(a, b) \mid P: a \rightarrow b \}$$

and therefore, the *preference of the alternative b over the alternative a* can be regarded as n -tuple

$$\pi(a, b) = (\pi_k(a, b))_{k=1}^n.$$

The *distance of alternative $a \in L$ from the best alternative 1* is defined as

$$D_1(a) = \frac{1}{\sum_{k=1}^n z_k} \sum_{k=1}^n z_k \cdot \pi_k(a, 1),$$

and the *distance of the worst alternative 0 from alternative a* is defined as

$$D_0(a) = \frac{1}{\sum_{k=1}^n z_k} \sum_{k=1}^n z_k \cdot \pi_k(0, a).$$

Now, for two alternatives $a, b \in A$, we say that the alternative a *prefers* the alternative b if a is closer to the best alternative and the worst alternative is further of a , and we say that the alternative a is *indifferent* over the alternative b if they are equally distanced from the best and the worst alternative. Otherwise, we say that the alternatives a and b are *incomparable*.

This relation offers to a decision maker a graph in which some alternatives are comparable and some are not. This information can be useful in practical applications.

If the decision makers want to have a total order of alternatives than they can form following relation which gives full rank of alternatives, but this rank is poorer in the information and less realistic because it comes to balancing distances from the best and the worst alternative.

For $a \in A$, we define the *difference* as

$$D(a) = D_0(a) - D_1(a).$$

A total order of alternatives is defined as follows: for all $a, b \in A$, a *prefers* b if and only if $D(a) > D(b)$, and a *indifferent* b if and only if $D(a) = D(b)$.

3. MCD FOR THE PURCHASE OF A CAR

In this section we will apply the lattice method to the car selection problem for one small private company. We will observe the investments in core assets, i.e. the investments in movable durable goods. As alternative to own funds, the owner of the company has a bank credit and a financial leasing.

Analysis of interest for loans shows that car loans were by far the most sought in 2008. (31.4 percent), but in 2009 interest in auto loans began to decline (25.07 percent), and in the first half of 2010 tremendously dropped to 13.92 percent (this research is conducted by Internet portal www.kredit.rs).

When it comes to cash loans indexed in euros, the interest is almost equally to the car loans. These loans are attractive because they are unconditional, i.e. citizens receive cash and a procedure of approval is much easier and faster than other types of loans.

Financial leasing are often compared to bank loans, because they have some similar characteristics (in a predetermined repayment instalments, interest, method of recording accounting ...), but basically it differs from it because the lesser is the owner of the subject trough entire period of the lease contract and that subject is the instrument of collateral charges.

In this example, we are not going to observe the cost criteria, and we are looking for the best solution with respect to the strength and functionality, consumption of fuel and other expenses, price maintenance and safety of car failure. So, we are interested in buying the best posible car in the present moment.

We will assume that the owner of a private company has a certain amount of money available to be invested for the purchase of a car. So, using that assets he can buy a new small car for cash, or the same amount of money can be invested as a deposit in the bank for a credit intended for buying a new but larger car, or even larger car on leasing, or buying for cash even larger but used car, or the largest (and most expensive) used car on bank credit. Thus, the set of alternatives is given by Table 1.

Table 9: The set of alternatives

A	<i>Alternatives</i>
a_1	New car for cash
a_2	New car on credit
a_3	New car on leasing
a_4	Used car for cash
a_5	Used car on credit

The set of alternatives will be evaluated by the following set of criteria presented by Table 2. We will assume that all criteria are of the same importance, i.e. we will assume that $z_j = 1$, for every $j \in \{1,2,3,4\}$. Also, to each criterion c_j , $j \in \{1,2,3,4\}$, we associate the function $Z_j : A \times A \rightarrow [0, +\infty)$, that measures the importance of the difference between two given alternatives in a following way: for all $a, b \in A$, we put $Z_j(a, b) = 1$, if $a \neq b$, and $Z_j(a, b) = 0$, otherwise.

Table 2: The set of criteria

C	<i>Criteria</i>
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c_1	Strength and functionality
c_2	Consumption of fuel and other expenses
c_3	Price maintenance
c_4	Safety of car failure

For each $i \in \{1,2,3,4,5\}$ and $j \in \{1,2,3,4\}$, the degree to which the alternative a_i satisfies the criterion c_j is given by Table 3.

The values given in this table are compatible with the decision maker, i.e. the decision maker proposed these values that represents the degree to which alternatives satisfy the criteria.

Table 3: Degrees of satisfaction

	c_1	c_2	c_3	c_4
a_1	5	9	10	9
a_2	6	8	9	9
a_3	7	7	8	9
a_4	8	6	7	7
a_5	10	5	6	6

By the lattice method, starting with the set of alternatives, the lattice of new alternatives generated by the given ones is formed, and it is illustrated by Figure 1.

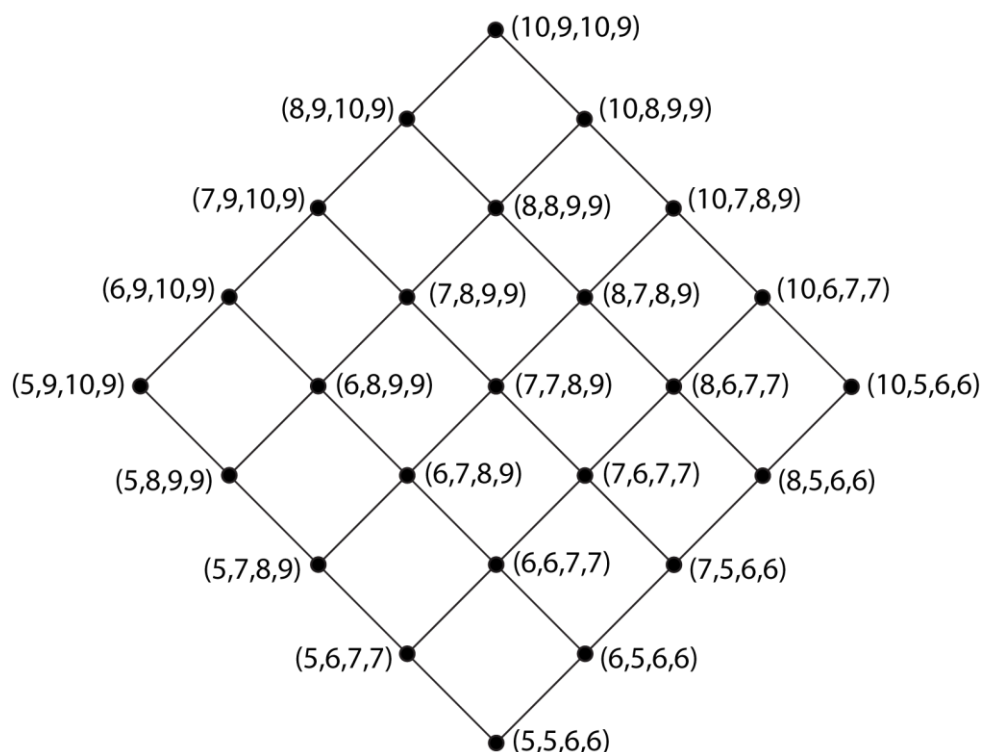


Figure 3: The lattice of new alternatives

As it can be seen from Figure 1, for each $i \in \{1,2,3,4,5\}$, all paths from alternative a_i to the top have the same length, and also all paths from the bottom to the alternative a_i have the same length (all these lengths are equal to 4).

Farther, for each $i \in \{1,2,3,4,5\}$, the distances of alternative a_i from the best alternative 1 and the distance of the worst alternative 0 from the alternative a_i are calculated, and thus we obtain the differences of each alternative a_i .

The obtained distances and differences are presented by Table 4.

Table 4: Distances and differences

	$D(a_i,1)$	$D(0,a_i)$	$D(a_i)$
a_1	0.1875	0.0625	0.1250
a_2	0.1688	0.0812	0.0876
a_3	0.1500	0.1000	0.0500
a_4	0.0894	0.1606	-0.0712
a_5	0.0625	0.1875	-0.1250

Now, it is easy to verify that lattice method provides linear ordering of alternatives in a following way.

$$a_1 \rightarrow a_2 \rightarrow a_3 \rightarrow a_4 \rightarrow a_5$$

So, the best solution for the owner of small private company is to buy a small car for cash, and the worst solution is buying a used car for a bank credit.

4. CONCLUSION

New method can be successfully applied to practical examples, and it is crisp in a relatively small number of alternatives. In case that the relative values of certain points are included, in other words, if they are different, then the decision maker preferences can be very good described. Namely, in that case calculating the preference of one alternative over another, with respect to a given set of criteria, include in the preference both the difference between these alternatives and the values of alternatives themselves.

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MULTICRITERIA DECISION MAKING IN FRUIT WINE EVALUATION

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Abstract: *This paper uses the SMART multicriteria decision making method for the evaluation of three fruit wines. Rating the entrepreneurial potential of production of fruit wines has been conducted considering the economic, market and technological criteria. Blackberry wine has achieved the best final score, primarily because of its greatest market potential and technological simplicity. At the same time, apple wine has shown the best economic efficiency, but with a very poor market identity and the highest technological demands. Cherry wine has achieved a better final score than apple wine, with a slightly worse economic performance. Furthermore, the ranking has been changed using different weights of criteria. In this situation, cherry wine has turned out to be the best option. The SMART method has proved to be a useful tool in business decision making providing more objectivity within the decision-making process in complex situations when alternative evaluation should be made based on mutually conflicting criteria.*

Keywords: SMART, multicriteria decision making, fruit wine, rating

1. INTRODUCTION

The most important entrepreneurial job in large part is to make decisions about the business. The entrepreneurs need the right decisions that will increase overall business potential of their company. They have to make decision on how to run their business so as to make a profit. They have to make choices on matters such as what they will produce, how they will produce it and how to finance the production. In order to start running a business, an entrepreneur must decide on what he is going to offer. It is not enough just consider the expected costs and income but also include all other factors that influence this decision. In this paper authors proposed a modern approach of deciding which fruit wine production offers the best entrepreneurial potential.

Production of fruit wines is very popular in the World with a long tradition. Market development of fruit wine varies from country to country with certain region distinctiveness of flavour or technology. Despite many advantages, the production of fruit wines in Croatia cannot be considered as a commercial activity. There are only a few fruit wine producers who succeeded to set up a serious fruit wine business, selling their fruit wine legally in grocery shops or HoReCa sector (abbreviation of the words Hotel/Restaurant/Café). Most of other manufacturers offer small quantities of fruit wines that are not legally regulated, mainly on green markets and fairs.

Since almost all kinds of fruits can be processed into fruit wine that option is definitely not exploited enough, while the economically it can be very attractive.

One of the reasons for small market share of commercial fruit wines production in Croatia is a lack of information about its economic effects, and weak consumer familiarity with this type of wine.

In the last few decades, computers and computers' models became an important tool in the modern agriculture production. Increasingly, farmers are implementing different complex computer models for solution of various planning problems. Hierarchical multi- criteria decision models (MCDM) are aimed at the classification and evaluation of objects defined in attribute-value space.

In this paper wine from blackberry, apple and cherry were evaluated using Simple Multi-Attribute Rating Technique (SMART). This technique belongs to Decision Support Systems (DSS) that is computerized information system which supports decision-making activities. As one of the simplest multicriteria decision making methods, SMART, in this paper, took in the consideration economic, market and technological features of this three fruit wines providing scientific and rational framework for the entrepreneurial orientation.

2. MULTICRITERIA DECISION MAKING METHODOLOGY

A decision is a choice out of a number of alternatives, and the choice is made in such a way that the preferred alternative is the "best" among the possible candidates. Multicriteria decision analysis (MCDA) is a structured approach to analyze problems with several criteria and alternatives. It helps the decision maker (DM) to make consistent decisions by taking all the important objective and subjective factors into account (Mustajoki et al, 2007). Methods for multicriteria decision making (MCDM) have been designed in order to designate a preferred alternative, to classify the alternatives in a small number of categories, and/or to rank the alternatives in a subjective order of preference (Lootsma, 1999). Decision models are typically developed through decomposition of complex decision problems into smaller and less complex sub-problems; the result of such decomposition is a hierarchical structure that consists of attributes and utility functions (Rozman, Pažek, 2005).

Methods of multi-criteria analysis can be found in many papers within the agriculture topics. Among the author from the ex-YU region there are significant numbers of multicriteria methods papers from the Faculty of Agriculture and Biotechnology, University of Maribor. Rozman et al. (2006) apply MCDM in the case of selecting the most appropriate methods of spelt food processing displayed several-criteria decision support model. Pažek et al. (2006) used AHP and DEX-and expert system for decision making on farms with organic production. A large number of papers based on multicriteria analysis in the field of agriculture and water resources management announced Bojan Srđević from the Faculty of Agriculture, University of Novi Sad (2000, 2005).

The Simple Multi-Attribute Rating Technique (SMART) is one of the simplest MCDM methods (Winterfeldt, Edwards, 1986) which was put forward by Edward's in 1977. The cost of this simplicity is that the method may not capture all the details and complexities of a real problem (Brady et al, 1997). However, SMART method leads to results that are easily interpreted and may serve as one of the guidelines for further business action.

The performance of the alternatives under the respective criteria, evaluated via a direct-rating SMART procedure, is expressed in grades on a numerical scale. The ranking value x_j of alternative A_j is obtained simply as the weighted algebraic mean of the utility values associated with it, i.e.

$$x_j = \sum_{i=1}^m w_i a_{ij} / \sum_{i=1}^m w_i, \quad j = 1, \dots, n \quad (1)$$

In the alternatives evaluation procedure, decision makers are asked to rank each of the attributes in relation to the goal. The top rank is given a score of 100. Each other attribute is then tasted against to this standard given a score from 0 to 100. These weights are then normalized to sum to 1 (Parkin, 1996). The alternative with the highest score is determined as the best among all taken in consideration.

In this paper SMART analysis is used for the purpose of comparative assessment of entrepreneurial welfare of the fruit wines production. The best production orientation considering three kinds of the fruit wines, blackberry, apple and cherry wine, is determined based the economic, market and technological criteria. Data on the economic success of manufacturing certain types of wine were collected from secondary sources and were updated by interviews with Croatian fruit wine producers. Furthermore, producers have evaluated technology complexity and demands using the SMART methodology demands. For this purpose opinions of three manufacturers that produce all three types of analyzed wines have been used. Finally, market prosperity of each type of wine is determined by the survey which made on the random sample of 53 respondents.

SMART analysis in paper is made by the software Criterium DecisionPlus 3.0 (CDP). It supports the two leading methodologies for multi-criteria analysis (AHP and SMART) and uncertainty analysis.

3. RESULTS

Economic performance of the fruit wine venture

Economic performance is one of the major motivations of each business venture. Economic results of this business activity were difficult to measure. There is no any relevant source of economic indicators which would give insight to business success of this relatively non commercial fruit wine production. In Croatia there are only a few legalized fruit wine producers who offer their wine in some of HoReCa branches. Some

of them precede fruits to wine from their own fruit plantation while other purchase fruit on the market. On the fruit wine market the most common is blackberry wine that can be purchased in stores, restaurants, pharmacies and healthy food stores. Apple and cherry wine are not so usual in the average stores but they can be found in specialized wine boutiques or can be ordered online from several producers. Calculations of income and costs are made using different recipe sources where the three major ingredients are present – fruit, sugar and different oenological products. Costs of the three fruit wine are presented in the following table.

Table 10: Production costs of 100 liters of fruit wine, EUR

	Blackberry wine	Apple wine	Cherry wine
Cost of fruit purchase	133.50	24.80	111.30
Sugar	16.30	14.40	8.00
Oenological and other products	29.30	29.30	29.30
Legal costs	93.30	93.30	93.30
Labour costs	32.00	48.00	40.00
TOTAL	304.40	209.80	281.90

Because of the effects of economy of scale, the expected average cost would be reduced by increasing the produced quantity of fruit wines. The lowest production cost of apple wine is a result of the lowest fruit price. Apples for industrial processing can be purchased at the price of 0.09 EUR per kilo.¹ On the other hand, approximately the same income can be achieved by selling all three fruit wines. Differences of selling price value are not as significant as in the case of the costs.

Based on the costs and income authors calculated the *Cost/Income ratio* that measures business efficiency using operating costs as a percentage of operating income. The ratio should be as low as possible.

Table 11: Expected net income of 100 liters of fruit wine, EUR

	Blackberry wine	Apple wine	Cherry wine
Selling price per litre	4.70	4.00	5.30
Income	470.00	400.00	530.00
C/I ratio	0.648	0.524	0.532

Market prosperity survey

Market prosperity of the three fruit wines was determined by researching consumer's familiarity with the wines and the frequency of certain fruit wine consumption. Survey was made by phone on the random sample of 53 respondents all over Croatia. The occurrence by gender is 60% female and 40% of men. Most of the respondents (30%) are older than 50 years. Majority of respondents (62%) consumed some of the fruit wines. Out of that, women are more frequent consumers and thus 8% of them consume fruit wine daily. The best known fruit wine is blackberry wine which was consumed by 70% of respondents. Significantly smaller consumption is of cherry and apple wine which was consumed by only 7% and 5% of respondents respectively.

Technological complexity

Technological complexity of the three fruit wine is determined by the producers' estimations. In this survey were included only producers that produce all three kinds of wine having objective insights to technologic specificity of each fruit wine. Unfortunately, only two all-fruit wine producers were found. From interviews with them, blackberry wine was estimated as at least technologically demanding production. Second place by technological complexity went to the cherry wine, while the wine apple is the most demanded. Cherries contain pits that should be removed before wine production while the wine apple is characterised by the lower amount of alcohol and acids, so it is more difficult to preserve this wine against deterioration. However, according to interviewed producers, technological demands for all three kinds of wine have very similar value and differences are irrelevant.

¹ Average purchase price of the largest food industries in Croatia in 2011 by the authors' research.

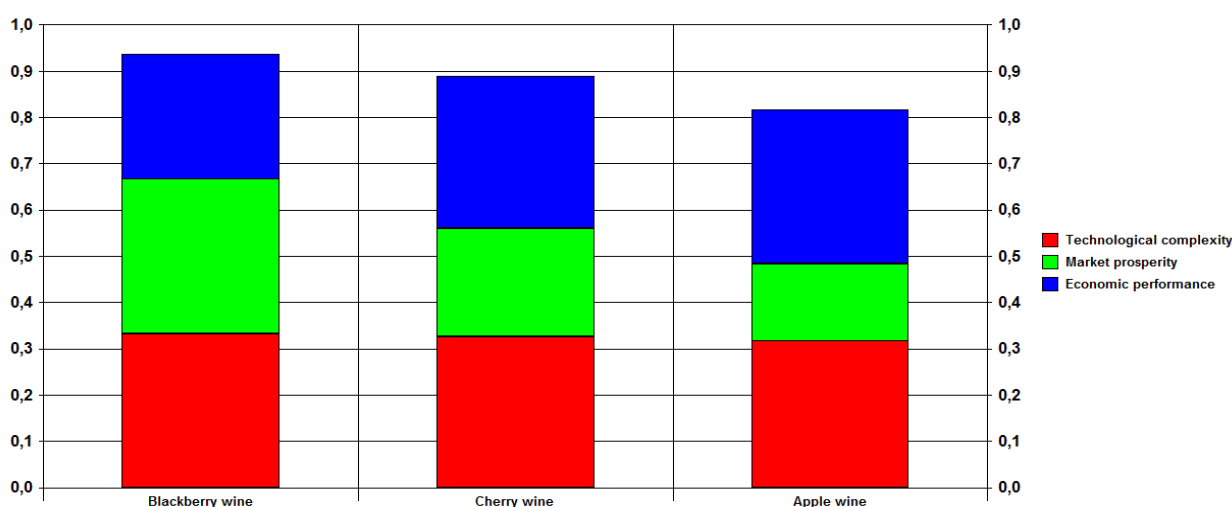
Building the SMART model

According to the surveyed economic, market and technological criteria value, it is possible to build the SMART model. The top rank is given a score of 100 while each other attribute is given a score from 0 to 100 related to the extent that lagging behind best result. Quantitative data (Cost/ income ratio) can be easily standardised to SMART value, while qualitative data (consumption frequency and technological complexity) are defined by respondent using scale from 0 to 100.

Table 12: SMART model with criteria scores.

	Blackberry wine	Apple wine	Cherry wine
Economic performance – standardised values	80.9	100.0	98.5
Market prosperity	100.0	50.0	70.0
Technological complexity	100.0	95.0	98.0

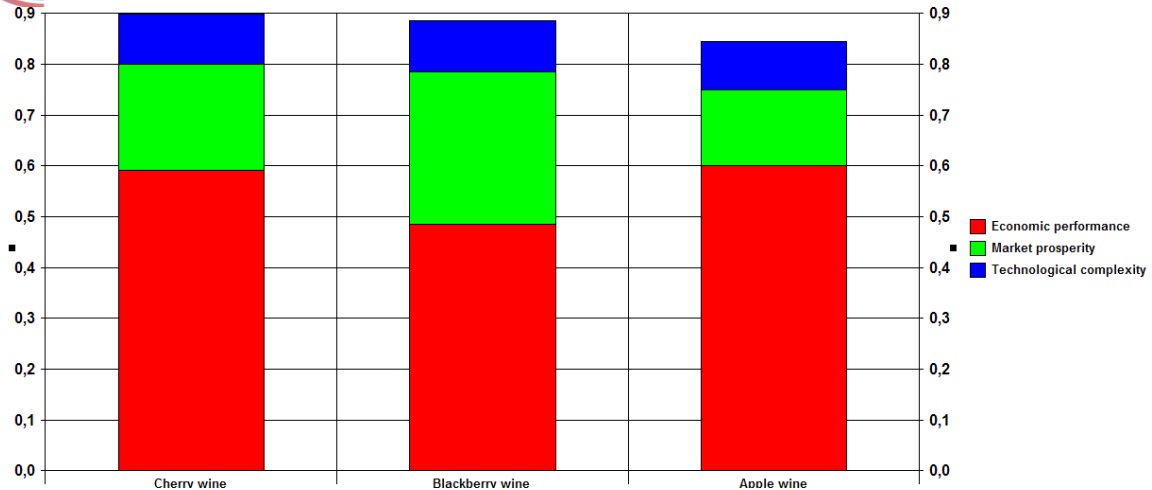
Based in the built SMART model, the entrepreneurial potential of the three fruit wines can be ranked.



Graph 1: Fruit wine ranking with the same weights of criteria

The blackberry wine is ranked as the first entrepreneurial choice with the highest final score (0.93). The leading position is a consequence of the best market prosperity and technological simplicity. Cherry wine is the second best with a certain lag in respect of market prosperity compare to blackberry wine. Apple wine is on the third place despite the best economic performance.

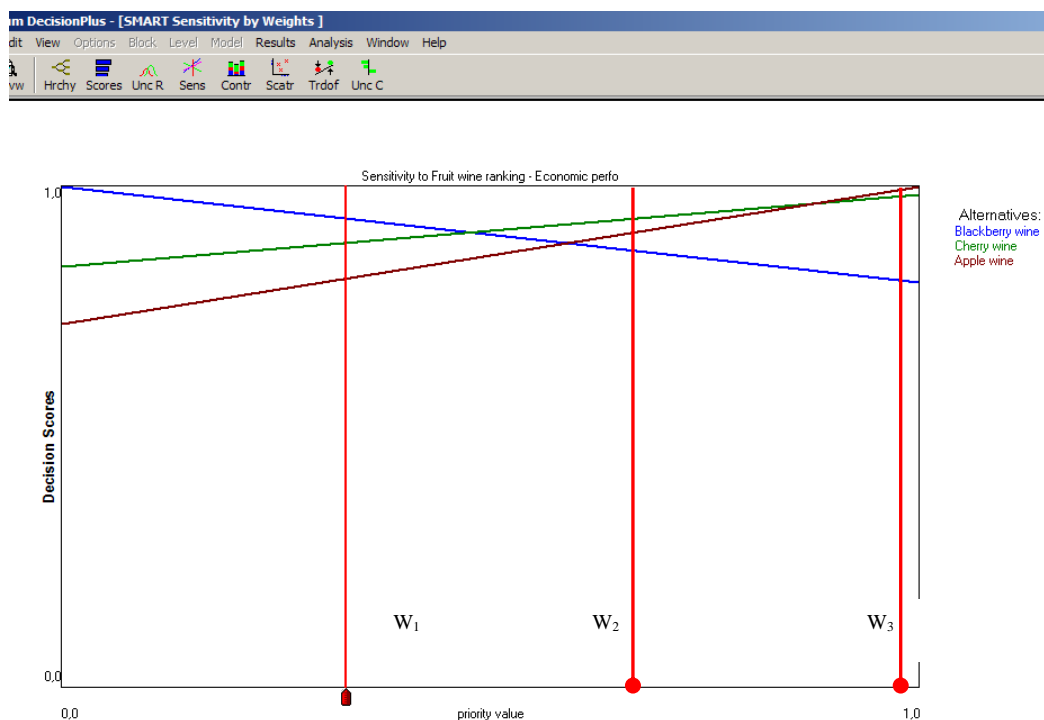
In the previous graph it is assumed that all three criteria have the same weights. However, each entrepreneur can adopt this model according to his/her preferences and assumed criteria importance. The following graph presents the situation of the different weights of selected criteria. For this purpose, economic criteria are the most important representing 60% of the total grade of fruit wine. Following, the market criteria with 30% impact on the overall score, while technological complexity is the least important factor with weights of 10%.



Graph 2: Fruit wine ranking with different weights of criteria

Using a different weights approach the ranking of fruit wine is changed. Cherry wine became the best entrepreneurial option thanks to better economic performance marked with the highest impact on the final grade.

Accordingly, sensitivity analysis can illustrate how the results will be modified by shifting criteria loading of importance. On the Graph 3, there is an illustration about the influence of the Economic performance weights on the final fruit wine ranking. When the w_1 is applied as the importance of economic criteria is equal to market and technological criteria importance, blackberry wine is the best option. Raising the importance of Economic performance on the w_2 and w_3 , cherry wine and apple wine become the best options respectively.



Graph 3: Sensitivity of wine ranking relate to *Economic performance* weights

4. CONCLUSION

Making decision on "what to produce" is the first and the most important decision of the entrepreneurial venture. In this paper, authors presented a modern approach of rational business decision making. The main strength of a rational decision making is that it provides structure and discipline to the decision making process. It ensures consideration the full range of factors relating to a decision, in a logical and comprehensive manner. Decision of fruit wine production should not include just a simple cost/benefit method but also market prosperity and technological complexity. Even such a comprehensive analysis can be extended by a number of further decisive factors. In this paper authors used a The Simple Multi-Attribute Rating Technique (SMART) as one of the simplest multicriteria decision making methods for the purpose of evaluating entrepreneurial potential of three different fruit wine production. In situation when economic, market and technological aspect of rating had the same importance, blackberry wine is determined as the best business option. Applying weighting where economic performance of venture plays much more significant factor of the fruit wine evaluation, cherry wine was rated as the best alternative. Presented model offers more objectivity during decision making process. It involved determination of economic parameters, interview with related producers and market survey which were, finally, incorporated into a single evaluation grade. However, the model is not fixed and invariable, it should be adjusted by specific situation and preferences of users. Due to this, SMART method, as a part of Decision support systems, do not exclude the man as a final decision-maker but increase his prudence and decision making objectivity.

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USING CONJOINT ANALYSIS TO ELICIT EMPLOYERS' PREFERENCES TOWARD KEY COMPETENCIES FOR A BUSINESS MANAGER POSITION

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Abstract: *This paper attempts to identify those competences for a business manager position which potential recruiters consider to be important. We propose conjoint analysis as an appropriate tool to determine the recruiters' preferences. Conjoint analysis is an experimental approach used as a tool for measuring customer preferences regarding the attributes of a product or a service, and for understanding the development of an individual's preferences. The conducted research and the obtained results have the purpose to inform potential candidates about various recruiters' expectations, and to help university teachers design their courses.*

Keywords: *key competences, business manager, recruiters, conjoint analysis, preferences*

1. INTRODUCTION

The employees are the key to success for any company. Therefore, the companies that recognize this fact and manage to select and retain quality staff are more likely to achieve competitive advantage. To choose good quality staff means to organize the recruitment process properly and to select the candidates capable of being efficient and loyal to the company.

Recruitment is the process of identifying and hiring the best-qualified candidate from a previously generated applicant pool so to meet the goals of a company and to satisfy current legal requirements (Catano et al., 2001). In the recruitment process, candidates' competences have a vital role. There are a number of papers devoted both to concepts of competence and to various models of the key competencies. According to Dalton (1997), a competency model describes "motives, traits, and so forth as a set of desired behaviors for a particular job position or level". As such, a competency model is an "occupational profile" typically developed for individual occupations but also extensible to occupational groups. Competency models are used to tie job specifications to the organizational strategy; the competencies then function as a common language (Lievens et al., 2004) which is used to identify the critical success factors driving performance in organizations (Delamare Le Deistand & Winterton, 2005).

The objective of this paper is to determine the list of key competencies for a business manager position which potential recruiters consider particularly valuable. For that purpose we employ conjoint analysis.

Conjoint analysis is an experimental approach used for measuring customer preferences regarding the attributes of a product or a service (Kuzmanović & Obradović, 2010; Venkatesh et al., 2012). Originally developed in the field of mathematical psychology, conjoint analysis has attracted considerable attention, especially in marketing research, as a method that portrays consumer decisions (Iyengar & Jedidi, 2012). However, few studies have used the conjoint analysis within the labor market. Using conjoint analysis Baker and McGregor (2000) determined the relative importance of seven criteria on hiring accountants and, at the same time, examined whether these values differ among different groups of individuals. Biesma et al. (2007) applied conjoint analysis to estimate preferences of employers for key competencies of master level graduates entering the public health field.

This paper is organized as follows. Section 2 provides an overview of the literature related to the models of key competencies. Section 3 describes conjoint analysis, a method we have proposed as an appropriate tool for determining the importance of a variety of competencies from the recruiters' point of view, as well as to isolate the most important ones in the process of candidate selection. Survey was conducted and most important findings are given in Section 4. Section 5 provides the concluding remarks.

2. MODELS OF KEY COMPETENCIES

In today's environment characterized by high rate of unemployment and high pressure to rationalize production, as a result of increased competition causing an increase in labor productivity, it is crucial for the company to hire the best people. In other words, technological and organizational changes lead to an

increased need for staff equipped with higher and better skills (Elias & McKnight 2001; Green et al., 2001; Stasz, 2001) which is primarily achieved through education and training (Borghans et al., 2001).

To respond to the demands of the modern age, it is necessary for an organization to perform quality and efficient recruitment, selecting the right people for the job, and efficiently using human resources, motivating employees, eliminating the leaves, introducing fair remuneration and promotion systems, and making decisions based on current information (Mitchell et al., 2011). Expert recruitment and orientation of employees enables assigning the employees on the basis of their skills, attitudes and work motivation.

Although there is no direct and linear relationship between the recruitment of personnel and organizational efficiency and performance, it is reasonable to assume that improved personnel selection will result in better performance (Kurtz & Bartram, 2002). In addition to potential benefits directly related to a good recruitment, there are lower costs of poor selection of candidates, as well as the risk of rejection of good candidates who can be hired by competitors (Robertson et al., 2002).

The question is to determine the capabilities, skills and competencies which a candidate should possess so he could be chosen. In addition, some other potential problems can occur, as when candidate's wishes and potentials do not align with demands of the employer.

In response to the above question, numerous studies have been conducted. In terms of qualities and skills a candidate should possess (using notions of many authors) two types of competencies: field-specific competencies and generic competencies. Generic competencies can be defined as the combination of learning, analytical and problem-solving abilities applicable in various domains (Heijke et al., 2003). Several studies investigated the role of key competencies for the labor market (Borghans et al., 2001; Stasz, 2001; Heijke et al., 2003). Some emphasize the role of field-specific competencies on labor market outcomes (Mane, 1999) while others stress the importance of generic competencies (Stasz, 2001).

According to Ruetzler et al. (2010), there are seven criteria to evaluate a candidate: academic grade point average (GPA), interpersonal skills, interview preparedness, the ability to work with others, alignment with organizational culture, and work experience.

Since a student's primary "job" is to study academic materials, a student's GPA is often seen as the equivalent of an employer's performance evaluation. The use of the GPA as a selection variable is controversial; however, when a job candidate has limited work experience, the GPA provides an apparently objective criterion to which recruiters can turn in screening applicants and establishing a candidate's potential (Kuncel et al., 2004). Although some studies suggest that overall GPA is not considered to be an important selection criterion (Baker & McGregor, 2000; Guo et al., 2009; McKinney et al., 2003), there is support elsewhere for the proposition that GPA is used as a selection tool and may well be important when identifying a set of candidates to be interviewed (Roth & Bobko, 2000).

Interpersonal skills, which include listening as well as oral and written communication abilities, are widely identified across the literature as important competencies. Interpersonal skills – sometimes referred to generically as communication skills – have been ranked among the five most important skills for entry-level managers by hospitality industry leaders (Chung-Herrera et al., 2003; Fjelstul, 2007; Mayo & Thomas-Haysbert, 2005; Tesone & Ricci, 2005).

Little research exists that directly examines the preparedness of a candidate for an interview or the impact of such preparation on job offers. A recent study addresses the effects of preparation for interviews that involves faculty members conducting mock interviews so that candidates can "rehearse" performing in the interview setting, concluding that mock interviews lead to increased confidence and enhanced interviewing skills (Hansen et al., 2009).

Having the ability to work with others involves being able to work as a team member as opposed to behaving as an individual who prefers to work alone or does not like to help others. Being teamoriented is a highly valued trait in the most industries. Tesone and Ricci (2005) found that the ability to work as part of a team was the number one skill identified by industry practitioners. In Fjelstul's (2007) research, teamwork ranked as the second most important skill. Baker and Harris (2000) discovered that students specialized in technology or information systems felt that the ability to work with others was one of the two most important traits in the eyes of recruiters.

Alignment with an organization's culture and mission occurs when a candidate's values and beliefs are consistent with those espoused in the organization's internal literature, such as its mission statement. An employee's "emotional commitment" and sense of identity with a company lead to greater performance both of an employee and a firm (Hemp, 2002). A meta-analysis conducted by Kristof-Brown et al., (2005) found that person-organization fit, the compatibility between a person and an organization, correlated significantly with the intent to hire and with actual job offers.

3. CONJOINT ANALYSIS

Conjoint analysis is a multivariate technique that can be used to understand how an individual's preferences are developed. Specifically, the technique is used to gain insights into how consumers value various product attributes based on their evaluation of the complete product (Kuzmanovic & Martic, 2012). Conjoint analysis, sometimes called 'trade-off analysis', reveals how people make complex judgments. The technique is based on the assumption that complex decisions are made not based on a single factor or criterion, but on several factors CONsidered JOINTly, hence the term Conjoint. Conjoint analysis enables the investigator to better understand the interrelationship of multiple factors as they contribute to preferences.

Conjoint experiments involve individuals being asked to express their preference for various experimentally designed, real or hypothetical alternatives. These hypothetical alternatives are descriptions of potential real-world alternatives in terms of their most relevant features, or attributes; hence, they are multi-attribute alternatives (Parker & Schriff, 2011). Lists of attributes describing single alternatives are called profiles. Typically, the set of relevant attributes is generated by reviewing the research literature and performing pilot research with techniques such as focus groups, factor listings, or repertory grids. Two or more fixed values, or "levels", are defined for each attribute, and these are combined to create different profiles.

Obviously, the number of possible profiles increases immensely with the increasing number of attributes or levels. A set of profiles that consists of all the possible combinations of the attribute levels is the full-factorial experimental design. As in most conjoint studies, the large number of possible combinations of attributes and levels make it impossible to generate a design based on all the possible combinations. Namely, such designs are impractical because the subjects' cognitive limitations and time constraints do not allow considering a large number of profiles. Thus, fractional factorial designs, which assume no interactions between attributes and ensure the absence of multicollinearity, are used to reduce the number of profiles.

The experimental procedure involves profiles being presented to respondents who are invited to express their preference by rating or ranking these profiles. Preference functions are estimated from this data, using OLS regression for rating the data, and ordinal techniques when the rankings are obtained.

Having collected the information on individual preference, the responses need to be analyzed. To determine the relative importance of different attributes to respondents, the trade-offs that individuals make between these attributes, as well as the overall benefit taking into account these trade-offs, a relationship must be specified between the attributes' utility and the rated responses. The simplest and most commonly used model is the linear additive model. This model assumes that the overall utility derived from any combination of attributes of a given good or service is obtained from the sum of the separate part-worths of the attributes. Thus, respondent i 's predicted conjoint utility for profile j can be specified as follows:

$$U_{ij} = \sum_{k=1}^K \sum_{l=1}^{L_k} \beta_{ikl} x_{jkl} + \varepsilon_{ij}, \quad i = 1, \dots, I, \quad j = 1, \dots, J, \quad (1)$$

where I is the number of respondents; J is the number of profiles; K is the number of attributes; L_k is the number of levels of attribute k . β_{ikl} is respondent i 's utility with respect to level l of attribute k . x_{jkl} is a (0,1) variable that it equals 1 if profile j has attribute k at level l , otherwise it equals 0. ε_{ij} is a stochastic error term.

The parameters β_{ikl} are estimated by a regression analysis. These beta coefficients, also known as part-worth utilities, can be used to establish a number of things. Firstly, the value of these coefficients indicates the amount of any effect that an attribute has on overall utility of the profiles— the larger the coefficient, the greater the impact. Secondly, part-worths can be used for preference-based segmentation. Namely, given that part worth utilities are calculated at the individual level, if preference heterogeneity is present, the researcher can find it. Respondents who place similar value to the various attribute levels will be grouped together into a segment. Thirdly, part-worths can be used to calculate the relative importance of each attribute, also known as an importance value. Importance values are calculated by taking the utility range for

each attribute separately, and then dividing it by the sum of the utility ranges for all of the factors. The results are then averaged to include all of the respondents. If the market is characterized by heterogeneous customer preferences, it is possible to determine the importance of each attribute for each of isolated market segments.

Overall utility scores can be estimated for different combinations of attributes by inserting the appropriate levels into Equation 1. These utility scores can be further used to predict the market shares for each of the defined combinations. Finally, part-worths can be used to test the internal validity of conjoint analysis, i.e. the extent to which the results are consistent with economics theory, or, more generally, *a priori* expectations.

4. EMPIRICAL STUDY

The main objective of this study was to identify the key competencies of candidates for the business manager position from the employer's point of view, but also to determine a most preferred candidate. The survey was fielded in Belgrade, Serbia, in May 2011. In total, 31 individuals answered the survey. While this sample size may be regarded as relatively small, it is not atypical for conjoint analysis application when the survey goal is investigational work, or to develop a hypothesis about a market (Orme 2006).

Study design

The first stage in the design of a conjoint analysis study is the selection of the attributes. We have defined ten key attributes based on literature review (Biesma et al., 2007; Ruetzler et al., 2010), and opinions of potential employers obtained within pilot research. Having chosen the attributes, levels must be assign to them. These should be realistic, plausible and capable of being traded. The attributes and levels chosen for this study are shown in Table 1.

Table 1. Attributes and their levels

Attribute	Level 1	Level 2	Level 3
Education	Bachelor	Master, general	Master, specialized
Work Experience	None	Internship	Employment
Foreign languages	One language	More languages	/
Computer skills	Basic	Advanced	/
Communication skills	Fair	Good	/
Problem solving skills and creativity	Fair	Good	/
Team working skills	Team worker	Individualist	/
Organizational skills	Average	Good	/
Proactivity	Highly	Insufficient	/
Interview preparedness	Insufficient	Full	/

The first attribute "Education" refers to the fact that candidate entering the selection process must have at least the Bachelor degree. In addition to Bachelor degree, the candidate may have a "general" master degree, or may be specialized in a specific field. The attribute "work experience" is chosen because employers often emphasize its importance during the pilot research. In this study we distinguish work experience in terms of employment or internship. The internship most often refers to the three-month period of work during studies. The assumption is that all candidates are fluent in at least one foreign language (usually English language). Therefore, we define two levels for this attribute. The first level corresponds to excellent reading, writing and good conversation of one foreign language, while the second level assumes the same for more than one languages. Candidate's preparedness for the interview indicates his willingness and desire for a given position. This attribute refers not only to how the candidate is informed about the company but also his attitude, manners and outfit. Therefore, we define two levels of this attribute: full and insufficient prepared. All other attributes are described using two levels, where one of them refers to the fair level while the other refers to a higher level of a certain skill.

Although many previous studies stressed the GPA as an important factor, the results of the pilot research we conducted indicate that this attribute is of negligible importance for the position of business manager. Therefore, we excluded it from this study.

Once attributes and attribute levels are selected, they must be combined to form different hypothetical profile of candidates for survey respondents to assign preference ratings. The attributes and levels in Table 1 gave

rise to 2304 possible profiles ($3^2 \times 2^8$). To reduce this number of profiles to a manageable level, in this study a component of the statistical package SPSS 16.0 (Orthoplan) was used. Thus the 2304 possible profiles were reduced to 16. Two control profiles (holdout tasks) were added to the given design. These 2 profiles were not used by the conjoint procedure for estimating the utilities. Instead, the conjoint procedure calculates correlations between the observed and predicted rank orders for these profiles, as a check of the validity of the utilities. The 18 hypothetical profiles considered are shown in Table 2.

In order to elicit the preferences for the various profiles, in this study a rating approach was utilized. The respondents expressed their preferences for a particular candidate on a scale of 1 to 9, where 1 stands for absolutely undesirable, and 9 stands for absolutely desirable. The survey was conducted using the traditional “paper and pencil” method.

Table 2. Generated list of profiles

ID	Education	Work Experience	Foreign languages	Computer skills	Communication skills	Problem solving creativity	Team working skills	Organizational skills	Proactivity	Interview preparation
1	Master G	none	one	advanced	good	fair	teamwork	good	insufficient	insufficient
2	Bachelor	none	more	basic	fair	fair	individual	good	insufficient	full
3	Bachelor	internship	more	advanced	good	good	individual	average	insufficient	insufficient
4	Bachelor	employment	one	advanced	good	good	teamwork	good	highly	full
5	Master S	internship	more	basic	good	fair	teamwork	good	highly	insufficient
6	Bachelor	employment	more	advanced	fair	fair	teamwork	average	insufficient	insufficient
7	Master G	employment	more	basic	fair	good	individual	good	highly	insufficient
8	Bachelor	none	more	basic	good	good	teamwork	good	insufficient	full
9	Master S	employment	one	basic	good	fair	individual	average	insufficient	full
10	Bachelor	none	one	basic	good	good	individual	average	highly	insufficient
11	Master G	internship	one	basic	fair	good	teamwork	average	insufficient	full
12	Bachelor	none	one	basic	fair	fair	teamwork	average	highly	insufficient
13	Master G	none	more	advanced	good	fair	individual	average	highly	full
14	Master S	none	one	advanced	fair	good	individual	good	insufficient	insufficient
15	Master S	none	more	advanced	fair	good	teamwork	average	highly	full
16	Bachelor	internship	one	advanced	fair	fair	individual	good	highly	full
17	Bachelor	internship	one	advanced	fair	fair	teamwork	average	insufficient	full
18	Master S	internship	one	advanced	fair	good	teamwork	good	insufficient	full

* holdout profiles

Analysis and Results

In the total sample, slightly more than half of respondents were female (54,8%). Table 3 provides detailed demographic data.

Table 3. Demographic characteristics

Characteristics	Description	%
Industry	Bank	9.6
	Production company	19.4
	Sales company	29.1
	Service company	41.9
Position at the company	HR	38.7
	Sales manager	25.9
	Marketing manager	12.9
	Project manager	6.4
	Top manager	16.1
Working experience	Less than five years	54.8
	From six to ten years	32.3
	More than ten years	12.9

Results from the analysis are shown in Table 4 and Figure 1. Table 4 presents the (averaged) part-worth utilities of each level of the attributes, while Figure 1 is the graph description of the attributes importance.

The constant whose value is 5.771 (Table 4) represents a stochastic error obtained through regression analysis, and it is used to calculate the total utility of each profile. A high value of the Pearson coefficient, 0.983, confirms the high level of significance of the obtained results. Similarly, a high value of the Kendall correlation coefficient, 0.899, indicates a high level of correlation between the observed and estimated preferences. The Kendall coefficient for two holdout profiles has a value of 1.000, which is an additional indicator of the high quality of the obtained data.

The signs of the part-worths are in line with the a priori expectations. For example, a negative sign is attached to the level which indicates that there is no work experience. Respondents showed expected behavior for all other attributes, with the highest level having the highest utility. These results can be regarded as an indication of the theoretical validity of the questionnaire, i.e. the extent to which the results conform to the a priori expectations.

As Figure 1 shows, the most important attribute is "Proactivity", with an importance value of 16.69%. Slightly less important is the attribute "Work Experience", with a value of 15.22%. Attributes with a relatively higher importance are also "Interview preparedness" (12.08%) and "Education" (11.02%). Moderate important attribute is "Problem solving and creativity" (9.80%) followed by three equally important attributes "Computer skills", "Communication Skills" and "Team working skills" (importance value = 9.63%). The least important attributes by far are "Foreign Language" and "Organizational skills", whose importance values amount to 3.55% and 2.73%, respectively.

Table 4. Averaged part-worth utilities

Attribute	Attribute level	Part-worth utilities	Std. Error
Education	Bachelor	-0.164	0.114
	Master, general	-0.188	0.134
	Master, specialized	0.352	0.134
Work Experience	None	-0.427	0.114
	Practice	0.109	0.134
	Work	0.319	0.134
Foreign languages	One language	-0.087	0.086
	More languages	0.087	0.086
Computer skills	Basic	-0.236	0.086
	Advanced	0.236	0.086
Communication skills	Fair	-0.236	0.086
	Good	0.236	0.086
Problem solving skills and creativity	Fair	-0.240	0.086
	Good	0.240	0.086
Team working skills	Team work orientation	0.236	0.086
	Individual work orientation	-0.236	0.086
Organizational skills	Average	-0.067	0.086
	Good	0.067	0.086
Proactivity	Yes	0.409	0.086
	Insufficient	-0.409	0.086
Interview preparedness	Insufficient	-0.296	0.086
	Yes	0.296	0.086
Constant	5.771	0.095	
Correlations between observed and estimated preferences			
Pearson's R	0.983	Significance = 0.000	
Kendall's tau	0.899	Significance = 0.000	
Kendall's tau for 2 Holdouts	1.000		

Part-worth utilities reflect the sensitivity of respondents to change of attribute levels (see Figure 2). It may be noted that all attributes included in the study are extremely sensitive to level changes, but in the case of three-level attributes this sensitivity varies depending on the interval. For example, when we observe the attribute "Work Experience", the preferences decline much faster in the interval Internship-None than in the interval Employment-Internship. In the case of attribute "Education", only the best level (master specialized) increases the overall preferences, while the medium (master general) and worst (bachelor) decrease them. These two levels have a negative sign of part-worth utilities.

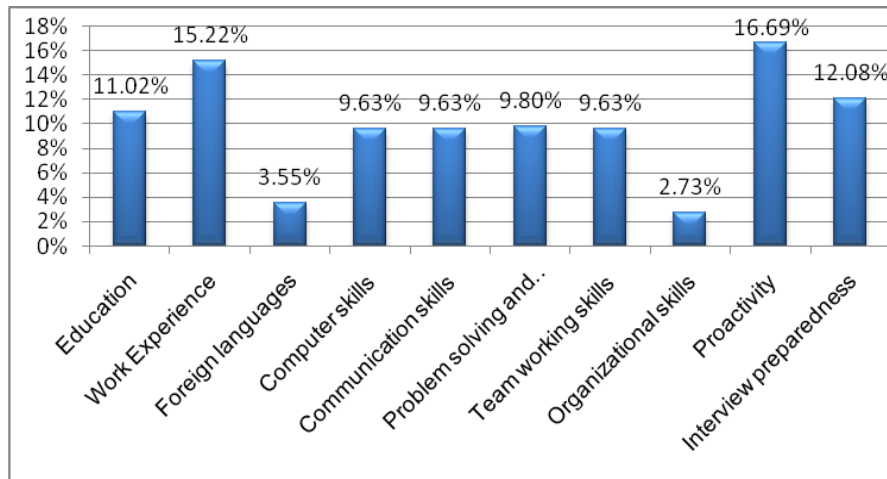


Figure 1. Averaged attribute importance values

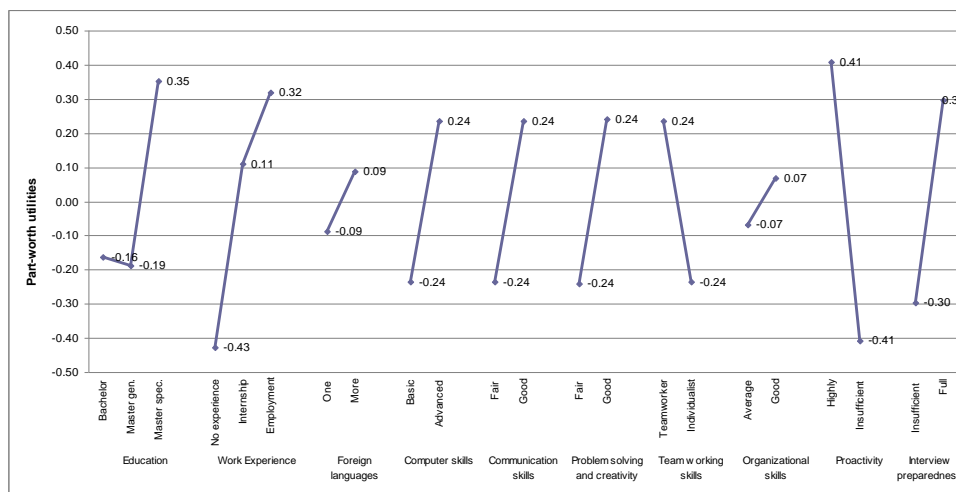


Figure 2. Part-worth utility functions

Characteristics that describe the "best" candidate are: Specialized Master degree in education, has work experience, speaks two or more foreign languages, has advanced computer skills, has strong communication skills, he/she is very creative and skilled in problem solving, oriented to teamwork, possess good organizational skills, he/she is proactive and well prepared for the interview.

6. CONCLUSION

To determine the skills and competencies for the business manager position which recruiters particularly prefer, in this paper conjoint analysis was used. To our knowledge, this is the first study to use this approach for that purpose in Serbia.

Research has shown that potential employers consider the proactivity as the most important attribute, while number of foreign languages and organizational skills are of least importance. They stressed that they more often pick proactive candidates due to lack of time for the training of hired workers. Because of the shorter training, selected candidates must be skilled, resourceful and capable to quickly incorporate into the new work environment.

Since the goal of the research was to show the applicability of conjoint analysis to determine the recruiters' preferences toward key competencies for a business manager position, the findings obtained and presented above confirm that our task is successfully accomplished. The findings of the study are significant both on a theoretical and applied levels. On a theoretical level, they add to our knowledge of the relative importance of some factors influencing recruiters' preferences. On the applied level, the results provide useful information both to students (the potential candidates) and university teachers (those that guide and educate candidates). Indeed, these information could help teachers to provide students more effectively with appropriate skills and competencies needed for their future employment.

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ANALYSING THE EFFECTIVENESS OF MEASURES FOR ENERGY MANAGEMENT IN LOCAL COMMUNITIES USING LOGICAL AGGREGATION APPROACH

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Abstract: *Energy is a precondition for the survival of the mankind. It drives everything, sustains life. Consequently, energy efficiency has been one of the most widely discussed topics in the last twenty years. This paper is aimed to investigate the effectiveness of measures for improving energy management in local communities. The analysis is done on the example of the municipality of Bijeljina. The starting point for this research is the Sustainable Energy Action Plan for the Municipality of Bijeljina, which was presented in 2011. The idea of the paper is to examine selected measures from the Action Plan in order to rank them on the basis of their effectiveness. Effectiveness is defined as a logical function that aggregates four different criteria: the cost of their implementation, their impact on reducing CO₂ emission, reducing energy consumption and increasing the usage of renewable energy sources. In this study, logical aggregation is implemented using generalized Boolean polynomials that are based on interpolative Boolean algebra. The results have shown that three factors are of particular importance for efficient energy management: education of population, large infrastructure projects and investment in new production capacities. This paper may be of particular value to those local communities that do not yet have developed awareness of sustainable and efficient energy management, and to all those who are in the process of transformation into energy-efficient communities.*

Keywords: *energy efficiency management, local communities, effectiveness analysis, ranking, logical aggregation, interpolative Boolean algebra, generalized Boolean algebra.*

1. INTRODUCTION

In the uncertain conditions of the global energy market and the scarcity of domestic energy resources to build a sustainable and efficient energy system, the system of balanced relations between environmental protection, competitiveness and security of energy supply, is a significant challenge for any local community. Availability of energy is an essential prerequisite for economic development. Although at the global level connection (correlation) between economic growth and growth in energy consumption weakens (improving the energy intensity), however, the worldwide demand for energy continues to grow. Most European countries are dependent on energy imports. Some countries do not have their own energy sources, and some countries have not developed producing capacity. Some global problems such as exhaustion of non-renewable energy resources (oil, gas, coal, etc.), the insufficient level of cost efficiency of "clean" technologies for energy production, increase in environmental pollution and the impact of global warming and frequent economic crisis on regional and global level in last decades are responsible for the growing importance of energy efficiency.

Efficient energy management has three key challenges: reducing energy consumption, increasing energy production from renewable sources and reducing greenhouse gas emissions. Each of these issues can be observed separately, but only if they are observed integrated, then we can talk about sustainability. Climate change and greenhouse gas emissions have become a priority development issue. The main challenge is the long-term development of the economy with reduced emissions of carbon dioxide. The goal is efficient use of energy, usage of renewable energy sources, efficient transportation system with the use of more neutral fuels in terms of CO₂ emissions and the internalization of external costs of environmental protection through the establishment of rates for emitted carbon dioxide (which gives a clear signal that the economy in the planning and investment must take into account the risks associated with environmental pollution).

Local communities as the nuclei of the social and economic life have a decisive role in creating and implementing measures for sustainable development and within its framework for energy management. This paper deals with the issue of energy management in Bijeljina, municipality of Republika Srpska - one of two entities in Bosnia and Herzegovina. It is based on the Sustainable Energy Action Plan for Municipality of

Bijeljina created in 2011². The Action Plan has identified measures that need to be implemented in order to improve energy efficiency within the municipality of Bijeljina according to main ideas of sustainable development. The idea of this paper is to analyze these measures by their effectiveness. Effectiveness of the single measure is defined through four different criteria: cost of its implementation, its impact on reducing CO₂ emission, reducing energy consumption and increasing usage of renewable energy sources. In order to create criteria function to describe efficiency, logical aggregation based on interpolative Boolean algebra is used to aggregate selected criteria into logical criterion function. Logical criterion function is transformed into applicable form using generalized Boolean polynomials. The results have shown that three main factors are important for efficient energy management: education of population, large infrastructure projects and investments in new production capacities. It is of particular significance the fact that the education of the population resulted in a much higher effectiveness than any other analyzed measure.

The remainder of this paper is organized into four sections. Section 2 will present basic concepts of efficient energy management in the sustainable development framework. Section 3 presents data that are used in this study. In section 4 we describe methodology that is used for the purpose of the analysis. Section 5 will report results along with the analysis. In section 6 we present our conclusions.

2. ENERGY EFFICIENCY OF LOCAL COMMUNITIES

The question is – what is energy efficiency? What parameters indicate that the certain system is energy efficient? Energy efficiency is the sum of planned and implemented measures aimed at using minimum possible amount of energy so that the quality of life and production rate remains preserved (Savic, M., Dimitrijevic P., 2010). Energy efficiency should not be considered as energy saving as saving always implies certain sacrifices, while the efficient use of energy never impairs working and living conditions. Improved efficiency in utilization of energy results in its reduced consumption for the same amount of product or service, which ultimately brings the proportional material savings.

Efficient energy system is energy efficient way of energy production and consumption, with the aim to have the least possible harmful impact on the environment. Therefore, in order to be sustainable, energy efficient systems have to minimize its impact on environment. This impact could be measured on several ways; however, one of them is particularly important – the emission of CO₂ gases into the atmosphere. This impact has been monitored and analysed over the last several decades and represents one of the major element of all strategies of the future energy development (for example EU declared goals by 2020: 20% of energy from renewable sources, 20% increase in energy efficiency, 20% reduction in emissions and 10% of bio fuels in total consumption of gasoline and diesel fuel).

Local authorities are dynamic, complex and vital systems in the sector of the public government. They are marked as one of the key elements in performing of energy activities, according to Strategic Legal Framework. In other words, energy management at local level is very significant part of the overall energy management system in one society, i.e. country. Introducing the system of efficient and sustainable energy management at local level is fundamental for development of “Smart Energy Cities”. As of 2007, European Union adopted a set of documents “Energy for a Changing World”³ and unilaterally committed to decrease the CO₂ emission for 20% until 2020 which will result in increase of energy efficiency for 20% and share of 20% of the renewable energy combined with other sources of energy. By adopting the decision 20:20:20, European cities are motivated, within the “Covenant of Mayors”⁴ to be actively involved in realization of set goals. Bijeljina municipality entered this agreement in October 2010.

In accordance with assumed obligations, the Sustainable Energy Action Plan of Municipality of Bijeljina is developed, covering the period from the reference year 2004 until 2020. Following the recommendations of the European Commission, sectors of energy consumption are differentiated into three main sectors, each having its own subsectors:

- Buildings sector,
- Traffic,
- Public lighting.

²www.sobijeljina.org/dokumenti/odrzivi_energetski_akcioni_plan_opstine_bijeljinasustainable_energy_action_plan_bijeljina.pdf

³ec.europa.eu/energy/index_en.htm

⁴http://www.eumayors.eu/about/covenant-of-mayors_en.html

Energy analysis that has been performed for each of these three sectors showed that all sectors have potential for energy savings.

3. DATA

In order to analyze effectiveness of measures for improving energy efficiency in the municipality of Bijeljina, we used data that are presented in the Sustainable Energy Action Plan of Municipality of Bijeljina. The measures, selected for the purpose of this analysis, are those whose effects are clearly quantified in the Action Plan and expressed in a numeric values that are suitable for analysis. Table 1 shows the selected measures along with its corresponding values.

Table 13: Measures for energy efficiency management in municipality of Bijeljina along with the corresponding values of criteria

Sector	Fields of action	Measure for energy efficiency management	Implementation time	Estimated price (EUR)	Expected Reduction in CO ₂ emission (t/a)	Expected reduction in energy consumption (MWh/a)	Expected production of clean energy (MWh/a)
Buildings, equipment/facilities and industries	Municipal and other building under jurisdiction of municipality	<i>Education and behavior changing of employees at the buildings and premises owned by the municipality of Bijeljina</i>	2012-2020	312.500	1.893	4.373	0
		<i>Installing thermostatic sets in all buildings and premises owned by the municipality of Bijeljina</i>	2012-2020	2.750	274	762	0
		<i>Thermal insulation of the exterior and roof of several buildings owned by the municipality of Bijeljina</i>	2012-2020	500.000	718	2.000	0
	
	Residential buildings	<i>Education of consumers in the houses and apartments sub-sector and in commercial and services sub-sector</i>	2012-2020	395.000	14.735	80.396	0
		<i>Reconstruction of building's exterior thermal protection and roof renovation of residential buildings</i>	2012-2020	9.500.000	7.508	55.732	0
	

Local electricity production	Hydroelectric power	<i>Construction of small hydro power plants, "Vodozahvat" channel, power 0.45MW</i>	2011-2012	700.000	1.677	0	2.600
		<i>Construction of small hydro power plants "ATC" MOK channel, power 0.11MW</i>	2011-2013	300.000	426	0	660

...
District heating/cooling and combined heat and power	Combined heat and power	<i>Project of expanding the district heating network based on geothermal energy</i>	2011-2018	99.190.000	46.826	175.340	0
		<i>Gasification of Bijeljina Municipality</i>	2012-2020	50.000.000	11.903	56.096	0
	Solar energy	<i>Solar system installation in public buildings, 66 buildings</i>	2012-2019	300.000	258	400	0
		<i>Solar system installation in households, 2700 households</i>	2012-2020	1.800.000	364	2700	0

4. METHODOLOGY

Logical aggregation (LA) is a tool for aggregation of primary attributes' values into one resulting representative value using logical Boolean functions with logical operators instead of weighted average function which is the most widely used approach. Logical aggregation approach that is used in this paper is based on the interpolative Boolean algebra (IBA). IBA is a fundamental basis for real [0,1]-valued logic that is developed by Radojevic (2000). In a general case logical aggregation has two steps (Radojevic, 2008A):

1. Normalization of primary attributes' values

$$\|\cdot\| : \Omega \rightarrow [0,1] \quad (1)$$

The result of normalization is a logical value from [0,1] interval that represents realized intensity of the analyzed primary attribute.

2. Aggregation of normalized values of primary attributes into one resulting value by a logical or pseudo-logical functions a logical aggregation operator:

$$Aggr: [0,1]^n \rightarrow [0,1] \quad (2)$$

These logical and pseudo-logical functions need to be translated into the corresponding generalized Boolean polynomials (GBP). Any logical or pseudo-logical function has its' corresponding GBP. GBP is used to obtain generalized value realization (Radojevic, 2008B) of the corresponding logical or pseudo-logical function.

In this paper we use logical function to create criterion function in order to analyze effectiveness of measures for improving energy efficiency of local communities. In order to do so, we define effectiveness of measure on the basis of four main criteria:

- Cost of implementation (A),
- Impact on reducing CO₂ emission (B),
- Impact on reducing energy consumption (C) and
- Impact on increasing usage of renewable energy sources (D).

In order to properly define effectiveness of measure we analyzed the data from Table 1. It is obvious that each measure has values for both criteria A (cost of implementation) and B (impact on reducing CO₂ emission), but do not have for both C (reducing energy consumption) and D (increasing usage of renewable energy sources) but only for one of them. This is very important notice that will be reflected in the following definition of effectiveness.

We define effective measure as a measure that has low cost of implementation, high impact on reducing CO₂ emission and has either high impact on reducing energy consumption or high impact on increasing usage of renewable energy sources. Mathematical representation of this definition is:

$$\phi(x) = A(x) \wedge B(x) \wedge ((C(x) \vee D(x))), \quad (3)$$

where x is the measure that is analyzed, $\phi(x)$ is the function of effectiveness for that measure and $A(x)$, $B(x)$, $C(x)$ and $D(x)$ are normalized values of the corresponding four criteria.

Using transformation rules (Radojevic, 2008C) we can transform this logical function into the following generalized Boolean polynomial:

$$\begin{aligned} (A(x) \wedge B(x) \wedge (C(x) \vee D(x))) &= (1 - A(x)) \otimes B(x) \otimes (C(x) + D(x) - C(x) \otimes D(x)) \\ &= (1 - A(x)) \otimes B(x) \otimes C(x) + (1 - A(x)) \otimes B(x) \otimes D(x) - (1 - A(x)) \otimes B(x) \otimes C(x) \otimes D(x). \end{aligned} \quad (4)$$

$$\begin{aligned} (A(x) \wedge B(x) \wedge (C(x) \vee D(x))) &= B(x) \otimes C(x) - A(x) \otimes B(x) \otimes C(x) + B(x) \otimes D(x) - A(x) \otimes B(x) \otimes D(x) - B(x) \otimes C(x) \otimes D(x) + A(x) \otimes B(x) \otimes C(x) \otimes D(x). \end{aligned} \quad (5)$$

Generalized product (Radojevic, 2008C) is an arithmetic operator, any function $\otimes : [0,1] \times [0,1] \rightarrow [0,1]$ that satisfies all four axioms of T-norms and can be in the following interval:

$$\max\{Y(x) + Z(x) - 1, 0\} \leq Y(x) \otimes Z(x) \leq \min\{Y(x), Z(x)\}. \quad (6)$$

In order to decide what operator to use as a generalized product, we analyzed the nature of the criteria that are aggregated. Criterion A (cost of implementation) is of a different nature than all other criteria (B, C, D) as it concerns costs of implementation and its value is expressed in EUR (currency euro). Therefore, the corresponding operator for the case of aggregating A with one of the other criteria is ordinary product ($\otimes := *$):

$$A(x) \otimes B(x) = A(x) \cdot B(x), A(x) \otimes C(x) = A(x) \cdot C(x), A(x) \otimes D(x) = A(x) \cdot D(x). \quad (7)$$

Similarly, criterion B (Impact on reducing CO₂ emission) is of different nature than all other criteria given that it concerns pollution. Therefore, the same operator ($\otimes := *$) is used in the case of aggregation B with one of the other criteria:

$$B(x) \otimes C(x) = B(x) \cdot C(x), \quad B(x) \otimes D(x) = B(x) \cdot D(x). \quad (8)$$

In the case of aggregation criteria C and D, we took into account the following characteristics of these criteria:

- Values of both C and D are expressed in the same measure MWa/h;
- If we decrease energy consumption we will remain an excess of energy. It has the same effect on the system as if energy consumption remains the same but we increase production of energy nut from renewable sources. This will create the surplus of energy causing no pollution like in the first case.

Bearing in mind these findings, we concluded that criteria C and D can be aggregated using min operator ($\otimes := \min$) inherent in the aggregation of attributes of the same nature:

$$C(x) \otimes D(x) = \min(C(x), D(x)). \quad (9)$$

With selection of adequate operators of generalized product, transformation process is completed and criterion function is obtained:

$$\Phi(x) = B(x) \cdot C(x) - A(x) \cdot B(x) \cdot C(x) + B(x) \cdot D(x) - A(x) \cdot B(x) \cdot D(x) - B(x) \cdot \min(C(x), D(x)) + A(x) \cdot B(x) \cdot \min(C(x), D(x)). \quad (10)$$

This criterion function is a mathematical expression that describes our definition and we used it on the data from Table 1 in order to analyze effectiveness of the selected measures.

5. RESULTS

Results that are obtained using the proposed approach are presented in Table 2

Table 2: Measures ranked on the basis of their effectiveness in energy efficiency management

Measure for energy efficiency management in municipality of Bijeljina	Normalized data				Effectiveness of measure	RANK
	Estimated price	Expected CO ₂ reduction	Expected reduction of energy consumption	Expected production of clean energy		
<i>Education of consumers in the houses and apartments sub-sector and in commercial and services sub-sector</i>	0,00379	0,31468	0,4585	0,0000	0,143738	1
<i>Project of expending the district heating network based on geothermal energy</i>	0,95238	1,00000	1,0000	0,0000	0,047619	2
<i>Reconstruction of building's exterior thermal protection and roof renovation of residential buildings</i>	0,09122	0,16034	0,3179	0,0000	0,046315	3
<i>Gasification of Bijeljina Municipality</i>	0,48008	0,25420	0,3199	0,0000	0,042283	4
<i>Construction of small hydro power plants, "Vodozahvat" channel, power 0.45MW</i>	0,00672	0,03581	0,0000	1,0000	0,035573	5
<i>Construction of small hydro power plants, "Borum" channel GOK, power 0.45MW</i>	0,00672	0,03581	0,0000	1,0000	0,035573	5
...

The results show that education of the population is the far most effective measure and it is probably the best measure to start within those local communities that need to improve their energy efficiency management. Furthermore, we noticed that two of the six most effective measures represent the most expensive infrastructural projects – construction of urban district heating network based on geothermal energy and gasification of Bijeljina. Therefore, large infrastructure projects are of particular importance for development of effective and sustainable energy management in local communities. Investment projects such as building new capacities for production from renewable energy sources (water, wind, solar energy etc.) are also very important for efficient energy management in local communities. Two of such measures are given high rank

in Table 2 which indicates that one of the best ways to become energy efficient within sustainable development framework is to produce more energy from renewable resources.

6. CONCLUSION

Energy is a precondition for the survival of mankind. It drives everything, sustains life. In new circumstances, when fossil fuel reserves that mankind depended on for the last 200 years, are rapidly decreasing, questions of rational energy consumption are being raised as well as search for new sources of energy. The use of renewable energy sources is still expensive investment for many countries. This is why the energy dependence, especially in Europe that consumes large amounts of energy, has become pressing issue. Therefore, energy management has become one of the most discussed topics in the 21st century.

The most of energy is being produced and consumed at the local communities' level. Therefore it is logical that the foundations for efficient energy management should be set there. Local communities in European Union have already begun to give great attention to the problem of energy management (e.g. Covenant of Mayors). The other communities will soon reach the same issue. This paper could be the starting point for them. It gives an answer to the question of what measures for efficient energy management are most effective within the framework of sustainable development. The results of the analysis clearly indicate that local communities, that are still not paying enough attention to energy management, should start with education of people and large infrastructural and investment projects.

Problem of ranking alternatives that involves these of logic cannot be solved by methods based on the concept of weighted sum, which are very common in the existing practice. Logical aggregation approach based on interpolative Boolean algebra allows modelling of such problems. Interpolative Boolean algebra, developed by Dragan Radojevic, has enabled modelling with logical aggregation to be consistent with the basic theories and axioms of classical logic. Within its framework, it is possible to quickly and easily create logical criteria functions and translate them into precise mathematical forms suitable for calculating. This paper presents only one possible use of this approach. The results show strong justification for further exploration of this method.

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MANAGEMENT OF KEYSTONE VULNERABILITIES IN SMALL AND MEDIUM ENTERPRISES – THE FUZZY MODEL FOR ASSESSMENT

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Abstract: Business environment of today demands highly reliable organizations in order to be competitive on the global market. Practice suggests that the organizational vulnerabilities must be treated permanently because in the time of crisis they may lead to catastrophe. This paper proposes a new fuzzy model for assessment of management of keystone vulnerabilities with the goal to increase the achievements of regular management. It is assumed that the fuzzy rating weights of uncertain parameter values in this paper are described by linguistic expressions, which are modelled by triangular fuzzy numbers. The proposed algorithm determines: (1) the indicators on the level of enterprises with the highest possible probability to be critical with respect to keystone vulnerabilities, (2) process on the level of enterprise with the lowest level of management of keystone vulnerabilities value, (3) business process of small and medium enterprises which have the lowest level of performances according to the management of keystone vulnerabilities and (4) beliefs that some business processes are in an equally bad state. Results marked with grades (1) and (2) are very important for the operation management. The rest of the given results are very important for defining economic plans on the regional level and the state level. The functioning of proposed fuzzy model and its corresponding software is illustrated through the data collected from small and medium enterprises in central Serbia.

Keywords: management of keystone vulnerabilities, small and medium enterprises, uncertainty, fuzzy set

1. INTRODUCTION

One of the basic assumptions of modern business success is coping with the keystone vulnerabilities of treated organization. Keystone vulnerabilities represent the most relevant causes of the decline of organizational business performance and may lead to its complete collapse. There are different ways to overcome the vulnerabilities of the organization and one of the most effective forms to overcome them is effective management of keystone vulnerabilities. In literature, this way of coping vulnerabilities is often treated as a part of organizational resilience (McManus, 2007). Increased use of the word resilience exists in the areas of development, engineering, climate change, ecosystems, weather disasters, etc. due to its own semantic capabilities. Entities that can be described by using these words, in most cases have the ability to bounce back to the initial condition in a short period of time. Initial condition relates to the time that preceded the impact of any disorder. As a contrast to that, the academic approach tries to define multiple meaning of this word, which is dependent on the discipline and practice that has analysed it. Relationship between resilience and vulnerabilities is an issue in many science fields, from environmental change to socio-economical systems (Vogel, 2007).

Steps, that set direction to the process approach which is one of the foundations of this thesis, can be observed in the papers which treat resilience of social - ecological systems. In the terms of process approach, resilience can be seen as the ability of a system to recover and adapt to disturbances in the environment, while continuing to operate as if the characteristics of change have never occurred (Manyena, 2006). Based on this, it can be concluded that resilience is a process, not an outcome. The characteristics of a system which has high level of resilience and can cope with natural disasters are related to the focusing on the recovery from disturbances, i.e. adaptation to the disorder.

In the terms of business, organizational vulnerabilities must be treated permanently because in the time of crisis they may lead to catastrophe. Components and features of resilience in a social system can be defined through five thematic areas where the appropriate action is possible to be implemented (Twigg, 2007): (1) management, (2) risk assessment, (3) knowledge and education, (4) risk management, (5) decreasing vulnerabilities and preparing for disturbances and reaction to them. One of the most complex issues in this area is to define keystone vulnerabilities and to quantify the measure of its management. Vulnerability is a complex subject thanks to its own nature, so it cannot be easily reduced to a single metric which makes it hard to quantify. One of the most difficult issues to accomplish is to define a unique threshold of risk, danger or harm for an organization in general. Similarly, a measure of resilience is still extremely difficult to acquire

so this field is open for further research, especially in organizational science (McManus, 2007, Stephenson, 2010).

In this paper, uncertainty in relative importance of business processes, the relative importance of indicators and parameters values are modelled by fuzzy sets (Klir and Folger 1988, Pedrycy and Gomide 1998, Zimmermann 2001). Fuzzy set theory can provide a valuable framework for handling imprecise and ambiguous data. Fuzzy set theory resembles human reasoning in its use of approximate information and uncertainty to generate decisions (Kaur and Chakraborty 2007). It has been shown that fuzzy approaches of treating uncertainties in real-world applications, have numerous advantages such as: (a) they are conceptually easy to understand, (b) they can capture most nonlinear relations in problems of arbitrary complexity, (c) they are based on a natural language, (d) they can be built based on the expertise and (e) they could be combined with conventional methods and techniques for dealing and reasoning with uncertain data (FazelZarandi, Türkşen, and Saghir 2002).

In the current business environment, organizations need to be engaged in a comprehensive and systematic process of prevention, preparedness, mitigation, response and recovery and business continuity. It is not enough for organizations to have a draft plan that provides scenarios for disaster or emergency. Threats in business require direct facing and solving in the course of a business process, a dynamic and interactive relationship that aims to ensure the continuation of the main activities of the previous organization, during and after major crisis events. The concept of resilience has become incorporated into the knowledge of the corporate strategy of a number of leadership companies on a global scale (Booz Allen Hamilton 2004). During the process of strategy implementation, the most used technology is information technology (IT). Information technology (IT) has big influence on business operations and capability, organizational capability and core capabilities from the resilience perspective (Pham and Jordan, 2006). In the time of crisis, improvisation concept in the terms of resilience can be valuable solution. The positive result of improvisation is learning: (1) how to improve, (2) through the re-utilization of improvisation, (3) through the action component of improvisation. Other technologies and resources are also valuable for organizations. Modern trends of management bring together different approaches in pursuit of sustainable resource use and social-ecological resilience (Plummer and Armitage, 2007). Considering the sustainability of organizations, it is very important to carry out an evaluation in natural resource management and to recast it in the light of complex adaptive systems thinking. An evaluative framework for this brings three broad components: ecosystem conditions, livelihood outcomes and process and institutional conditions. One of the best ways for achieving sustainability is overcoming vulnerabilities. That can be analysed from the organizational level perspective, management of organizational resources, etc.

This paper is proposing the model for assessment of keystone vulnerabilities management on the organizational level of small and medium enterprises (SME) in the production sector. Organization is presented through its own processes and management of keystone vulnerabilities is described through the set of indicators (McManus, 2007) which needs to be quantified on each process level. Quantification is defined by linguistic expressions and calculations that rely on fuzzy sets. In order to be resilient, an organization needs to have resilient processes and in the same time, management of the keystone vulnerabilities must be on the high level.

The paper is structured as follows: literature review of fuzzy approach and organizational vulnerabilities is presented in the section 1, physical model for management of keystone vulnerabilities in SME of production branch is presented in section 2, fuzzy quantification model for quantification of management of keystone vulnerabilities in organization is presented in section 3, in the section 4 the case study on the sample of 25 SME in Serbia is presented and section 5 sets the conclusion.

2. THE NEW MODEL FOR MANAGEMENT OF KEYSTONE VULNERABILITIES ASSESSMENT

The demands of modern market shape the organizations that can manage its own vulnerabilities and strive in the moments after disturbances, emphasizing the process approach. This way, one organization can be described by its processes and their interconnections. Different reference models - PERA (Purdue Enterprise Reference Model), GRAI / GIM (Group de Recherche en AutomatisationIntegree / Integrated Methodology), etc. can be used to represent the organization as well as reference standard (ISO 14258 - Concepts and Rules for Enterprise). In this paper, the organization is represented by its processes. In theory and in practice there is a large number of the process distribution. Classification framework of processes comprises four divisions of the master processes (Arsovski, 2006): (1) management, (2) management of resources, (3)

implementation and (4) measurement, analysis and improvement. Besides the division into four master processes, the basic classification is also used (Oakland, 2004): (1) process of management, (2) the main processes and (3) support processes. From the aspect of value creation, the processes are divided into key processes and support processes, which involve the management process.

By the size, enterprises that enter the scope of this research can be categorized as SMEs (Small and Medium Enterprises) of economy production sector. This type of organization is very dependent on ICT technology, which has been considered in defining the model. By using ICT it is possible to increase the availability and the speed of documents and information flow. Besides that, it is possible to raise the skills and the quality of employees' work and to enable the geographic complexity of the organization, etc. This indicates the great impact of ICT on the organization. In the model, which represents the type of SME production sector, there are four major processes: (1) production, (2) marketing and sales, (3) procurement, (4) design and development. Support processes are observed regarding the assessment of their influence on the organizational resilience, which is significantly lower than the influence of main processes. Process of management is viewed as a single entity. Other part of the model is related to the indicators of management of keystone vulnerabilities.

The basis for management of keystone vulnerabilities assessment can be described as mapping related factors which are the same in every science field that treats vulnerabilities. In the field of ecology which has treated the key vulnerabilities of ecosystems for many years, generally accepted definition of vulnerability is presented as a multidimensional concept that consists of exposure, sensitivity and adaptive capacity (e.g. Turner II et al., 2003, Metzger et al., 2005). Since there is no clear demarcation of concepts that treats the key vulnerabilities of organization, this paper is proposing the ecological conceptual model that is adapted to the needs and characteristics of organizations and their processes according to the work of McManus (2007). The components of keystone vulnerabilities are not assessed in this paper but the management of those components is assessed. The concept of ecosystem exposure corresponds to the criticality of organizational processes. The concept of ecosystems adaptive capacity corresponds to the preparedness of the organization processes. The term susceptibility has the same meaning in the ecosystem theory and in the organizational processes. The key assumption in the process criticality evaluation is in what way that process affects the resilience of the entire organization, i.e. how it affects the organization's ability to respond to the disorder. The assessment of process preparedness in terms of organizational resilience needs to focus on how defined plans and redundant resources will prevent loss of the process function in the case of disturbances. During the susceptibility assessment of a process, it should be considered how exposure to various risks affects the overall organizational resilience. This means that it is necessary to perform analyses that will answer how the processes will be affected if a disruption occurs. In the table 1, the model for quantification of management of keystone vulnerabilities with relevant indicators is presented.

Table 1: Quantification of management of keystone vulnerabilities with relevant indicators

Indicators of management of keystone vulnerabilities	C – Criticality P – Preparedness S – Susceptibility	Referent processes in SME of production sector					
		Process of management	Marketing and sale process	Design and Development process	Procurement process	Production process	Support processes
1.Planning Strategies	C						
	P						
	S						
2. Participation in Exercises	C						
	P						
	S						
3. Capability and Capacity of Internal Resources	C						
	P						
	S						
4. Capability and Capacity of External Resources	C						
	P						
	S						
5. Organisational Connectivity	C						
	P						
	S						

The defined indicators of management of the keystone vulnerabilities in organizations are the subject of interest on the organizational level (McManus 2007, Stephenson 2010) as well as the supply chain management (Pettit, 2008). Indicators of management of the keystone vulnerabilities presented in this paper are adapted from McManus 2007 because this set of indicators has very good correspondence with the selected type of organizations.

3. MODELLING OF UNCERTAINTIES

This Section describes modelling of uncertainty applied in proposed fuzzy model. The number and type of linguistic expressions, which represent relative importance of business processes and indicators of keystone vulnerabilities management, are determined by the management team.

3.1 THE RELATIVE IMPORTANCE OF BUSINESS PROCESSES AND KEY INDICATORS OF VULNERABILITIES

The importance of each business process depends on multiple factors, such as the type of economic activity, firm size and others. It can be assumed that the relative importance of business processes on the enterprise level has different values. Weight value of business processes are almost unchanged during a predefined period of time and involve a high degree of subjective assessment of the management team. In this paper, the weight of business processes and the weight of management of keystone vulnerabilities indicators are given by matrix pairs of comparison of the business processes and indicators relative importance, respectively (analogous to the AHP method). It is believed that this approach is closest to the human way of thinking. In conventional AHP, the management team presented their assessment using a numerical scale, which is defined on the set of real numbers. The scale proposed in AHP is a simple and easy to use, but it is not always possible to review the decision makers to map the precise number. Thus the next assumption is introduced – the members of management team express their assessment using linguistic expressions. In this paper, set R, consisted of five linguistic expressions (very low importance, low importance, medium importance, high importance, and very high importance) is defined. These expressions are modelled by using triangular fuzzy numbers defined in interval [1,5], where 1 denotes as the lowest relative importance and 5 denotes as the highest relative importance:

- Very low importance - $\tilde{R}_1 = (x; 1, 1, 2)$
- Low importance - $\tilde{R}_2 = (x; 1, 2, 3)$
- Medium importance - $\tilde{R}_3 = (x; 2, 3, 4)$
- High importance - $\tilde{R}_4 = (x; 3, 4, 5)$
- Very high importance - $\tilde{R}_5 = (x; 4, 5, 5)$

The importance of business process p compared to the business process p' , $p, p' = 1, \dots, P$, and the importance of indicator i compared to the indicator i' in every enterprise f , $f = 1, \dots, F$ is described by one of five predefined linguistic expressions which are modelled by fuzzy triangular number $w_{pp'}^{\sim f}$, and $w_{ii'}^{\sim f}$, $i, i' = 1, \dots, I$, respectively. The highest and the lowest limit of these fuzzy numbers is highlighted as $l_{pp'}^f$, $u_{pp'}^f$, and $l_{ii'}^f$, $u_{ii'}^f$ and modal value is $m_{pp'}^f$ and $m_{ii'}^f$ respectively.

If the importance of process p' compared to the process p , and the importance of indicator i' compared to the indicator i in the enterprise f , $p = 1, \dots, P_f$; $f = 1, \dots, F$ is significantly greater, respectively, then the value of element in the pairs matrix of comparison process must be presented by fuzzy triangular number:

$$w_{pp'}^{\sim f} = \left(\frac{1}{u_{pp'}^f}, \frac{1}{m_{pp'}^f}, \frac{1}{l_{pp'}^f} \right), \text{ and, } w_{ii'}^{\sim f} = \left(\frac{1}{u_{ii'}^f}, \frac{1}{m_{ii'}^f}, \frac{1}{l_{ii'}^f} \right) \text{ respectively.}$$

If the importance of the matrix elements described above is equal, it can be represented by a single point whose value is 1 and which is represented by triangular fuzzy number (1,1,1).

3.2 FUZZY RATING OF PARAMETER VALUES

Every indicator of keystone vulnerabilities management $i, i=1, \dots, I$ can be described by 3 parameters: criticality, preparedness and susceptibility. These parameters are indexed by $j, j=1, 2, 3$. Inevitably, the values of parameters on the process level $p, p=1, \dots, P$ in the enterprise $f, f=1, \dots, F$ involve subjective judgments of and individual preferences of each decision maker of management team. In general, we propose a method for determining the values of indicators parameters of keystone vulnerabilities management, which is based on Delphi method (Hu and Sandford, 2007). In this paper the small and medium enterprises are in the focus so it can be assumed that decision makers of management team can made decisions by consensus.

It is closer to human reasoning if decision makers express their opinions and evaluations by using linguistic expressions rather than numeric values. In this paper, fuzzy rating of management team is expressed by predefined linguistic expressions, which are modelled by triangular fuzzy numbers,

$\tilde{v}_{ij}^{pf}, i=1, \dots, I; j=1, 2, 3; p=1, \dots, P_f; f=1, \dots, F$. The lowest and the highest limit of this modal value of

triangular fuzzy number \tilde{v}_{ij}^{pf} are set as $L_{ij}^{pf}, U_{ij}^{pf}, M_{ij}^{pf}$, respectively.

The values in the fuzzy triangular domain, \tilde{v}_{ij}^{pf} belongs to the interval [1-9] and they have the same meaning and values as a standard scale which is defined by AHP (Saaty, 1990).

In this paper, we use five linguistic expressions for describing the fuzzy rating of indicators value, which are defined by triangular fuzzy numbers in the following way:

- Very low value - $(y; 1, 1, 2.5)$
- Low value - $(y; 1, 3, 5)$
- Medium value - $(y; 2.5, 5, 7.5)$
- Large value - $(y; 5, 7, 9)$
- Very large value - $(y; 7.5, 9, 9)$.

3.3. THE PROPOSED FUZZY MODEL

For the management team carrying out the resilience of small and medium enterprises according to management of keystone vulnerabilities, the following tasks are important: (1) to determine which indicator in process $p, p=1, \dots, P_f$ has the smallest value, (2) to rank indicators of management of keystone vulnerabilities on the enterprise level, (3) to rank the processes on the enterprise level and (4) to elaborate the statistical analysis of gained results and to suggest actions that will lead to process and overall resilience improvement.

The proposed fuzzy model is realized in the following steps:

Step 1. Setting the matrix pair of comparing the relative process importance in enterprise f ,

$\left[\tilde{w}_{pp'}^f \right], p, p' = 1, \dots, P_f; f = 1, \dots, F$. The weight of process $p, p = 1, \dots, P_f$ is calculated as:

$$\tilde{w}_p = \frac{1}{P_f} \cdot \sum_{p'=1}^{P_f} \tilde{w}_{pp'}$$

$$\tilde{w}_p = \left(\frac{1}{P_f} \cdot \sum_{p'=1}^{P_f} \tilde{l}_{pp'}, \frac{1}{P_f} \cdot \sum_{p'=1}^{P_f} \tilde{m}_{pp'}, \frac{1}{P_f} \cdot \sum_{p'=1}^{P_f} \tilde{u}_{pp'} \right)$$

Step 2. Setting the matrix pair of comparing indicators importance in enterprise f ,

$\left[\begin{smallmatrix} \sim f \\ w_{ii'} \end{smallmatrix} \right]$, $i, i' = 1, \dots, I$; $p = 1, \dots, P_f$; $f = 1, \dots, F$. The weight of indicators i , $i=1, \dots, I$ is calculated as:

$$\begin{aligned} \sim f w_i &= \frac{1}{I} \cdot \sum_1^I \sim f w_{ii'} \\ \sim f w_p &= \left(\frac{1}{P_f} \cdot \sum_1^{P_f} \sim f l_{pp'}, \frac{1}{P_f} \cdot \sum_1^{P_f} \sim f m_{pp'}, \frac{1}{P_f} \cdot \sum_1^{P_f} \sim f u_{pp'} \right) \end{aligned}$$

Step 3. The weight of indicator i , $i=1, \dots, I$ on the level of process p , in enterprise f , $\sim f w_{ip}$, $i = 1, \dots, I$; $p = 1, \dots, P_f$; $f = 1, \dots, F$ is calculated:

$$\sim f w_{ip} = \bigcup \left(\sim f w_p, \sim f w_i \right) = \left(x; \mu_{\sim f w_{ip}} \right)$$

where:

$$\mu_{\sim f w_{ip}} = \min \left(\mu_{\sim f w_i}, \mu_{\sim f w_p} \right)$$

Step 4. Determining of the scalar value of fuzzy number $\sim f w_{ip}$, w_{ip}^f by applying moment method (Zimmermann, 1996):

$$w_{ip}^f = \frac{\int x \cdot \mu_{\sim f w_{ip}}}{\int \mu_{\sim f w_{ip}}}$$

Step 5. In general, the parameters can have cost and benefit nature. The value of each parameter can be described through the fuzzy number $\sim pf v_{ij}$ by a management team. Applying the normalization process, domain of the triangular fuzzy numbers, $\sim pf v_{ij}$ is mapped into a set of real numbers on the interval [0-1] and in that way they are becoming comparable. The value 0, and the value 1 denote that treated parameter j , $j=1,2,3$ of indicator i , $i=1, \dots, I$ on the level of process p , in the organization f , $p = 1, \dots, P_f$; $f = 1, \dots, F$ has the lowest or the highest value, respectively. Normalized values of triangular fuzzy numbers are triangular fuzzy numbers and they are presented as $\sim pf r_{ij} = (z; a_{ij}^{pf}, b_{ij}^{pf}, c_{ij}^{pf})$. In this paper, a linear normalization procedure is applied (Shih, et al, 2007).

For the benefit type of criteria:

$$\sim f r_{ijp} = \left(\frac{L_{ijp}^f}{U_{ijp}^{f*}}, \frac{M_{ijp}^f}{U_{ijp}^{f*}}, \frac{U_{ijp}^f}{U_{ijp}^{f*}} \right)$$

For the cost type of criteria:

$$\sim f r_{ijp} = \left(\frac{L_{ijp}^f}{U_{ijp}^f}, \frac{L_{ijp}^f}{M_{ijp}^f}, \frac{L_{ijp}^f}{L_{ijp}^f} \right),$$

where:

$$U_{ijp}^{f*} = \max_{y=1, \dots, Y_{ip}^f} U_{ijp}^y, \quad L_{ijp}^{f-} = \min_{y=1, \dots, Y_{ip}^f} L_{ijp}^y$$

Step 6. The assumption which sets the equal importance of all management of keystone vulnerabilities indicators can be introduced. With respect to this assumption, the values of indicators $i, i=1, \dots, I$ on the level of process $p, p=1, \dots, P_f$ can be represented by the volume of polyhedron which is denoted as $V_{ip}, i=1, \dots, I; p=1, \dots, P_f$.

$$V_{ip} = \begin{vmatrix} b_{i1}^{pf} & b_{i2}^{pf} & 0 \\ b_{i1}^{pf} & 0 & b_{i3}^{pf} \\ 0 & b_{i2}^{pf} & b_{i3}^{pf} \end{vmatrix} = 2 \cdot b_{i1}^{pf} \cdot b_{i2}^{pf} \cdot b_{i3}^{pf}$$

Step 7. The value of weighted indicator $i, i=1, \dots, I$ on the level of process $p, p=1, \dots, P_f$ in the enterprise $f, f=1, \dots, F$ is calculated:

$$d_{ip}^f = w_{ip}^f V_{ip}^f$$

Step 8. The lowest value of indicator $i, i=1, \dots, I$ with respects to all considered business processes in the enterprise $f, f=1, \dots, F$ is denoted as $(d_i^f)^*$. The rank of key indicators of keystone vulnerabilities management at the enterprise level is determined by relation $\min_{i=1, \dots, I} (d_i^f)^* = (i^{*f})$.

Based on practices in the field of organizational resilience, it can be considered that if the value of indicators in one or more processes is critical it can lead to very poor process efficiency and it can imply the impossibility of organization recovery.

Step 9. The value of management of keystone vulnerabilities of process p in the enterprise $f, p=1, \dots, P_f; f=1, \dots, F$, is calculated:

$$KV_p^f = \frac{1}{I} \cdot \sum_{i=1}^I d_{ip}^f$$

Step 10. The ranking of business processes is calculated according to the next relation: $\min_{p=1, \dots, P_f} KV_p^f = KV_{p^*}^f$.

Business process in the enterprise $f, f=1, \dots, F$ to whom the lowest value is adjoined $KV_{p^*}^f$, is denoted as $(p^*)^f$. The management team should take appropriate actions in order to increase the value of management of keystone vulnerabilities of the process p^* which will lead to the enterprise $f, f=1, \dots, F$. improved resilience.

Step 11. Calculating the value of management of keystone vulnerabilities on the level of enterprise $f, f=1, \dots, F$ is calculated:

$$KV^f = \frac{1}{P_f} \cdot \sum_{p=1}^{P_f} KV_p^f$$

4. CASE STUDY

Developed fuzzy model and its corresponding software are tested on the real data which are gained from the 25 SME of Central Serbia production sector. The relevance of this type of enterprise can be illustrated through the data of the Republic Statistical Office of Serbia: (1) 99.4% of all enterprises belong to SMP in 2010, and (2) the most of employees work in the production sector of industry. The data from EU claims that 80 million workers are employees of SME which gives approximately 60% of total GBP of EU (Lukacs E., 2005). From the perspective of joining EU, SMEs are very important for Serbian economy.

The management team has identified six most significant processes of SME production sector and five indicators of management of keystone vulnerabilities (see Table 1). The indicators are ranked on the enterprise level by the application of developed fuzzy model and its corresponding software. The results of ranking are presented in the tables 2, 3 and 4. By using the proposed Algorithm (from Step 1 to Step 8) the rank of indicator is given and presented in Table 2.

Table 2: The lowest level of indicators on the enterprise level

Indicators which are ranked as the the first in the 25 SMEs	Enterprises
i=1	f=1; f=7; f=1; f=9; f=11; f=13; f=23
i=2	f=4; f=25
i=3	f=14; f=18; f=21; f=24
i=4	f=2; f=3; f=5; f=13; f=6; f=8; f=10; f=12; f=15; f=16; f=17; f=19
i=5	f=20

Based on the gained results, it can be claimed that in 28% of treated SMEs indicator i=1(Planning strategies) has the lowest value. One of the main reasons of this is global economic crisis, which dictates new business trends. In this situation, many enterprises in Serbia do not have the clear picture of future market demands, so they cannot have confident future business plans and active strategy for determining them. Indicator i=2 (Participation in exercises) has the lowest value in 8% of treated SMEs. This indicator can be significantly improved by defining appropriate programs of exercises that cover the area of occupational health and safety, improvement of production technologies, potential hazards scenarios, etc. Examples from practice indicate that fire exercises are the only one that has actually been demonstrated in most of the organizations. The lowest level of indicator i=3 (Capability and Capacity of Internal Resources) is measured in 16% of treated SMEs. This result indicates that some of enterprises use old equipment which is not very reliable or an enterprise infrastructure needs to be renewed. Indicator i=4 (Capability and Capacity of External Resources) is the most critical indicator with the lowest value of 48% in the whole sample of SMEs. This indicates the weak connections of enterprises, low level of partnership deals and unsecure relationship with great amount of stakeholders. Indicator i=5 (Organisational Connectivity) has the lowest value just in one enterprise which makes this 4% of treated SMEs. This indicates the need for improving enterprise connectivity within its organizational borders, but in the same time the improvement the channels with external stakeholders. This can be accomplished through the implementation of new connectivity models or through the modernization of connectivity technologies, such as information and communication technologies.

In Table 3 rank of business processes is presented. It is performed by using proposed Algorithm (from Step 1 to Step 9) and corresponding software.

Table 3: Business processes which are mapped with the lowest value of management of keystone vulnerabilities on the level of enterprise

Processes ranked on the fist place	Enterprises
p=1	
p=2	f=4; f=6; f=7; f=8; f=10; f=11; f=12; f=14; f=15; f=16; f=17; f=18; f=20; f=21; f=22; f=23; f=25
p=3	f=2; f=3; f=5; f=19; f=24
p=4	f=9; f=13
p=5	
p=6	f=1

With respects to keystone vulnerabilities, in treated SMEs the most effective processes are p=1 and p=5. Management team should put the most efforts in order to improve management of keystone vulnerabilities in

processes $p=2$ (the lowest value in 68% of SMEs) and $p=3$ (the lowest value in 20% of SMEs) and $p=4$ (the lowest value in 8% of SMEs). This demands developing new marketing strategies, modification of products or designing new products, and emphasizing partnership relations and improving relations with suppliers.

For making strategic decisions in the field of management of keystone vulnerabilities, it is necessary to perform ranking process at the level of treated group of SMEs. By applying Algorithm (from Step 10 to Step 11) rank of business processes is given. It is presented in Table 4.

Table 4: Rank of business processes for SMEs in central Serbia

Business process	The average value of management of keystone vulnerabilities on the level of enterprise	Rank of business processes for SMEs
$p=1$	0.087	4
$p=2$	0.04419	1
$p=3$	0.05281	2
$p=4$	0.08504	3
$p=5$	0.15934	6
$p=6$	0.10064	5

According to the rank of business processes for SMEs in Central Serbia, the lowest value of management of keystone vulnerabilities is present on the level of process $p=2$ – Marketing and sale process. On the strategic management level, this means that new marketing strategies are needed and beside that, new market segmentation in order to stabilize the sale. According to the acquired data, the best management of keystone vulnerabilities is present on the level of $p=5$ – production process. In treated companies, managers of production process are well educated and experienced. On the other hand, the equipment is well known and new production models and maintenance can be implemented and operated.

Important issue for decision making process is information about the possibility that process ranked on the second place ($p = 3$) can be as equally bad in terms of keystone vulnerabilities as the first ranked process.

Using two statistical tests about the difference of means assuming that variances are equal, it can be concluded that both processes are equally bad. The test about the relation of two variances samples at risk of 5% shows the same. It means that management team should take measures to improve both processes in the same time.

5. CONCLUSION

The industrial management practice shows that in almost every enterprise, keystone vulnerabilities represent the most relevant causes of the decline of organizational business performance and may lead to its complete collapse. There are different ways to overcome the vulnerabilities of the organization, and one of the most effective forms of overcoming them is effective management of keystone vulnerabilities. They must be treated permanently because in the time of crisis they may lead to a catastrophe. In this paper, a new fuzzy model for evaluation and ranking of management of keystone vulnerabilities on the process level and on the enterprise level is proposed. The proposed model was tested on a selected group of SMEs of production sector in Central Serbia. The analysis done by proposed model was in a very good alliance with the real situation in SME management in practice.

The following conclusion is made:

- It is possible to describe the considered problem by formal language that enables to look for the solution by exact method.
- The uncertainties which exist in the model can be described by fuzzy numbers.
- The relative importance of the business processes and indicators of key vulnerabilities are stated by pair-wise matrix of relative importance. All the changes, as the changes in the number of processes/indicators (or relative importance) can be easily incorporated into the model.
- The procedure for determination of indicator weight on process level is developed.

The further research will cover the scope of process improvement measures as well as improve the overall organizational resilience.

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FRACTALS MODEL OF TECHNOLOGY EFFICIENCIES PROBABILITIES FOR FLEXIBLE USE IN COMBAT UNITS*

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Abstract: The paper presents initial results in the development of a new simplified analytical model for grouping combat efficiency task functions. The new fractal parts of joint task functions appeared as efficiency representatives. Based on the previous estimations of effective probabilities combat function efficiencies, caused by technology and equipment of units, a new performance named as relevancies was generated. These values are dimensionless random arguments for probability functions joining in fractals. Variables correlated to random fractal changes and reflected as arguments on the efficiency functions. Efficiency probabilities expressed as semi-empirical functions related to the new arguments become deterministic using one pair of probability values and relevancies in reference point. Semi-empirical curves are determined, by the level of technology performances in combat units and its flexible use in different missions. This was possible to represent by the new coordinate frame which provides linking of all functions on 2-D figures. The rotation of axes in a new frame refers to changes of relevancies arguments in flexible conditions of combat units' deployments. The frame is projected from 3-D efficiency coordinates by imaging in to the 2-D figure. The method has limiting opportunities by supposing flexible capabilities in the military tasks of opposite goals. Model used is aimed at varying effective technologies in the combat tasks balancing roles. The flexibility of units could consider readiness of technology for full combat tasks and also for less combat tasks in peace keeping missions by variation of fractal values.

Keywords: combat systems efficiency, probabilistic empirical functions, efficiency estimation methodology, efficiency frame, flexible operations, efficiency model

1. INTRODUCTION

Capabilities of combat units expressed by probabilistic efficiency relations is constraining determined by available technology performances. Best practice of their flexible use, in the particular missions, is not visible from efficiencies expressions. To answer on this, efficiencies caused by technology performances required explanation with additional representative measure, in the form of relevancies. New representative has to estimate importance of related technologies in constrained and oriented types of missions, where combat unit applies achieved level of efficiency. Mathematical expressions and relations that refer probability efficiency of combat units quality was the, leading edge, in estimations of technology efficiency influences on the capabilities of considered combat system.

Full efficiency combat systems, (Ventcelj, 1973, Kovač at all, 2006), are determined by grouping of main task in three particular efficiencies general functions. These are:

- efficiency of command control and information referred as E1
- efficiency of fire power and maneuver, including mobility, referred as E2
- efficiency of protection, logistic functions and other mission sustainability functions referred as E3.

Grouping criterion in this manner, is the consequences of military forces nature, and could be considered as independent of operation, mission, or types of forces. This is more or less accorded with defence technologies grouping by their structure. Efficiency of technology performances as contribution to unit's

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general functions could not be considered in the similar manner. Efficiency functions, as components of full unit efficiency, are structural linked with all combat elements in military deployment (*Ventcelj, 1973, Kovač at all, 2006*). They can assume as the independent in the designed efficiency estimations determined by technology readiness, but with dependable constrains for the variables of combat systems deployment. This is because system requires flexible approach of operational and tactical tasks referring to variable missions. Military missions and flows of operations in new ages, sometimes requires more, less or full missed using of some technology performances which reflects functions efficiency. So called, weight coefficients, as efficiency relevancy measures, cannot answer on question how variations are naturally linked with changes of efficiency probabilities. Variations of relevancies of technology by effects of their performances are used to achieve flexible effects. This not vary their based performances expressed as efficiency values E_1, E_2 and E_3 but vary their importance in linking relations during deployment. Interfering linked relations, for pairs of particular task functions, would be the better base for the new technology grouping. This linking could refer technology contributions in full efficiency during deployment. Constituent's labels for these links are particular efficiency functions. Manner of their new integration is fractal designing of pairs of their functions. Corresponding fractal parts are the elements of full efficiency probabilities. Fractals values can vary by the relevancies of their technology performances, changing more or less, the full required function of efficiency. Improving contribution of technologies, in selected function pairs in fractals, provides variations in their importance regarding the combat or peace keeping mission. Each fractal has its own relative relevancy depend of mission but their constitutive functions depend of initial efficiencies, based on available technology and equipment. Relevancies depend of opposite requirements in the tasks, and, they are variable random arguments. Their variations correspond to fractals variations regarding using of initial technology, as invariant readiness estimated at the beginning. This required promoting new model of efficiency as the function of relevancy arguments which is initially provided by fractals grouping and estimations of their linked behaviour.

2. DETERMINATION OF EFFICIENCY FRACTALS

Composition of three axes of efficiency probabilities, fig. (1) inclined at the angles of 120 degrees makes representative coordinate frame. Frame is projected from 3D, for the efficiency of three particular functions, (*Kovač at all, 2006 and Mlinović at all, 2011*). Triangle surface of full combat units efficiency is composed of particular triangles fig.(2). Two of three main task efficiency functions make fractal space of functions efficiency pairs. Fractals are able to be represented by particular closed triangle surface which composes as constituents of full efficiency triangle fig2. Each fractal triangle has two sides of probability values and one links with them making closed surface structure. Values of surfaces are considered as fractals contribution to the full efficiency estimations, fig.(2), similar as before exposed in ref. (*Mlinović at all, 2011*).

Ideal value of total efficiency is represented by maximum summarized composed equality-triangle surface, for each of efficiency probabilities taken as 0.997, (*Mlinović at all, 2011*), fig. (1), which surface is,

$$\sum_{sbs}^{ID} \approx \frac{\sqrt{3}}{4} \times 3 \times 0,997^2 \approx 1,2897 \quad (1)$$

Task function has limiting ideal efficiency probabilities of about 0.997 which corresponds to three standard deviations (SDEV), for the circular random variable as representative argument for two dimensional distribution law or around three in the case of semi-empirical estimated laws. Roots of probability function are two dimensional normal distribution laws with equal standard deviations redesigned as the special case exponential one dimensional. (*Przemieniecki, 2000*). Argument is taken as the ratio to standard deviation and in that sense of meaning is dimensionless. Real full efficiency triangles is determined for the real measured or estimated expected probabilities of efficiency performances inside of this maximized surface triangles fig.(2). Summarized surface for this real triangle is less than ideal composition fig. (1), (*Mlinović at all, 2011*), and is given by expression,

$$E_{bs}^{st} = 0.4325 (E_1 \cdot E_2 + E_2 \cdot E_3 + E_1 \cdot E_3) \quad (2)$$

Ratio surfaces of real eq.(2) and ideal triangles eq.(1). is taken as combat unit full efficiency probability given by expression,

$$e_{bs}^{st} = \frac{E_{bs}^{st}}{\sum_{sbs}^{ID}} \leq 1 \quad (3)$$

Composed F with eq.(2), eq.(3) becomes,

$$e_{bs}^{st} = 0.335(E_1 \cdot E_2 + E_2 \cdot E_3 + E_1 \cdot E_3) \quad (4)$$

The particular initial efficiency functions has values according to the technologies refers to their declared performances, but virtual vary depend of used conditions. Articles in expression (4), designed as the particular probability functions makes conditions of fractal compatibility considered in the summarized full efficiency. Fractal composition of two interactive technology functions by meaning of their contribution values to the full efficiency is given further.

Fire power and maneuver E_2 linked with command control and information functions E_1 makes structure of first fractal which integrates efficiency in missions and represented joint efficiency of capabilities to defeat targets. This could be determined as the **targets efficiency fractal**, in the form,

$$F_t = F_1 = f_1 E_1 \cdot E_2 \quad (5)$$

Links of fire power and protection have to include efficiency of the all types of self protection capabilities resistances, sustainability linked with urgent logistic support, transport etc. Combat units referred by their technologies and manner of their uses, contributes different in this linked functional pair fractal, used in different missions. This links determined, second, **vulnerability fractal** expressed in the form,

$$F_v = F_2 = f_2 E_2 \cdot E_3 \quad (6)$$

Third constitutive fractal linked pair in this considerations, is protection logistics and sustainability, integrated with command control and information functions. This function pair represents efficiency which does not depends of full fire power and maneuver capabilities in the units missions, but links their efficiencies in considerations. Their efficiency contribution, conditionally, is not influenced by weapon, ammunition and fire control systems technology efficiency, but respects indirect influences through logistic functions, protection transport etc. All relevancy questions which provide sustainability performances can be included in this fractal linked directly or indirectly. This could be determined as the **sustainability influenced fractal in the form**,

$$F_{st} = F_3 = f_3 E_1 \cdot E_3 \quad (7)$$

Final expression of efficiency developed by interactive interferences of main task functions grouped in fractals, becomes sum of probability product particulars as fractal elements in the form,

$$e_{bs}^{st} = \sum F_k = F_t + F_v + F_{st} \leq 0,997 \quad (8)$$

Ballancing contribution of each fractal is $f_1 = f_2 = f_3 = 0,335$, corresponding to the eq.(4) in referencing conditions. These conditions of combat units efficiency refers composed technologies performances implemented in task functions. It is obvious that two particular task functions E_i , and E_j contribute together in the new determined contribution, F_k of efficiency fractals for all i or j , taken as indexes $i, j = 1, 2, 3$, where $i \neq j$, and referring to them $k=1, 2, 3$. This exposed linked manner providing balancing performances of two technology functions in the fractal links. Geometrical form in full and particular fractal triangles, fig.(2), represents how particular efficiency probability efficiencies reflects on changes of both full and fractal triangle values, in composition of final efficiency .

Frame is designed to consider always efficiency as sum of the fractals. Values expressed by eq. (8) are expectations of technologies contributing when they are integrated in the combat unit by variable tasks expressed by expected fractals contributions in them. Fractals provide composition of different applications of particular functions efficiency E_1, E_2 and E_3 , keeping unchanged their technology performances declared values. Denoted names for the fractals maybe, are not précised determined, but, expressed main sense of function pair's integration as interaction of technology. This could approximately orientated the new approach of technology efficiency considerations as reflect to the main combat units capabilities. Compatibility conditions of fractals connections in this triangle are values of task functions efficiency probabilities content in different fractals. Three fractal labels interact different in the different operations. Their constituents' fractal functions, contributing more or less to the overall efficiency.

3. FLEXIBLE VARIATIONS OF TECHNOLOGY EFFICIENCIES IN FRACTALS

Variation of relevancies of technologies performances and their roles in the different missions and operations can be expressed by axes rotation in 3D space, toward compression or extension of fractal surfaces fig. 1 and 2. 3D meaning of these changes corresponds to triangles planed point of view which is not referred in this paper. They decreasing or increasing by axes rotation constrained by two selected angles and one complementary to the 360 degree. This exposes dependable manner which refers flexibility of technology use for each of two functions content in the fractals, and for all considered flexible capabilities. Surface fractals changes express more or less effective use of technology in flexible circumstances. Fractal values do not expressed analogy of mathematical serial or redundant probabilities and reliabilities as noted in (Przemieniecki, 2000). Their composed abilities in this approach are independent of their task orders, which provide to treat technology accordance of task functions also independent. Same fractals contributions coefficient f_k , in the all fractal expressions eq. (6), (7), (8), which are 0.335, means their equal relevancies for their all included function pairs. These equality properties are presented by the equal angles between three coordinate frame axes of 120 degrees. This could mean equal initial relevancies for all technology functions as contribution to tasks. Ideal efficiency triangle in this frame has maximum ideal surface. Ideal triangles surfaces of different central angle values than, 120 degrees, are not equal to this maximized. Angles variations changes, affects full efficiency, because they also changes their fractal values. This could mean different initial relevancies of task function roles expected in mission changes. Proportionally to the rotated angles between i and j efficiency functions, where, $i \neq j$, values becomes somewhere between, $120^\circ \geq \Phi_{i,j} \geq 120^\circ$ of fractal central angles. Angles changes decreasing or increasing the values of fractal triangle surface corresponding to its rotated axes proportional to the expression,

$$1 \geq \left(\frac{\sin \Phi_{i,j}}{\sin 120^\circ} \right) \geq 1 \quad (9)$$

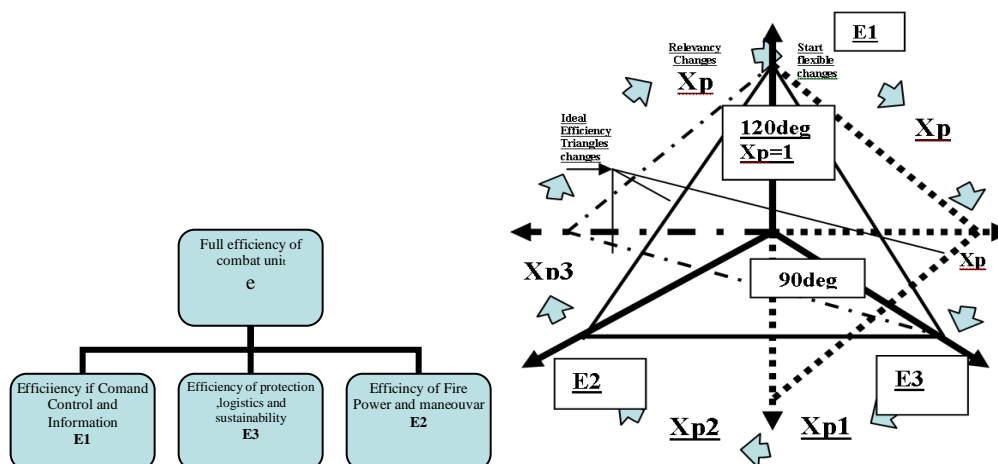


Figure 4: Maximum probabilities of three basic functions exposed on three represented axes

This happens for each fractal respectively, but also, causally to the other neighbors fractals, which shares same i or j efficiency function fig. 2. Changes reflected to full initial efficiency relevancies. Coefficient of technology adaptability, as relevancy performance of this action is representative of combat unit technology used in the new considered circumstance. Adaptability and referencing relevancy values presented by frame **axes rotation** in this model are taken as coefficient,

$$\bar{e}_{id} \equiv \bar{x}_p^{-1} = \frac{\sum_t}{\sum_{bs}^{st}} \leq 1 \quad (10)$$

Their meaning is equal to the inverse values of performances relevancies. Higher relevancies in technology possibilities are less rigid then adaptability equal to one. Value \sum_{bs}^{st} is full ideal efficiency for referencing capabilities. That means that all functions in frame have relevancies $\bar{x}_p = 1$ as the declared by rigid performances conditions of used technology. This value contributes to each initially available function efficiency in fractals, as referencing argument in combat unit, which is preliminary evaluated by appropriate

equipped technologies. Value, Σ_i is also representative of possible ideal efficiencies composition, for all ideal referred function probability values, but forced by new conditions and new flexible requirements. New conditions means new coordinate frame for relative measurement and, corresponding to them, new relevancies estimated from eq. 10. Adaptability refers how big was the price of this new forcing, because technology is not used with its own full capacities or is used as degenerated by performances in the new flexible tactical requirements. This degrades their initial ideal efficiency conditions but distinguish their relevancies as higher than 1 for $\bar{\mathbf{x}}_p$, in eq. 10, as valid argument value for the all efficiency functions.

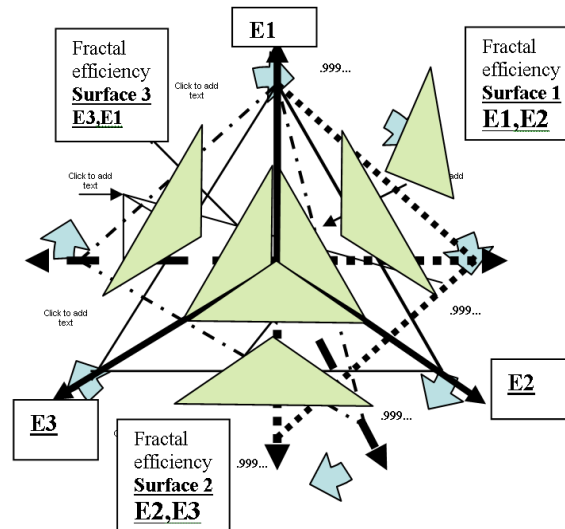


Figure 2: Geometrical expression of real combat system performances by their efficiency functions fractals. Ideal sum of triangle fractals, in eq 10, rotated at the angles $\Phi_{i,j}$ is,

$$\Sigma_i = 0.497 \sin \Phi_{1,2} + 0.497 \sin \Phi_{2,3} + 0.497 \sin \Phi_{1,3} \quad (11)$$

Differences caused by axes angles rotation, makes different values of $\bar{\mathbf{x}}_p$ in eq. (11) and Σ_i in eq.(10) respectively. Less than one **coefficient of adaptability**, as the relative measure represents dynamically degradation of initial ideal probability capabilities which in density probabilities laws functions, (Przemieniecki, 2000), could corresponds to the moments or standard deviations virtual changes. This approach is simplified in paper by semi empirical functions of efficiency probabilities. Changes of axes angles expose behavior that the parts of technologies become more important sometimes and the other parts less important in flexible circumstances. In approach aimed for flexible operations treatment, more significant becomes relative changes then absolute. Some of the fractals in this model behaves in increasing manner representing contributing role of technology properties and some of them decreases, refers same technology functions as less important in the new circumstances. This exposes also relative variations of efficiencies functions proportional to their contributions to each fractal as decreasing or increasing around new relevancy point in eq. (10). How big are these tolerances it is given in the further considerations? Contributing values of fractal surfaces relative to full efficiencies depend of rotating angles is

$$F_k = \left(\frac{E_i(\bar{\mathbf{x}}_p) \cdot E_j(\bar{\mathbf{x}}_p) \cdot \sin \Phi_{ij}}{2\Sigma_i} \right)^{-1} < 1 \quad (12)$$

Values in eq. (12) rearranged in equations (8), gives new expression for efficiency e_i in eq. (8). Combinations of $\Phi_{i,j}$ offers new possibilities to express relative efficiencies as the level of flexibilities, which also refers relative property of technologies, depend of missions.

Examples of considerations using are next. It can considered that one fractal remains same by form and central angle value with 120 degrees, second required to be maximized, changing central angle between functions on the 90 degrees, and third fractal consequently decreasing its values by changing central angle of 150 deg. In this case full relative efficiency is represented as,

$$e_{i,\Phi_{\max}} = \sum F_k \cong \frac{0.5 \cdot E_1 \cdot E_2 + 0.25 \cdot E_2 \cdot E_3 + 0.4325 \cdot E_1 \cdot E_3}{\Sigma_i} \quad (13)$$

Second threshold case could be intermediate which changes 15 deg central summarized angles and achieved also maximized value of third remained fractal triangle.

Third manner of variation reject any interactions in one fractal, as not used in operation or mission. Considering two remained fractals, both can be maximized for the values of 90 deg in the central fractal angles, fig 2. In this case efficiency function is,

$$e_{t, \Phi^2_{\max}} = \sum F_K \cong \frac{0.5 \cdot E_2 \cdot E_3 + 0.5 \cdot E_1 \cdot E_3}{1} \quad (14)$$

and represents maximum of two fractals balancing in efficiency. This could be maximum adaptability and maximum initial relevancies of new frame with referenced relevancy value, $\bar{x}_p \approx 1,2897$. This third function has best representative to explain accommodations of one task function as it Command and control or information significant in the interoperable missions and unit's integrations.

4. RELEVANCIES OF FRACTALS AND EFFECTIVE EFFICIENCY FUNCTIONS OF TECHNOLOGIES CONTRIBUTION

Efficiency expressed by probabilistic functions faced with question which probability distribution law is the best to explain the nature of probability changes referred to the considered values taken as random arguments changes. If model take relevancies of efficiency as the random arguments, the nature of requirement could be not to change initial values of efficiency probabilities but estimated them by variable relevancies as arguments. New arguments then became equal for expression of comprehensive random changes of considered functions. Efficiency probabilities of available initial technology by quality are not changeable. Augmenting efficiencies are virtual, as new relative quality for the available technologies. This explanation is offered by relevancies, as their random arguments in the appropriate probabilistic distribution laws. Assumptions for efficiency dependence between references dimensionless variables as relevancies and probabilities, has simple base in exponential distribution law, redefined in the so called Relay's law. This was base for axes ideal probabilities of all functions but also base for new approach in the considerations. Circular argument is composed by two dimensional opposite arguments as ratio of equal deviations. Their probability distribution integral, (*Živanov, 1973* and *Przemieniecki, 2000*), refers behavior of probability vs. dimensionless relevancies, arguments, $\bar{\omega}$, in the form,

$$\mathbb{F}_{\bar{\omega}}(\bar{\omega}) = 1 - e^{-\frac{1}{2}(\bar{\omega}^2)} \quad (15)$$

fig.(3a). Function has determined fixed values, and does not give experts variations and changes of initial efficiency required by flexibilities. But their form is referencing to explain changes of probabilities by relevancies, using rotated axes. Threshold properties of function are for, $\bar{\omega}=0, \mathbb{F}(\bar{\omega})=0$, and, $\bar{\omega} \rightarrow \infty \mathbb{F}(\bar{\omega}) \rightarrow 1$. Referencing maximum of probability density function, as probability first derivation, in the eq.(15), have argument $\bar{\omega}$, equal one. For the $\mathbb{F}(\bar{\omega}=1) = 0.3935$, their first derivation, is, $\mathbb{F}'_{\bar{\omega}}(\bar{\omega}=1) \approx 0.6065$, and their second derivation is, $\mathbb{F}''_{\bar{\omega}}(\bar{\omega}=1) = 0$. Modern probabilistic theories provides different variations and opportunities to explain the most of variable probabilities behaviors and their changes. Some of them could be employed in this modeling also very successfully using first and second orders moments, of probability density functions. But preliminary estimations with less reliable initial input data as used in older literature (*Mujić J. & Jovanovic M. 1975*), do not need sophisticate theoretical or numerical models. Model derived in this paper, could have semi empirical approvals as the base for experts training in efficiency estimations and their relevancies for the flexible missions. This orientated to the less sophisticated mathematical expressions but with selected properties similar with mentioned exponential distribution law. Requirements are to be more flexible and simple in the initial assumed values then classical assumed known probability functions. Functions extracted from family type, given in the form,

$$F(\bar{x}) = \frac{k\bar{x}^n}{k\bar{x}^n + p} \quad (16)$$

satisfies similarity with exponential distribution function eq. (15). For the values, $n > 1$, function is $F(\bar{x}) = 0$ for $x=0$, and, $F(\bar{x}) \rightarrow 1$ for $\bar{x} \rightarrow \infty$. Function refers to express probabilities semi empirically by the relevancies arguments \bar{x} . Coefficient p, k and exponent n are the dependant of relevancies \bar{x}_p and their probabilities,

$F(\bar{x}_p)$ chosen as the referent, in the point where curve has second derivation equal to zero value, fig 3 a. Their final form, is, only, function of probability efficiency in zero second derivation $F(\bar{x}_p)$, and relevance coefficient \bar{x}_p . Form of this expression extracted from simple functional analyses of eq. (16), if $F(\bar{x}) = E(\bar{x})$, related as efficiency function in this model as,

$$E(\bar{x}) = \frac{E(\bar{x}_p) \cdot \bar{x}^{\left(\frac{1}{1-2E(\bar{x}_p)}\right)}}{E(\bar{x}_p) \cdot \bar{x}^{\left(\frac{1}{1-2E(\bar{x}_p)}\right)} + [1 - E(\bar{x}_p)] \cdot \bar{x}_p^{\left(\frac{1}{1-2E(\bar{x}_p)}\right)}} \quad (17)$$

Values of $\bar{x}_p = 1$ for the each $i=1,2,3$, of efficiency functions, $E_i(\bar{x}_p)$, eq. (17), fig.(3b), which participate in the fractals, eq.(5), (6) and eq.(7) means equal initial relevancies of function probabilities in the frame, which axes are equal inclined, on the 120 degrees. Initial technology performances reflected as considered contributions to efficiency have equal relevancies in this case as the initial readiness expressed by each of the constitutive referencing efficiency $E_i(\bar{x}_p)$.

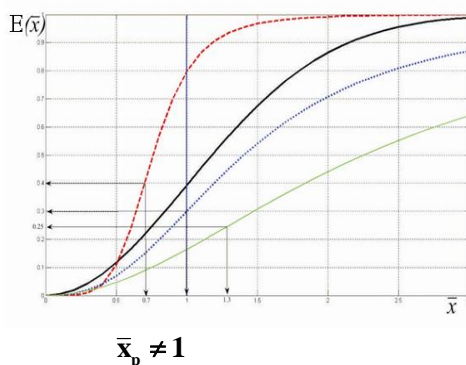


Figure 3a: Approximated semi-empirical function of efficiency probabilities vs. variable initial points

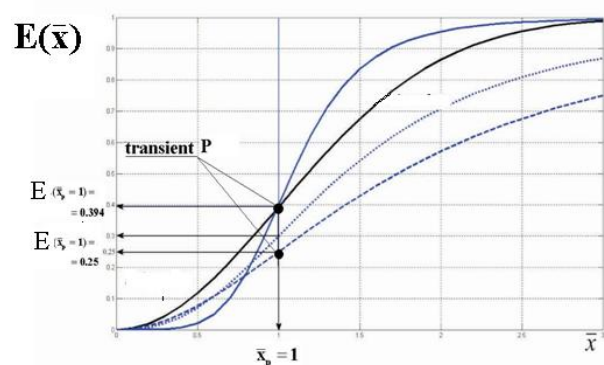


Figure 3b: Approximated semi-empirical function of probabilities vs. equal relevancies

Referencing value can be taken in eq.(17) for all three functional curves in the fig.(3b) also for old $\bar{x}_p = 1$, as for new $\bar{x}_p \geq 1$ relevancy arguments estimated from eq. (10). Then all task functions efficiencies could be considered as values for the new relevancies argument $\bar{x}_p \neq 1$ and compared with old values. Composition of efficiency in fractals put the question which relevancies corresponds to each of particular efficiency functions, after all curves, rearranged their initial position by higher initial relevancies \bar{x}_p . Virtual probabilities of efficiency of i function linked with function j , is new values $E_i(\bar{x}_{ij})$, not same as old one. Each of, $E_i(\bar{x}_{ij}), j \neq i$, functions, have two values, for two different j in their linking at the fractals. Functions, once contributes decreasing of fractal surfaces, and once contributes to increasing of their surfaces by same action of axes rotating in one of directions. This could be flexibility of particular function, $E_i(\bar{x}_p)$, in the new relevancies point eq. 10, expressed over fractals changes. Virtual effective changes corresponding as decreasing or increasing initial efficiency probabilities depend of decreasing or increasing fractal surfaces by new variations of function relevancies around new value of \bar{x}_p . Relevancies values around of new \bar{x}_p point, extracted from the fractals content determined by i and j efficiency functions angle is,

$$\bar{x}_{ij} = \bar{x}_p \left(\frac{2 \sin \Phi_{ij}}{\sqrt{3}} \right) \geq \bar{x}_p \quad (18)$$

It is obviously these changes of fractals values in the new conditions referred as new relevancies \bar{x}_{ij} are not function of fractal values then only of compressing or extending of fractal spaces between function axes. This proves their dimensionless independent character as used variables. This, also, refers about more or less technology flexibilities which are function of initial efficiency, and new probabilities as their virtual tolerances, in the flexible operations. This values corresponds to the efficiencies calculated from eq. (17). Effective relevancy pair of coefficients, \bar{x}_{ij} , applied for two i efficiency functions $E_i(\bar{x}_{ij})$, for each of two $j \neq i$, functions is given from, eq. 17, by,

$$\frac{\bar{x}_{ij}}{\bar{x}_p} = \left[\frac{1 - E_i(\bar{x}_p)}{E_i(\bar{x}_p)} \left(\frac{E_i(\bar{x}_{ij})}{1 - E_i(\bar{x}_{ij})} \right) \right]^{(1 - 2E_i(\bar{x}_p))} \quad (19)$$

The new effective pair of efficiency probabilities for each of task function has to be generated as effective efficiencies caused by its initial values $E_i(\bar{x}_p)$ around new equilibrium relevancy point \bar{x}_p different of 1. Two Fractals making new relevancy, \bar{x}_{ij} , for each of functions as labels of fractals. Also, anyone efficiency function $E_i(\bar{x}_p)$ is vary in two fractals by different relevancies, \bar{x}_{ij} , referring to eq. 17. This could be treated as flexibility, of their technologies using in each of particular efficiency functions. Fractals relative contribution to the summarized new efficiency, e , also corresponds to similar manner as for their surfaces variable values referred in eq. 12. Fractals have new Φ_{ij} , angles between efficiency functions i and j , and exposed as redundant composed links, in the flexible designed full efficiencies. This makes possible to design particular fractals flexibility estimations by compromising variations of their contributions to full efficiencies of combat units.

5. CONCLUSIONS AND CONTRIBUTIONS TO EFFICIENCY METHODOLOGY

This method is not finished yet and is actual research as constrained applicable possibility, but initiates new chapter in efficiency considerations. This is attempt to efficiencies considering as probabilities sum of function links.

Fractal expressed new combat efficiency elements as unit elasticity capabilities in correlation with an old efficiency functions. They integrate efficiency function of combat units by their unchanged technology performances efficiency probability values. Fractals deliberate new considerations of flexible use of some fixed determined technology performances as efficiency properties declared in combat equipment. This provides estimations of multipurpose use of equipment and their adaptability on the mission or operation.

Approach generated new representative variables which become efficiency arguments named as the relevancies, able to be estimated by fractals changes and reflected to the efficiency probabilities.

To simplified fractals approach and probabilities variations usually analyzed by numerical models semi-empirical consideration is designed using excellence special property function which redefines arguments, but not function probability properties by referencing point, where second derivation is zero. This was led regarding the requirements of compatibility conditions expressed by same random arguments.

Angular coordinate frame refers by three functions which compose three interactive function pair's in new fractals. Rotation of axes achieved maximizations minimization or excluding some functional efficiency interactions depends of mission or dynamical flexible battlefield requirements but never exclude efficiency of all three functions. The importance property of the method proves functions native character for the military units at all.

New approaches in the simulations have to provide compatibilities with this approach and technology performances referred in the efficiency functions. The most of new requirements reflects to consider interoperable flexibilities and or their flexible equipment requirements. First approximation could be based on exposed method in this paper.

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RISK MANAGEMENT IN THE MILITARY DECISION-MAKING PROCESS

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Summary: *This paper presents risk management in the process of making military decisions from the aspect of the engagement of units in various Army operations. Particular emphasis is placed on a complex approach to risk management and procedures applied in the process of risk identifying and assessment.*

Key words: *risk, military decisions, risk management*

1. INTRODUCTION

Contemporary environment in which the Army performs its tasks is characterized by a wide specter of threats that may cause various injuries, accidents etc. These threats and new technologies drive the commanders and commands to a constant creativity so as to undertake protection measures referring to their soldiers, units, arms and other equipment.

There is a need for determine guidelines and procedures for risk management in a complex environment in which the units perform their tasks. A broad line of approach is necessary for practical reasons, since the risks come from various sources. Risk management should become a standardized and institutional document, technique, tool and procedure for successful solving of risk management problems on all decision-making levels.

The process of risk management is not an independent process. It is an integral part of decision-making and in no way should be separated from it. It is necessary that it be so integrated that an intuitive risk assessment in a situation that needs urgent reaction is made, thus presenting the integral part of the military decision-making process.

2. THE MILITARY DECISION-MAKING PROCESS

Speaking about the military decision-making process (MDMP), it is defined by the Instructions for operative planning and work of commands in the Serbian Army (Guidance) (*General Staff of the Serbian Army, 2008*). Application of procedures defined by the Guidance should meet the goals of the decision-maker, i.e. various levels of unit commands. This process is formally performed through seven phases of decision-making processes: initiation, orientation, courses of action development, courses of action analysis, courses of action comparison, courses of action approval and work on documents. One of the characteristics of the MDMP is that each of the phases stated is based on data and conclusions from the previous one and that each phase can commence only after the previous one has ended (*General Staff of the Serbian Army, 2008*).

Decision-making divergence of views is caused by peculiarity of the matter researched. This is characteristic for the military decision-making process, as well, since the nature of researched problem analysis seeks for extension of decision-making phases. If the final result is compared, i.e. the decision implementation, there is no difference in connection to decision-making as a universal category (*Karovic, S., Pušara, M., Radončić, H., 2010*). A vital segment to be emphasized in the elements of military decision-making processes refers to risk management.

3. COMPLEX RISK MANAGEMENT

There is uncertainty in every military operation. The commander bears both full responsibility and risk in decision-making. Confronted with an uncertain situation during the process of making military decisions, there exists a natural tendency towards gathering additional information and lessening the suspense. However, waiting and gathering information can lessen the suspense but will not eliminate it. Waiting can also increase the uncertainty because the enemy is given space to take over the initiative which will only make matters worse.

The process of risk identifying, measuring and management is known as risk management. Risk management is an activity designed to improve the chances for realization of a project within the defined time, costs and performances. Complex risk management in the Army is the primary part for identifying hazards and risk control in the process of making military decisions for engagement of units in the mission spectre performed by the Army.

Guidance to operative planning and work of commands in the Serbian Army (*General Staff of the Serbian Army, 2008*) only addressed the risk evaluation segment in the decision-making process. The procedure of the risk evaluation which is necessary in the military decision-making process is not explained, actually the risk management is not explained. The risk is an occurrence which, if it occurs, influences the goal achieving capability in a negative way and has two aspects. The first one is that it will probably happen, and the second is its influence (or consequence) on the performing of the operation. Equation 1 gives the general term for risk.

$$\text{Risk} = F(\text{probability, impact}) \quad (1)$$

Uncertainty means vagueness as to the result of the situation. That is exactly the basic problem because the decision-making process is also performed in conditions which are uncertain. The difference between risk and uncertainty is that risk always carries loss or injury chances. In a situation which includes a favorable and an unfavourable event, risk is the probability of unfavorable event occurrence. In this specific case, uncertainty for the needs of risk measurement is analyzed.

Why is the form of probability used in risks management? Probability is used to express the chance that the event will happen since risk represents the event probability potential. The nature of these events is frequently such that a subjective probability measure in analysis is used instead of objectively gained measures.

Risks management in military decision-making processes for a goal has identification and management of events with uncertain results. Precisely, the focus is on events which, if they occur, have unwanted effect or consequences on the execution of operation. Complex risk management is a consistent process applied in the entire military training and operations, whether individual or team training, and everyday activities as well as in operations performed by units. It is a cyclic process used for continual hazard identifying and assessment, developing and conducting control and result assessment. In that case only and with such approach does it get full meaning becoming an integral part of the military decision-making process.

4. STEPS IN RISK MANAGEMENT

Work on a reasonable assessment and deliberate acceptance of risk is a fundamental question for the execution of operation. Rational assessments and deliberate acceptance of risk is not gambling. Careful risk determination, analysis and hazard minimization by carrying out plans for their elimination, give contribution to a successful execution of mission. As opposed to this, gambling with improbable event heedlessly brings into question the success of the entire mission as well.

Army missions demand the commander to take reasonable risks and to act decisively. Command and other organs primarily orientated on battleground intelligence preparation, enable the commander to identify the risks and give recommendations of how to lessen them. Essential in deciding refers to the element of taking into consideration certain types of risks, i.e. "are they worth taking into consideration".

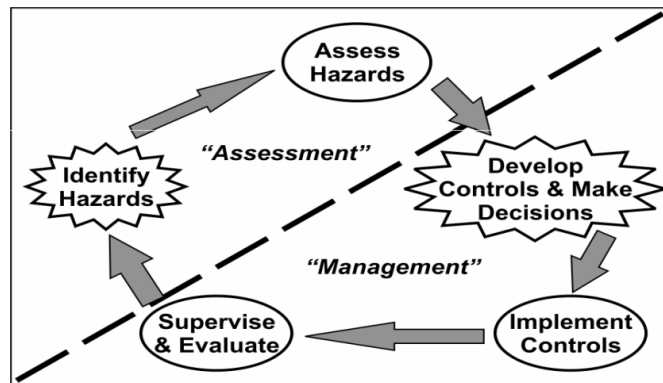


Fig. 1: Complex risk management process
Headquarters Department of the Army Washington (2006) FM 5-19 (p. 1-3)

The most important aspects of command include risk identifying, making decision of how and how much the risk can be minimized, which effects of the accepted risk are, maintaining control for risk alleviation and commanders readiness to accept the risks and to make a rational decision. Complex risk management goes in five steps:

- Step 1- Identify hazards
- Step 2- Assess hazards for determine risk
- Step 3- Risk control and decision-making
- Step 4- Decision implement control
- Step 5- Supervision (monitoring) and risk evaluation (assessment)

Risk management steps are given in figure 1. Steps 1 and 2 are assessments, while 3 to 5 represent managerial functions.

4.1. Hazards Identification

Hazard is such a condition which has potentials to cause various injuries, health problems or death of soldier's damage or loss of equipment and assets or to degrade execution of the mission. It can be a situation or event which can lessen the ability of execution of the mission or its failure. Hazards are present in all types of operations, combat and uncombative. Risk identification defines a cluster of future events which, if they occur, may have unwanted influences on the operation or any other specific criteria defined by the command. Risk identification goal is to number known risks, and the standard format for risk identification in the Army operations are mission factors (fig.2). The stated factors are institutionalized and adopted as key factors in executing Army operations. They are part of the adopted standards expressed through military decision-making process.

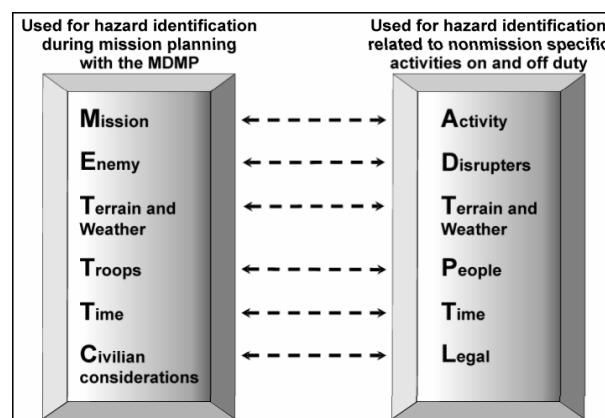


Fig 2: Factor assessment, *Headquarters Department of the Army Washington (2006) FM 5-19 (p. 1-3)*

Risks can be identified and confirmed by systematic command analysis, such as modeling and simulation, observation, assessment and experience. Risks identification includes written material contents analysis efforts and interviews with specialized experts in specific operation fields. Risks interdependence should be

identified through risks identification process, as well. Risk of failing to achieve a goal, in that sense, often influences the ability of achieving another, higher goal.

Hazards can be of various origin. They can be connected to enemy activities, accidents, and weather and environment conditions as well as to certain material and equipment impact. Complex risk management does not make a difference between the hazard sources. The loss of men, equipment or material has the same complex risk management process, in any dangerous situation, no matter of the source, because it affects the execution of mission efficiency (*Headquarters Department of the Army Washington, 2006*).

Institutionalized hazard factors (table 1), provide standardized method for identifying hazards. In the particular case, it will be dealt with the basic factors identified in fig.2, primarily those relating to operations execution.

Table 1: Institutionalized factors for risk assessment

Factors	Definition/explanation
Mission	The very nature of specific operations execution understands risks. It is expressed, particularly, in elements of combat activities between units and conditioned by specific types of maneuver. Therefore a detailed operational plan is significant.
Enemy	The command should first identify the enemy's abilities which represent mission execution hazard. What are the enemy's capabilities to incapacitate execution of the mission? The key segment for the enemy's threat identification is battlefield intelligence which should include both possibilities and weak points.
Terrain and weather	When considering terrain the primary orientation is in how developed are the road, i.e. communication networks, way blocking possibilities, combat activities, and protection characteristics. It is important as well, to perceive the elements that are not characteristic for the Republic of Serbia and refer to altitude, traffic density, quality of roads etc. This is important to be considered in case of multinational or peacekeeping missions. Characteristic weather hazards are weather conditions such as cold weather, ice, snow, rain, fog, wind, high temperature, bad visibility, dust etc. All the mentioned elements of weather should be assessed.
Man-power and material assets	Risk assessment concerning man-power, primarily directs its attention to the level of training and logistics security, i.e. the possibility of equipment quality maintenance. Special care is also taken concerning soldiers' and units' moral-psychological aspects, physical and emotional health.
Preparing process	According to the current and accepted standards, for the command preparing and work process in connection to the decision-making process with the objective of risk lessening, the subordinate structures are given two thirds of the time, and command one third. The units can so prepare to carry out the mission, while commands have opportunities to control realization of preparations as well.
State or legal grounds	This function broadens hazards consideration, especially during any kind of multinational operation. The objective is, primarily, to lessen the civilians' collateral damage, since this can have effects during carrying out the mission. This understands that first of all there are many civilians going on with their everyday activities, then the traffic density which can endanger supplying or say, the existence of criminal groups whose activities could be a hazard for accomplishing the mission.

Factors given in fig. 2 which refer to the everyday Army activities are not the subject of discussion in this paper. It can only be concluded that they are implemented in the sphere of everyday Army activities and are inseparable part of the functions which have direct implications on the units' operational capabilities.

4.2. Hazard assessment for risk defining

This process is realized by applying various methods with the objective of achieving risk level probability. The method of risk assessment will be described in a particular case per elements stated in fig.2, taking into account, primarily, that the assessment is based on experiences and intuition. This arises from the need of understanding risk on all commanding levels. Hazards and risks are assessed during mission analysis, i.e. in the second step of military decision-making process. It refers directly to the intelligence battlefield assessment connected to the aspects that might have effects on accomplishing the mission. The final result of this analysis is an initial risk assessment for every identified hazard expressed as **extremely high, high, moderate** or **low**. These categories are defined by standardized risk assessment matrix (fig.3).

RISK ASSESSMENT MATRIX						
Severity		Probability				
		Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic	I	E	E	H	H	M
Critical	II	E	H	H	M	L
Marginal	III	H	M	M	L	L
Negligible	IV	M	L	L	L	L
E – Extremely High		H – High		M – Moderate		L – Low

Fig. 3: Risk assessment matrix

Headquarters Department of the Army Washington (2006) FM 5-19 (p.1-3)

There are three steps, within this step, that are accomplished, and refer to:

- Assessment of event or occurrence probability,
- Assessment of expected event or occurrence result and
- Risk level determination for given probability and difficulties.

4.2.1. Assessment of event or occurrence probability

This is the first assessment based on familiar information or on previous experience information. Probability is assessed according to frequency of a similar event. For the needs of risk management in military decision-making process, and according to the American rule FM 5-19 (*Headquarters Department of the Army Washington, 2006*), there are four probability levels: **often, probable, occasional and rare**. The meaning of these probabilities is displayed in table 2.

Table 2: Probability meanings

Levels	Definition/description
Often	Known as a regular occurrence. Expected to happen to someone for sure. Often examples are thermal injuries, collision of vehicles and similar.
Probable	Happens several times. Occurs habitually and will happen in a certain moment. Examples may include unintentional dropping weapons, unintentional firing a shot and similar.
Occasional	Happens sporadically but is not unusual. Examples may include unexploded agents elements or warfare against friendly units and similar.
Rare	Is supposed not to happen but is not impossible. Examples may include ammunition explosion during transport.

4.2.2. Assessment of expected event or occurrence result

The sensitivity of an assessment is expressed in the level the incident will affect the operational capability or the success in accomplishing mission. The level of sensitivity is evaluated for every hazard based on knowing the results of similar events that occurred and are graded as:

- catastrophic
- critical
- marginal and
- negligible

The events to be characterized as *catastrophic* :

- the mission on the whole is endangered and cannot be accomplished,
- death and permanent invalidity,
- the loss of critical equipment for accomplishing mission,
- dangerous environmental pollution,
- security jeopardized mission and
- unacceptable collateral damage

The event to be characterized as *critical*:

- units' operational capability is seriously violated and so is the mission, ,
- permanent or partial invalidity or temporary incapability up to three months,
- massive weapon and equipment damage

- property and environment significant damage,
- security failure and
- significant collateral damage.

The event characterized as *marginal* is most often manifested through:

- reduction of units operational capabilities or mission accomplishment,
- minor damages of equipment, property or environment and
- days lost due to injury or illness up to three months.

Characteristics of *negligible* events:

- little or no negative influence on the units' operational capabilities and accomplishing mission,
- first aid or minor medical treatment,
- minor technique damage, but in function and repaired and
- minor or none environment damage.

4.2.3. Level of risk defining

Using risk assessment standard matrix (fig.3), the possibilities and gravity for each identified hazard is converted in a certain level of risk. Figure 3 represents the classic 5 x 5 risk ordinal matrix. The level of probability is given down the vertical side of the matrix (fig.3) and influence (consequences) along the horizontal side of the matrix. The higher the level of probability is, the greater is the risk event occurrence. The lower the probability level is, the less probable is risk event occurrence. Similar is the relation for consequences. Higher influence level - the greater are risk event consequences referring to operation or mission. Lower influence level - the less are risk event consequences referring to operation or mission. This matrix gives probability and gravity assessment expressed in the terms of standard level of risk. The assessment is not absolute and might only be an indicator, or need not, of the given work, activity or event relative hazard. The levels of risk are given in the lower left angle of the matrix. All the accepted residual risks of the matrix must be approved by the appropriate commanding level. Certain risk levels and their implications concerning the mission are given in the ordinal table3.

Table 3: An Ordinal Scale for Occurrence Probability (*Headquarters Department of the Army Washington (2006) FM 5-19 (p.1-3)*)

Ordinal Scale Level (Score)	Definition/Context: Occurrence Probability
Extremely High Risk (E)	Loss of ability to accomplish the mission if hazards occur during mission. A frequent or likely probability of catastrophic loss (IA or IB) or frequent probability of critical loss (IIA) exists. This implies that the risk associated with this mission, activity, or event may have severe consequences beyond those as associated with this specific operation or event. The decision to continue must be weighed carefully against the potential gain to be achieved by continuing this course of action (COA).
High (H)	Significant degradation of mission capabilities in terms of the required mission standard, inability to accomplish all parts of the mission, or inability to complete the mission to standard if hazards occur during the mission. Occasional to seldom probability of catastrophic loss (IC or ID) exists. A likely to occasional probability exists of a critical loss (IIB or IIC) occurring. Frequent probability of marginal losses (IIIA) exists. This implies that if a hazardous event occurs, serious consequences will occur. The decision to continue must be weighed carefully against the potential gain to be achieved by continuing this course of action (COA).
Moderate (M)	Expected degraded mission capabilities in terms of the required mission standard and will result in reduced mission capability if hazards occur during mission. An unlikely probability of catastrophic loss (IE) exists. The probability of a critical loss is seldom (IID). Marginal losses occur with a likely or occasional probability (IIIB or IIIC). A frequent probability of negligible (IVA) losses exists.
Low (L)	Expected losses have little or no impact on accomplishing the mission. The probability of critical loss is unlikely (IIE), while that of marginal loss is seldom (IIID) or unlikely (IIIE). The probability of a negligible loss is likely or less (IVB through IVE). Expected losses have little or no impact on accomplishing the mission. Injury, damage, or illness are not expected, or may be minor and have no long term impact or effect.

4.3. Risk control and decision-making

The hazards and certain initial level of risks are identified in the second step of risk management process. To implement control and make decision is essential in the following step. The hazards are assessed by

residual risk determination. Decision - making is based on residual risk assessment and the process of developing control and risk reconsidering continues till the acceptable level of risk is achieved. Risks should be reduced to the level that their performances are below the potential gain. This process runs in steps of development courses of action, courses of action analysis, courses of action comparisons and their approval in the process of defined standard procedures of military decision-making (*General Staff of the Serbian Army, 2008*).

The commander performs control to eliminate or reduce the risk (its probability), once the assessment of all hazards is done. The basic function of control is shown through: *degree level of training (level of competence) of units, physical control and warning (avoiding)*. Degree level of training control comprises elements characteristic for qualifying, i.e. whether the performances of the defined standards of training processes have been achieved. The segment of physical control is performed through physical protection of certain localities or placing certain warning signs. Finally, avoiding refers to physically eliminating contact with identified hazards.

According to the American Manual for risk assessment (*Headquarters Department of the Army Washington, 2006*), for the control to be efficient, it should fulfill the following criteria: that it is convenient, feasible and acceptable. Control convenience is manifested through removing or reducing hazard risk to an acceptable level. Control feasibility represents the quality of the unit to perform control, while the control acceptability expressed in subjective justification of time and resources spent, through gained benefits.

The important thing to be kept in mind is the so-called residual risk remaining even after control. Controls cannot completely eliminate risk reduction of certain hazards. Total residual risk will be higher or equal to the highest identified risk residual. Keeping in mind the complexity of remaining controls and potential synergistic effect of all hazards the commander can decide that the accomplished mission residual risk is high.

The very decision-making represents defining what acceptable level of risk is. Risk or potential loss should be coordinated according to expected gains. All decisions, this is to be pointed out, on all commanding levels, should be based on adequate risk assessment.

4.4. Decision implementation control

The fourth step in risk management, which refers to decision implementation control, gets its significance when commander gains access to certain command executions, directives, orders etc. Each segment included in the reducing of risk control in this phase turns into an operational action which is to be executed in order to justify the execution of control and reduce risk to acceptable level.

4.5. Supervision (monitoring) and risk evaluation (assessment)

The last, fifth step of the comprehensive risk management in military decision-making, represents supervision and risk assessment as means to secure realization of risk control according to defined standards. The adequacy of means for confirming chosen control measures in support of objectives and wanted results is provided as well. This consistent process provides probabilities of influence on identified weaknesses and the possibilities of changing or correcting control results.

Supervision should be apprehended in terms of control measure and it represents an integral part of risk management in the military decision-making process. Supervision enables the subjects to understand how, when and where the controls are performed. It secures from standards inadmissible deviation or violation of policy and risk control which might jeopardize mission accomplishment. Supervision and control enable the commander to predict, identify and assess some new hazards and if needed risk controls to be modified.

Evaluation (assessment) is performed throughout all stages of operation, as well as upon accomplishing the operation or a certain phase. Evaluation should:

- identify all hazards that have not been identified as a segment of the initial assessment, i.e. identify new hazard which appeared during the operation or other activities,
- assess efficiency in giving support to operative goals and tasks (have the controls influenced in a positive or negative way on training or mission goals achievements),
- assess the residual risk accuracy and control efficiency in hazard elimination and risk reduction and
- secure coordination with the leading principles of complex risk management. It is integrated in all stages of military decision-making process. (Are all assessments accurate? Are they on the defined

level? Have there been needless risks? Was the process cyclical and consistent during military decision-making?)

These are the most important elements referring to supervision and evaluation of risk assessment. It is important to stress out, however, that the complex risk management is realized in a standard manner in order to keep consistency with the mission and task demands. For risk management various tools adapted to show information for complex risk management can be used. Particular tools in the form of specific patterns which serve for definite assessments are not the subject of discussion in this paper, it would be a new paper which would also include particular questions for definite hazard analysis and assessment.

5. SUMMARY

Risk management is based on comprehending that risky event by its nature will probably occur, and condition is significant for it to be identified, i.e. reflection of what is familiar today. That is the root of identified risky event cause. Therefore, condition is an event that happened, that is currently going on or will definitely happen. Venture events are future events which can occur due to the conditions of the present times.

It can be concluded that complex risk management in the military decision-making process represents integral part of the decision-making process and accompanies all military decision-making stages and steps on all levels of command. It began as a necessity simply because the army executes missions and tasks on different locations with various hazards. Risk management in military decision-making has as goal to identify and manage events whose results are uncertain. It is, therefore, important to secure the success of the mission with acceptable losses and which in a way can be the criteria for accomplishing mission objectives.

The American rule Field Manual no. 5-19 for risk assessment served as basis to this paper. Work on this paper indicated that risk should be managed in a complex way. Ordinal scales of the meanings of certain risk probabilities, which serve as standard values for defining level of risk in operations and army missions. are specially identified.

This paper does not cover the tools used immediately for risk analysis and assessment in a particular type of operation. It would be, therefore, advisable in future similar papers to concentrate on creating standard tools for risk assessment for the particular type of operation. The risk management standards in the military decision-making process would so be provided as well as a standard tool for risk analysis.

Matrix 5 x 5 for risk probability assessment which defines the level of risk as well, served as basis for the assessment of level of acceptability of specific type of risk. Complex risk management never ends and represents the cyclic continuity which demands constant warnings in the process of military decision-making and undertaking steps for its reducing or elimination and bringing to an acceptable level.

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ORGANIZATION REPUTATION AND RISK: STAKEHOLDERS PERCEPTION

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Abstract: *Corporate reputation is the overall assessment companies follow based on the opinions of stakeholders, previous actions, and potential future actions, regardless of their interest in the company's products, whether they work for the company or invest in company's shares. Reputation and risk are inseparable social institutions, and studies analyzing this relationship are still unfinished. Reputation can affect the shareholders, the public, voters, investors and policy makers (stakeholders), so that they think that a private organization or a public institution is reliable and there is no doubt about risk when this company is concerned, but have a real aversion when there is a possibility of the reality to be different. Reputation often has an impact on many social situations, especially where participants are required to make decisions, but also whether reputation really affects the existence of risk or it is just a psychological phenomenon in stakeholders and a PR mask.*

Keywords: *Risk, reputation, stakeholders' perception, organization.*

1. INTRODUCTION

A significant number of organizations recognize value based on good reputation and even consider it their greatest asset. Often, false presumptions on reputation could have a dangerous reality which is not instantly obvious. Nowadays, it is possible to ruin reputation unless it is maintained, especially since public and private is almost equal as a consequence of the Internet and social networks. Companies try to anticipate this and this way protect the reputation and provide ways to handle possible risks. Reputation is seen as an intangible asset with a value potential (Bebbington J., 2008), it is hard to make and easily erodes. Reputation is the main factor in risk, particularly in the organizational and managerial context. Essential reputation is a socially built phenomenon. (Kewell, 2007)

Risk management concept is based on a basic premise that risk management is a planned, far-sighted, structured, informative and constantly changeable technique. The key to successful management risk is early planning and aggressive implementation. Good planning enables an organized, comprehensive and iterative process of identification and risk assessment and an appropriate response. (Malbašić S., 2006) Often, the concept of risk management is related to finance, but does not have to be. Risk is present everywhere, from occupational safety, the health of employees, environmental protection, information security and the sufferings of passengers in a vehicle or surgical intervention risk in health care institutions. Risk does not only threaten the security of a system but also the probability with which a loss may occur. (Cvetković, 2006) In other words, risk is a combination of the probability of it occurring and its consequences and according to the OH&S risk: Risk is a combination of probability of occurrence of a hazardous event or exposure and the severity of injury or threat to health that may be caused by the hazardous event or exposure in relation to work. (OHSAS, 2008) Risk is often associated with uncertainty and insecurity. Uncertainty is generally defined as a lack of knowledge about the outcome and risk has known probability, while uncertainty, even when we have knowledge about it, we lack in a precise probability. (Vincent-Wayne, 1998) *By integrating these definitions which describe the concept of risk we can conclude that the risk apart from the probability of the occurrence of an adverse event and its consequence, it represents the possibility of occurrence of events which will affect the attainment of goals i.e. risk is the description of the possibility of a different outcome than that expected.*

The paper will show the relationship between reputation and risk, mutual influence, examples of bad influences and the importance of reputation in risk analysis. The elements which influence the making of a good or bad business image, when assessed by individuals are also a part of this paper.

2. THE PERCEPTION OF REPUTATION

Stakeholders and the interested parties often associate reputation and risk in the sense that good reputation reduces or even excludes the possibility of risk, which will be shown through several examples in this paper. The above mentioned leads to the conclusion that dependence on finance, quality management, corporate social responsibility, staff and the quality of products/services creates the image of a company's reputation. Reputation is a set of assumptions, beliefs, ideas and images that reflect the position and respect of the given object, person, social group, product, organization, etc. (Kewell, 2007) Positive corporate reputation is an important driver of a successful organizational relationship with our clients, who may have a significant impact on the business of a company. Also, the reputation of an organization allows the company to rise above and differentiate from the competition in their geographical area. Reputation of a company can gradually increase or decrease depending on how much the organization deals with the public, how present it is in the media, depending on vendors, employees and other stakeholders. It is important to build reputation and constantly think about it because if it is once damaged, it is extremely difficult to restore it.

The following five elements influence reputation:

- Financial management;
- Quality control;
- Performance of social and environmental responsibility;
- The employees and
- The quality of goods or services.

It could be argued that these aspects are used by individuals when evaluating reputation and those which managers believe that individuals can use when forming their own perception of reputation. The main elements of reputation are the public's awareness of you, recognition, trust and quality they relate you with. It is the most important intangible value of a company. Reputation is not just what other people are talking about the company. It is also the function and the result of what the company is doing both internally and externally. Clients often find that respectable companies have products or services of high quality and that their high cost justifies it; which does not necessarily mean it is true, but it works. The process of management of social reputation makes employees, business partners and suppliers an important target group of users, stakeholders and other "outsiders". Reputation can be defined as an ambassador of companies and firms and as a key in marketing. All organizations with their work/inaction affect their own reputation which differentiates them from the competition. Good reputation affects the stakeholders so that they often filter the negative information about the organization.

The concept of reputation is mistaken with image and identity. Identity of an organization is in fact what it is – beliefs, attitudes, culture, etc. On the other hand, image is the impression that the public has about an organization or a person. Image and identity of an organization will be formed even if nothing is done. Reputation, corporate reputation or image can be represented as a value judgment about a company based on a corporate identity and image. A company which respects reputation becomes the target group for all stakeholders.

Deephous (2000) point out that: "Significance of reputation:

- Attracting and keeping good employees,
 - Assistance in doing business with suppliers,
 - Influencing political and regulatory considerations,
 - Keeping and attracting clients and users of services and products,
 - Development and support of all brands,
 - Improving relationships with investors,
 - Help with strengthening internal communication and interpersonal relationships of the employees,
- while the key elements for reputation are the following:
- Products and services – values and qualities
 - Social responsibility,
 - Good working conditions and environment,
 - Financial and emotional conditions,
 - Technical ability and
 - High level of intellectual capital and knowledge management"(p. 1101).

Positive reputation is important as a competitive advantage because it informs the interested parties wishing to negotiate with it about its attractiveness. Also, the media play a significant role in gaining positive reputation. One study found that local newspapers have a stronger effect than television, and in 1991 it was found that 67.3% of the respondents in a national survey received the news about local businesses from local newspapers, television or radio. (Deephous, 2000) Nowadays, in addition to newspapers and television, one of the major media providing information on organizations, their activities, achievements and responsibilities is the Internet.

3. REPUTATION AND ORGANIZATIONAL RISK

Stakeholders used knowledge about and recognition of reputation to estimate the value of such entities, reliability and ethics at a given time, risk, as an opportunity and a threat it poses, the quality of products and services they provide and the organizational level of overall effectiveness. The processes which form reputation are mainly based on the exchange of images, impressions, telling, from "word of mouth" and the descriptions of experiences among social actors. Micro-processes are the basis for the growth and spread of reputation among social actors within and across social networks and organizational fields. Many potential users do not want to test new companies with no previous record, experience and good practice, especially with regards to large projects, because they fear the negative consequences and possible risks. An example where the image had great influence is the example of "Gerber" company, a baby equipment manufacturer with reputation similar to "Chicco" company, which withdrew plastic baby bottles from the market last year because they contained harmful Bisphenol A (BPA), a chemical used to produce plastics for which research has shown that it can seriously jeopardize children's health. And hundreds of parents, loyal to the brand and reputation of the company on the market, used these bottles before withdrawal, not thinking about the possibility of risks to the health of their children. This is another proof that reputation has a very strong impact on the perception of customers.

The discussion held so far raises some important questions. How and why could those who research risk analyze the relationship between risk and reputation further? How could social problems and situations apply this? What methods and approaches could be used? The paper will show the following three strategies for exploring these issues like Kawell point out that:

1. "Traditional established research methods
2. Stakeholders method
3. Discussion method". (p.1101)

In the first strategy, the participant expects that not only will his current behaviour affect the immediate consequences which he will be faced with in the current situation in the future, but also the subsequent behaviour of his partner and therefore have consequences for himself, so he has an incentive to compromise between short-term effects of his current decisions, and their long-term effects on reputation. This compromise can significantly affect the behaviour of participants. In this model, reputation is seen as central to human decision making, along with human knowledge and risk analysis.

In the second strategy, reputation is seen as the absence of uncertainty in stakeholders when estimating firms as potential suppliers of products or services. Participants who are in authority are key and have access to stakeholders and have a tendency to influence the choice stakeholders would make in decision making, helping them to shape their attitudes. Stakeholders are seen as a part in the creation of organizational reputation, but under some circumstances it does not necessarily apply. The importance of the relationship developed between different stakeholder groups and organizations is closed. The analysis shows the entities/subjects as a large company that aspire to see some stakeholders that are more powerful than others. The methodology of the research of the findings on reputation and risk among the participants would include a combination of statistical analysis, statistical survey of stakeholder opinion. The goal of this approach should consider how knowledge of the model distinguishes between stakeholder groups and what actually affects their personal and/or collective sense.

The third approach refers to research of the role of reputation in language games promoted by managers and professionals and their stakeholders. Reputation is a part of managers' and other political actors'

weapons they rely on when engaging in the struggle to manage programs and resources. Its influence is effective in situations where organizational actors, especially executives, are trying to create legitimacy for making plans and proposals and strengthen their control over decision-making. Such images and narratives can be aimed at very powerful forms of propaganda, and often succeed in creating a viable and compelling support for managerial activities.

This means that although focused on different things, they share similar ontology, research-based study of relationships between participants in networks of both social and organizational fields. They are different but potentially complementary, and share a common foundation as a reference point. Methodologically, they can be investigated using the normative methodology of social sciences, such as questionnaire, interview, mathematical modelling and so on. Stakeholders and interested parties should be aware of the fact that there is no entrepreneurial activity without risk and when reaching a goal, there is still a minimal risk or a chance of risk which needs to be predicted on time, defined in ISO 31000:2009 where risk is: "The impact of uncertainty on objectives", referring to business objectives. (ISO, 2009)

3.1 EXAMPLES OF RISK AND REPUTATION PERCEPTION

An example of the relationship between reputation and risk, where risk was reduced by increasing the company's reputation, is the famous ship Titanic. The myths regarding the construction of Titanic and the belief of experts in its infallibility as a sailing vessel, and if it can be an extreme example, such processes go through a myriad of settings in order to form our concept of security, threat, risk and resilience in different ways. Doubts and risk that something might happen to the ship were minimal. This is an obvious example when good reputation, owing to the media and the opinion of experts in public, influenced the user's perception of risk, security and threat. These notions were not even present in the minds of travellers; yet, the tragedy happened. The effort of public relations, media and spreading effects clearly play a role in the harmony of institutionalized prestige and reputation. They are an important factor in strengthening or weakening of the image of reputation through time and space.

Another example of the relationship between these two concepts, which also shows that reputation does not necessarily exclude risk, is the Bristol tragedy, sometimes called the BRI disaster, where the false assumptions about reputation often have a hidden dangerous reality. The BRI case acts as a starting point for discussion. BRI was the only teacher lecturing Hospital in southwest England that had been awarded the status of the "centre of excellence" for paediatric surgical operation in mid 1980. Although there are many facets of the tragedy, the key actors (stakeholders), the events that occurred, including parents and guardians, status of the award for excellence is associated with security and has an aversion towards risk. In 2006, the Bristol tragedy resulted in the death of 34 children who were cardiac patients. This incident points to the effects of reputation that have long been regarded as virtues, and devices for incubation of threats and the crisis of the incident. The Bristol disaster marked the emergence of two opposing beliefs about the reputation among doctors. There are certain beliefs that show paediatric (baby) cardio surgery in a positive light and point to the fact that the work of the Bristol paediatric team was in line with normal expectations from a "centre of excellence." However, the emergence of new physicians and surgeons who were recruited in the hospital from other centres of excellence from Britain and abroad between 1988 and 1994, admitted that the operation and performances were dangerous and beyond tolerable, i.e. out of range. Kawell (2007) point out that "Critically speaking, these new participants were able to perceive the danger that their colleagues were not able, and this way actually begin the process of the destruction of the localized reputation of the hospital. This case shows how the perception of reputation may be different among social actors. It also highlights the dangers that may arise from the effect of reputation. In this scenario, different groups of social participants have different opinions about the reputation and risk".(p.254) A proposal for further research is to consider how relations between the participants affect the occurrence of certain events of tragedy or crisis, or how their perceptions regarding the organization differed before and after the disaster.

In contrast to these examples, Michael Ewing, Albert Caruana, and Ernest Loy conducted research that measured the impact of reputation of consultant companies to risk, by the customer. The results show that clients prefer to use a consultant company with a good reputation, and only those with international cooperation, since they recognize the room for improvement of their projects. However, this study suggests that reputation is a measure of risk, and that these factors are different concepts, and that the organization which does not have a good reputation may still be eligible for co-operation. Also, it does not mean that a company with good reputation excludes the presence of risk. Working with organizations of high reputation can provide the client with a psychological advantage to not think about the threats but the uncertainties,

challenges, surprises, mistakes and the strengthening of competition should be seen as part of the company's life when it comes to the role and finances. (Ewing M., 1999)

4. INDIVIDUAL'S AND ORGANIZATION'S PERCEPTION OF RISK

Managers dedicate the most of their working time to the analysis and decision making. The consequences of decisions are fully recognized and felt only in the near or distant future that is always more or less uncertain (Vujošević, 2008). Modern, proactive management concept does not tolerate errors and does not recognize the justification for a bad outcome. It is promoted by the slogan: "Create the Future", i.e. make the future to be what suits you best. (Slovic P., 2004) Dealing with risk requires an understanding of processes that can lead to undesirable outcomes. This is the subject of risk analysis, which is a prerequisite to sound and effective risk management. The perception of risk can significantly be affected by an individual's sense when viewed from the psychological side. Earlier studies have shown that a sense of fear in humans affects the perception and acceptance of risk and hence the reputation. The opinion about an activity or technology is not only what we think about it, but what we feel as well. If a person has a fear of flying, their view of risk is at a maximum i.e. risk is seen as one hundred percent, regardless of good practice and the reputation of the organization.

Paul Slovic found that there is a positive and a negative impact connected to Information on risk and benefits in individuals. If there is a good feeling then they think the likelihood of the risk is less and the benefit great, and if a feeling is bad or negative, then the opinion of the risk is high and benefit is small. The information to be placed may affect the perception of risk, as one study found. Information "benefit is great" implies the opinion "risk is lower," and vice versa, the information "risk is small" implies "benefit is great," and both inputs have a positive impact. While the information "benefit is small" implies "risk is higher" and "risk is higher" implies "benefit is small" generally have a negative impact. (Slovic P., 2004)

Another study regarding the personal perception of risk is that white men tend to differ from all others in their attitudes and perceptions, on average, they are much more accepting of risk than other people. These results suggest that factors such as socio-political power, status, alienation and trust are a powerful tool for people's perceptions and acceptance of risk. (Flunn J., 2004)

Corporate governance is based on responsible management in achieving strategic directions and goals of business, risk management and disposition of resources. An important area for each organization where risk management is primary is finance. It should be noted that risk management is a skill based on the experiences and assessments of management. Risk management is not an end in itself but is primarily a means for achieving these goals. Enterprise risk management is closely linked to the process of corporate governance in the way that the board of directors (management) provides information on major risks and how they are managed. In addition, this approach of risk management can help organizations ensure compliance with laws and regulations, avoid loss of reputation and other negative surprises. (Lukić S., 2011)

When speaking about reputation, the practice has shown that organizations often give priority to risk, talk about and "take care" of it when it comes to social responsibility. Management often uses environmental or safety of employees at work for marketing purposes. They are aware of the sensitivity of their environment on sustainable development; therefore we may get the impression that risk management in this area is the only business of that company, according to media coverage. Such example is the Pancevo industrial zone. For days, the measures of protection, safety and security against air pollution were promoted, promises of filters and improvement of processes were made; finally, in 2009/2010 the air pollution crossed all limits and sirens disturbed citizens who watched in fear the values of the parameters increasing and closed windows. It was said that politics interfered in order to gain election points and opportunities for new promises. From that day on, the citizens have no more trust in the right risk management of industrial zones due to the poor reputation of the media; they are scared and aware of their own risk when staying in the city, but no media mentioned that the parameter values were above limits in the previous years; only that was not published. If the measures to keep the pollution within the specifications would be implemented, the citizens would need a few years to mitigate the perception of risk and feel safer through media appeal.

Management, which has a major role in the management of risk, is perceived differently when it comes to economic risk and the risk of social responsibility (CSR - Corporate Social Responsibility). What they find more important is profit and survival, but when you need to build reputation and prestige, then social responsibility takes precedence. CSR reports can be seen as the result and part of reputation of risk

management. It is arguable whether reputational risk can be managed directly. If managers believe that they can do it and if they see a CSR report as a part of that process, then further investigation is justified. Companies increasingly recognize that risk management, when it comes to reputation, is one of the main drivers of corporate social responsibility and are aware of the need to manage a wide range of environmental, social and ethical risks, and that the public is informed about it (Bebbington J., 2008). Often organizations meet the needs of the "powerful" stakeholders than the "less powerful", i.e. they are more likely to meet the demands of powerful financial interest groups than the demands of environmentalists. Most companies are interested in having some kind of visible social responsibility and are not aware of the risk of not managing it.

It is recommended to establish a special organizational unit for analyzing and managing risk, as it is drafted in Figure 1. Acceptance and observance of standards plays an important role in the process, as well as training employees, motivation and awareness of risk. What is interesting is that modern successful managers are more prone to risk than not. On the other hand, almost all people become averse to risk when the stakes are very high, regardless of the expected profit. (Vujošević, 2008) Therefore, the conclusion is that management is responsible for risk management, but at the same time management should not ignore the reputation of the company they manage, because breaking the connection between risk and reputation can only have a negative impact on the organization. The paper gives examples which presume that good reputation reduces perceptions of risk in stakeholders and increases the benefit of the organization, which does not mean that risk should be managed and reduced to the same minimum in each area (finance, information security, safety and health at work, environmental protection, etc.).



Figure 1: Organization for risk management

5. CONCLUSION

The systematic study of risk connected to reputation remains one of the key management challenges. Positive corporate reputation is an important driver of a successful organizational relationship with clients, who may have a significant impact on the business of a company. There are no definite studies showing a correlation between reputation and risk, although it often seems that way. Reputation can help attract interested parties but risk is always present, in greater or lesser extent. The focus of each organization should be on preventive measures, whether it be in finance, safety, environmental protection or the protection of data, caution is always desirable. The public needs to know not only the risks but also what managers responsible for the risk are doing to restrict it, and what individuals and communities can do to mitigate the potential bad effects on them. Also, what may affect the perception of risk are the communication capabilities of a PR manager. This person informs the public about whether there is risk, and if it exists, processes it on different levels, both within and outside the organization, and depending on the target, decreases or increases the perception of risk with stakeholders. The objective of risk management is not only to avoid losses, but also to improve the reputation, incomes and competitive advantage. The paper showed that the evidence from the BRI tragedy suggest that reputation may play a role in mitigating the impact of organizational disasters. Risk can also be viewed through the emotions of individuals (fear of flying); in this case, the reputation can have absolutely no impact. However, stakeholders choose which company they will do business with and which organization they will invest in for financial security. In this case, reputation can play a major role in decision-making, but it does not mean that security is guaranteed and the risk is excluded. The risk is present daily in every process, but people's awareness of this issue may be lower or higher concerning the reputation of a company, personal emotions, fears, or good/bad experience. Further research could go in the direction of a more detailed involvement of employees, as a

part of stakeholders, in the perception of reputation and risk as well as the inclusion of quantitative methods in the analysis of the costs of reputational risk.

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A NEW GVNS HEURISTIC FOR SOLVING TRAVELING SALESMAN PROBLEM WITH TIME WINDOWS

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Abstract: In this paper we present a new GVNS based heuristic for solving Traveling Salesman Problem with Time Windows. New procedures for feasibility checking of 2-opt and Or-opt moves are proposed. The method is tested on benchmark instances from the literature. The obtained results show that our new method is very efficient in solving large scale problems.

Keywords: Travelling Salesman Problem, Time Windows, Variable Neighbourhood Search

1. INTRODUCTION

The Traveling Salesman Problem with Time Windows (TSPTW) is a variant of the well-known Traveling Salesman Problem (TSP). Suppose that is given a depot and a set of customers (each customer has its service time (i.e. the time that must be spent at the customer) and a time window defining its ready time and due date). The TSPTW problem consists in finding a minimum cost tour starting and ending on a given depot, visiting each customer exactly once before its due date. The traveling salesman is allowed to arrive at some customer before its ready time, but in that case the traveling salesman has to wait. The cost of a tour is the total distance traveled.

Suppose that is given graph $G = (V;A)$, where $V = \{1, 2, \dots, N\}$, 0 is depot and $A = \{(i; j) : i, j \in V \cup \{0\}\}$ is the set of arcs between customers. The cost of traveling from i to j is represented by c_{ij} that includes both the service time of customer i and the time needed to travel from i to j . Each customer i has an associated time window $[a_i, b_i]$, where a_i and b_i represent the ready time and due date, respectively. So, Traveling Salesman Problem with Time windows can be stated, mathematically, as a problem of finding a Hamiltonian tour starting from the depot, that satisfies all time windows and minimizes the total distance traveled.

TSPTW is NP-hard problem since it is a special case of the well-known Traveling Salesman Problem which is NP- hard problem. Because of that there is a need for a heuristic which will be able to solve efficiently realistic instances in the reasonable amount of time. In that direction, some steps have been already made. For example, Carlton and Barnes use a tabu-search heuristic with a static penalty function, that considers infeasible solutions. Gendreau et al. propose a insertion heuristic based on GENIUS that gradually builds the route and improves it in a post-optimization phase based on successive removal and reinsertion of nodes. Calvo solves an assignment problem with an ad hoc objective function and builds a feasible tour merging all found sub-tours into a main tour, then applies a 3-opt local search procedure to improve the initial feasible solution. Ohlmann and Thomas use a variant of simulated annealing, called compressed annealing, that relaxes the time windows constraints by integrating a variable penalty method within a stochastic search procedure. Two new heuristic was proposed in 2010. One heuristic was proposed by Blum et al., while the other was proposed by Urrutia et al. These two heuristics are, currently, the state of the art heuristics.

In this paper we propose new two stage VNS based heuristic for solving the TSPTW problem. At the first stage we are using VNS to obtain feasible initial solution, while at the second we are using VNS to improve initial solution obtained at previous stage. This idea was originally proposed by Urrutia, but our implementation of this idea is more efficient than that of Urrutia since we succeed to improve some best known solutions.

2. CONSTRUCTION OF AN INITIAL SOLUTION

Construction of a feasible solution for TSPTW problem is also NP -hard problem. So, there are several heuristic for building a feasible solution. In this paper we proposed heuristic for building a feasible solution similar to heuristic proposed by Urrutia et al. The only difference between these two heuristic is the way of exploring neighborhood structures. The scheme of VNS heuristic is given below (Figure 1) .

Urrutia proposed VNS based heuristic for minimizing the sum of all positive differences between the time to reach each customer and its due date, that is $\sum_{i=1}^n \max(\beta_i - b_i)$. Obviously, each permutation of customers for which the value of the objective function is equal to zero represents one feasible solution of the TSPTW problem, so VNS heuristic finish itself work when such permutation is found.

As a local search VNS heuristic use *1-shift* local search. *1-shift* local search tries to improve current solution by moving some customer from the current position in the sequence to another. This local search induces neighborhood structure which contains all solutions which can be obtained from the current solution by displacing some customer. The dimension of that neighborhood is $O(n^2)$. It is easy to conclude that all customers, if the solution is not feasible, can be divided into two disjoint sets:

- set of violated customers - customers which is visited after their due date
- set of non-violated customers - customers which is visited before their due date

So, neighborhood induced by *1-shift* local search can be divided into two disjoint neighborhood; one which is induced by movements of violated customers and the other which is induced by movements of non-violated customers. These two neighborhoods can be further divided into four neighborhoods depending on whether some customer is moved backward or forward.

If we have more than one neighborhood structure as we have, it is important to define order in which they will be explored. Urrutia et al. in their paper performed extensive testing and concluded that the following order of exploring were the best, (the best means that a feasible solution can be obtained faster than for the other orders of neighborhood structures):

- backward movements of violated customers,
- forward movements of non-violated customers
- backward movements of non-violated customers
- forward movements of violated customers

We say that customer j can be located after customer i in feasible solution if the following inequality is satisfied: $a_i + c_{ij} \leq b_j$. For each customer i we build so-called Nearest Neighbor List which contains customers which can be after customer i in feasible solution sorted in increasing order according to travel cost. Since, each 1-shift move is defined by choosing two customers, customer i , the customer which will be moved and customer j , the customer before which customer i will be placed, for chosen customer i , customer j is chosen according to Nearest Neighborhood List of customer i . But, there is some restriction for choosing customer j depending on neighborhood structure which is examined. If we examine neighborhood induced by backward movements, we will exclude from the Nearest Neighbor List customers who are after customer i in the current solution. Similar restriction is made when neighborhood defined by forward movements is explored. Also we allow that customer i can be located after some customer, i.e. k only if the following inequality is satisfied $a_k + c_{ki} \leq b_i$. In the other words, customer i is moved between two adjoint customers, i.e. k and j only if $a_k + c_{ki} \leq b_i$ and $a_i + c_{ij} \leq b_j$. As a search strategy we are using the first improvement strategy.

Function *Perturbation(X; level)* is used as a shaking function. It performs level random 1-shift moves on given solution X.

Algorithm 1: VNS for building a feasible solution

```

Function Construct Feasible Solution;
1 Make Nearest Neighborhood List for each customer;
2  $X \leftarrow RandomSolution()$ ;
3  $level \leftarrow 1$ ;
4 repeat
5   while Solution is not feasible and level ≤ 8 do
6      $X' \leftarrow Perturbation(X, level)$ ;
7      $X'' \leftarrow LocalSearch(X)$ ;
8     if  $X''$  is better than  $X$  then
9        $X \leftarrow X''$ ;
10       $level \leftarrow 1$ ;
11    else
12       $level++$ ;
13    end
14  end
until Solution is not feasible;

```

Figure1: Scheme of VNS for Building a feasible solution

3. GVNS for TSPTW

The feasible solution built by previously described VNS has been improved by GVNS which steps are represented on Figure 2.

Most common moves which is performed on some TSP solution are **2-opt** moves and **OR-opt** moves. **2-opt** move broke down two edges of current solution and make two new edges inverting part of solution in such way that resulting solution is still a tour. If the **2-opt** move is performed on four consecutive customers such move is called **1-opt** move. In the other hand, **OR-opt** move relocate chain of consecutive customers. If the length of the chain is equal to k we will call such move **OR-opt-k** move. If the chain of k consecutive customers is moved backward that move is called **backward OR-opt-k**. Similarly, if the chain is moved forward move is called **forward OR-opt-k**.

Previously described moves can be performed on each feasible solution of TSPTW problem since TSPTW is a variant of TSP, but we must be careful because some movements can lead to unfeasible solutions. So, it is important to check whether some move yields feasible or unfeasible solution. For that purpose we built an array named **Gap** where $Gap[i]$ denotes maximal value for which arrival time at node i can be increased so that the feasibility on the final part of the tour which starts at node i is kept. If we suppose that node j precede node i than $Gap[j]$ is calculated in the following way:

$$Gap[j] = \min(Gap[i], \beta_j - b_j) \quad (1)$$

If we want to check feasibility of some move we have to recalculate arrival time at each customer between first and the last customer involved in move, and also at these two customers (first and last customer according to resulting tour if the move is performed). If all those customers are still non-violated and arrival time at last customer involved by move is increased for value less or equal to its Gap value then new solution will be feasible otherwise it will be unfeasible.

As a local search we decide to use **Seq-VND** which explore the following neighborhood structures respectively: 1-opt, backward OR-opt-2, forward OR-opt-2, backward OR-opt-1, forward OR-opt-1, 2-opt.

Algorithm 2: GVNS

```

Function GVNS();
1  $X \leftarrow \text{ConstructFeasibleSolution}()$ ;
2 repeat
3   while  $\text{level} \leq 30$  do
4      $X' \leftarrow \text{Perturbation}(X, \text{level})$            /* Shaking */;
5      $X'' \leftarrow \text{SeqVND}(X')$                    /* Local Search */;
6     if  $X''$  is better than  $X$  then
7        $X \leftarrow X''$ ;
8        $\text{level} \leftarrow 1$ ;
9     end
     $\text{level}++$ ;
  end
until  $t \leq n/2$ ;

```

Figure 2: Steps of GVNS

4. COMPUTATIONAL RESULTS

The proposed method is tested on three sets of benchmark instances from the literature. The first set has been proposed by Urrutia et al. and it contains 25 test instances. The second test set has been proposed by Olhmann and Thomas, while the third has been proposed by Ascheuer. The first two set contains symmetric test instances, while the third contains asymmetric test instances. The name of each instance from the first two test sets is consisted of n , number of customers, w and maximal width of time window. For example, name of test instance n350w300 denotes that the instance contains 350 customer and maximal width of time window is 300. In the other hand, the number in the name of each instance from the set proposed by Ascheuer represents the number of customers.

Computational results of our GVNS procedure is given below and they are compared with results of current state of the art heuristics. It can be concluded that our GVNS method is very efficient in solving instances with large number of customers since it offers new best known solutions on the 24 instances (of 25) proposed by Urrutia et al. However, it finds worse solutions than bestknown solutions at almost all instances proposed by Olhmann and Thomas. Similarly, on some small asymmetric instances GVNS method finds worse solutions than bestknown solutions but on some large instances it is able to find new bestknown solutions. Obtained results for asymmetric test instances are compared with bestknown solutions and with those proposed by Blum et al.

Table 1: Computational results for instances proposed by Urrutia et al.

test case	Urrutia et al.	VNS1	Deviation (%)
n400w500	12747.6	12692.0	-0.44
n400w400	14115.4	14054.0	-0.43
n400w300	15873.4	15821.0	-0.33
n400w200	18439.8	18377.4	-0.34
n400w100	19454.8	19405.0	-0.26
n350w500	11365.8	11324.8	-0.36
n350w400	12099	12051.8	-0.39

n350w300	13650.2	13614.6	-0.26
n350w200	15672	15636.2	-0.23
n350w100	17494	17455.2	-0.22
n300w500	9861.8	9817.4	-0.45
n300w400	10413	10375.8	-0.36
n300w300	11477.6	11456.8	-0.18
n300w200	13846.8	13814	-0.24
n300w100	15041.2	15001.8	-0.26
n250w500	8082.4	8074.4	-0.10
n250w400	8899.2	8872.6	-0.30
n250w300	10230.4	10210	-0.20
n250w200	11310.4	11289.8	-0.18
n250w100	12633	12609.4	-0.19
n200w500	6466.4	6456	-0.16
n200w400	7067.2	7065.6	-0.02
n200w300	8026.4	8025.4	-0.01
n200w200	9252	9253.6	0.02
n200w100	10019.6	10006.2	-0.13

Table 2: Computational results for instances proposed by Olhmann and Thomas

test case	Urrutia et al.	VNS1	Deviation (%)
n200w140	798	800	0.25
n200w120	803.6	804.2	0.07
n150w160	671	671.6	0.09
n150w140	693.8	694.6	0.12
n150w120	722	722	0.00

Table 3: Computational results for instances proposed by Ascheuer

Test instance	VNS	Blum	dev Blum (%)	best-known	Dev best (%)
rbg233	15000	15031	-0.21	14992	0.05
rbg233.2	14496	14549	-0.36	14496	0.00
rbg201a	12948	12967	-0.15	12948	0.00
rbg193	12535	12547	-0.10	12535	0.00
rbg193.2	12142	12167	-0.21	12143	-0.01
rbg172a	10952	10961	-0.08	10950	0.02
rbg152	10032	10032	0.00	10032	0.00
rbg152.3	9789	9797	-0.08	9791	-0.02
rbg132	8468	8470	-0.02	8468	0.00
rbg132.2	8192	8200	-0.10	8191	0.01
rbg125a	7936	7936	0.00	7936	0.00
rbg092a	7158	7160	-0.03	7158	0.00
rbg086a	8400	8400	0.00	8400	0.00
rbg067a	4625	4625	0.00	4625	0.00
rbg055a	3761	3761	0.00	3761	0.00
rbg050c	10024	10024	0.00	10026	-0.02
rbg050b	9869	9863	0.06	9863	0.06
rbg050a	2953	2953	0.00	2953	0.00
rbg049a	10018	10018	0.00	10019	-0.01
rbg048a.tw	9383	9383	0.00	9387	-0.04
rbg042a.tw	2772	2772	0.00	2772	0.00
rbg041a.tw	2599	2598	0.04	2598	0.04
rbg040a.tw	2378	2378	0.00	2378	0.00
rbg038a	2480	2480	0.00	2480	0.00
rbg035a.tw	2144	2144	0.00	2144	0.00
rbg035a.2	2056	2056	0.00	2056	0.00
rbg034a	2222	2222	0.00	2220	0.09

rbg033a.tw	2069	2069	0.00	2069	0.00
rbg031a	1863	1863	0.00	1863	0.00
rbg027a.tw	5091	5091	0.00	5091	0.00
rbg021	4536	4536	0.00	4536	0.00
rbg021.9	4478	4478	0.00	4478	0.00
rbg021.8.tw	4478	4478	0.00	4478	0.00
rbg021.7.tw	4479	4479	0.00	4479	0.00
rbg021.6	4480	4480	0.00	4480	0.00
rbg021.5.tw	4515	4515	0.00	4515	0.00
rbg021.4.tw	4525	4525	0.00	4525	0.00
rbg021.3.tw	4528	4528	0.00	4528	0.00
rbg021.2.tw	4528	4528	0.00	4528	0.00
rbg020a.tw	4689	4689	0.00	4689	0.00
rbg019d.tw	1356	1356	0.00	1356	0.00
rbg019c.tw	4536	4536	0.00	4536	0.00
rbg019b	1866	1866	0.00	1866	0.00
rbg019a	1262	1262	0.00	1262	0.00
rbg017a	4296	4296	0.00	4296	0.00
rbg017.tw	893	893	0.00	893	0.00
rbg017.2	852	852	0.00	852	0.00
rbg016b.tw	1304	1304	0.00	1304	0.00
rbg016a.tw	938	938	0.00	938	0.00
rbg010a.tw	671	671	0.00	671	0.00

5. CONCLUSION

In this paper, we presented new two-phase VNS based heuristics for solving Traveling Salesman problem with time windows. In the first phase, we built a feasible solution using GVNS and Nearest neighbor lists, while in the second, improvement phase, we improve obtained solution using GVNS. Also, we introduce new way for checking feasibility of 2-opt and Or-opt moves using array Gap.

Computational results show that our method is much better in solving problems with a large number of customers than in solving those with small number of customers. So, the direction of further research will include improving this method and generating new large scale problems since, up to now, the largest problem has only 400 customers.

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SET-COVERING BASED APPROXIMATE ALGORITHM USING ENHANCED SAVINGS FOR SOLVING VEHICLE ROUTING PROBLEM

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Abstract: The vehicle routing problem (VRP) is one of the most investigated combinatorial problems in operations research. In this paper we introduce a set-covering-based algorithm that uses an efficient extended savings algorithm to generate good routes in order to construct a feasible set for many different optimization problems as Capacitated VRP, Distance-Constrained VRP, Time-Constrained VRP or CVRP with heterogeneous fleet of vehicles. We have developed a software package that implements the mentioned algorithm in order to perform a wide class of experiments for Capacitated VRP.

Keywords: vehicle routing problem, set-covering based algorithm, heuristic

1. INTRODUCTION

The vehicle routing problem (VRP) was introduced by Dantzig and Ramser in 1959. They described a real-world problem and introduced the mathematical programming formulation. A wide description of the VRP can be found in Laporte and Semet 2002.

Stanojević *et al.* 2012 proposed a new way of merging routes and a corresponding formula for calculating savings. This kind of savings is a generalization of savings defined by Clarke and Wright 1964 and it was used to develop an extended savings algorithm (ESA). In this paper we present a set-covering based algorithm (SC-ESA) that uses ESA to generate routes for the feasible set of a capacitated vehicle routing problem (CVRP). A set-covering-based approach for CVRP was first suggested by Balinski and Quandt 1964. The classic set-covering-based algorithm for CVRP, called Column Generation gives exact solution by starting from an initial set of routes, solving an exact model in order to identify a solution for CVRP and, if possible, adding routes that can decrease the cost. SC-ESA is an approximate algorithm. It generates many good routes and then, among them it searches for a subset of feasible routes that represents a solution for CVRP. Due to its last step, SC-ESA can be easily adapted to solve a wide class of vehicle routing problems by adding constraints (e.g. for routes length and time, for a fleet of different types of vehicles, etc.) to the mathematical model.

The rest of the paper is organized as it follows. In Section 2 we set up notation and terminology. In Section 3 we formulate SC-ESA. Section 4 presents our experimental results. The results are compared with results obtained by running other heuristics. Section 5 contains some conclusions and ideas for further research.

2. VRP – NOTATION AND TERMINOLOGY

VRP concerns the distribution of goods by vehicles using an existing road network in order to serve customers. The solution of a VRP consists of a set of routes fulfilling some constraints, such that the global cost of the transportation is minimal.

The road network is described by a graph whose vertices represent the customers and the depot, and whose arcs represent the shortest paths between customers. We assume that the graph is complete; both arcs that connect two vertices have the same weights; and arcs' weights satisfy the triangle rule.

In this paper the capacitated vehicle routing problem (CVRP) will be considered. It means that only one depot exists and all vehicles have the same capacity. The characteristic of each vertex except the depot is the demand of the corresponding customer. The characteristic of the arc is the cost of the transportation along it.

Each route is a cycle that contains the depot. The cost of a route is the sum of costs of arcs that belong to the route. Capacity of a route is the sum of the vertices' demands that belong to the route. The CVRP is to

find a set of routes such that each customer belongs to a route, each route has the capacity less than or equal to the vehicle's capacity and the total cost of routes is minimal.

We will denote by 0 the depot and by $1, 2, \dots, n$ the other vertices of the graph. We will denote by (i, j) the arc between vertices i and j and by c_{ij} the cost of the arc (i, j) , for all $i=0, 1, \dots, n$ and $j=0, 1, \dots, n$, $i \neq j$. The notation $r = (0, \dots, i, j, \dots, 0)$ means that the route r contains the arc (i, j) . The notation $a \in r$ means that arc a belongs to the route r . We will denote by \bar{r} the route that contains the same arcs as r but they are passed in opposite direction.

3. SET-COVERING BASED APPROXIMATE ALGORITHM

The idea of a set-covering-based exact algorithm for CVRP is to enumerate all feasible routes \mathcal{R} and then to select a minimum-cost set of feasible routes such that each customer is included in some route. A route is feasible if and only if it starts and ends at the depot and picks up a total load not exceeding the vehicle capacity.

SC-ESA is an approximate algorithm based on set-covering approach. It generates “good” feasible routes (the set \mathcal{R}' in Model (1)-(4)) and then, it selects a minimum-cost set of routes that is solution for CVRP.

The model for obtaining the optimal set of routes among a subset \mathcal{R}' of \mathcal{R} is the following.

$$(\min) \sum_{r \in \mathcal{R}'} c_r y_r \quad (1)$$

subject to

$$\sum_{r \in \mathcal{R}'} \alpha_{ir} y_r \geq 1, \forall i \in C \quad (2)$$

$$\sum_{r \in \mathcal{R}'} y_r \leq K \quad (3)$$

$$y_r \in \{0, 1\}, \forall r \in \mathcal{R}' \quad (4)$$

where C is the set of customers, α_{ir} is a binary constant equal to 1 if the customer i belongs to the route r , y_r is a binary variable equal to 1 if the route r belongs to the optimal solution, K is the number of available vehicles and c_r is the cost of route r . Constraints (2) require that each customer appears in at least one route. Constraint (3) imposes that at most K routes will be used.

The generation step is the following. Deviations of the initial instance are formed by generating random costs of arcs (c'_{ij}) that follow a normal distribution with mean equal to the original costs (c_{ij})

and variance increasing from 0 by a given step (v). Each deviation is solved by the extended savings algorithm introduced by Stanojević 2012 and all generated routes (final and intermediate) are collected. The variance (Var) is increased when l unsuccessful iterations were done (no new routes were found). The use of normal distribution assures that the new costs are, with big probability, close to the original ones, hence the solutions of the deviated instances will be “good” routes for the original instance. The instances generation continues till a given number (NR) of routes are obtained.

In what follows we present the steps of SC-ESA with input parameters n , $(c_{ij})_{n \times n}$, NR , v and l .

1. Initialization: the set of routes $S = \emptyset$, the number of generated routes $k = 0$, the variance $Var = 0$, the number of unsuccessful iterations $it = 0$.
2. Routes generation: While $k < NR$ do

- Generate the new deviated instance with costs $C' = (c'_{ij})_{n \times n}$, $c'_{ij} = N(c_{ij}, Var)$ using the normal distribution generator $N(\mu, \sigma^2)$.
 - Run ESA with costs C' and record all (intermediate and final) routes in set \mathcal{R} .
 - If $\mathcal{R} \subset \mathcal{S}$ (i.e. no new routes were found) then $it = it + 1$, otherwise $it = 0$, $\mathcal{S} = \mathcal{S} \cup \mathcal{R}$, $k = | \mathcal{S} |$.
 - If $it > I$ increase the variance: $Var = Var + v$, $it = 0$.
3. Solve Model (1) - (4) using the set of routes $\mathcal{R}' = \mathcal{S}$.

Model (1) - (4) solved in Step 3 of SC-ESA can be replaced by other models depending on the characteristics of the original problem. For example,

- for Distance-Constrained VRP, $\mathcal{R}'' = \{r \in \mathcal{R}' \mid d_r < D\}$ will be used instead of \mathcal{R}' , where D represents the upper bound constraint for distance and d_r represents the length of route r (see for instance Laporte 2002);
- for Time-Constrained VRP the following constraint has to be added to the original model

$$\sum_{h \in H(r)} (s_h + t_r - T) y_r \leq 0, \forall r \in \mathcal{R}'$$

where $H(r)$ represents the set of vertices (except the depot) on route r , s_h represents the time spent in vertex h , t_r represents the time spent travelling on route r and T represents the upper bound constraint for time (see for instance Laporte 2002);

- for a heterogeneous fleet of vehicles for CVRP the following model (see Baldacci *et al.* 2008) will be used.

$$(\min) \sum_{k \in M} \sum_{r \in \mathcal{R}'_k} c_{rk} y_{rk}$$

subject to

$$\sum_{k \in M} \sum_{r \in \mathcal{R}'_k} \alpha_{irk} y_{rk} \geq 1, \forall i \in C,$$

$$\sum_{r \in \mathcal{R}'_k} y_{rk} \leq m_k, \forall k \in M,$$

$$y_{rk} \in \{0, 1\}, \forall r \in \mathcal{R}'_k, k \in M.$$

where $\mathcal{R}'_k = \{r \in \mathcal{R}' \mid q_r \leq Q_k\}$ is the set of generated routes feasible for a vehicle of type $k \in M$ (q_r is the capacity of the route and Q_k is the maximal capacity of vehicles of type k), y_{rk} is a binary variable equal to 1 if the route r is selected for a vehicle of type k , m_k is the maximal number of routes selected for vehicles of type k and c_{rk} is the corresponding cost.

Moreover, some generalized vehicle routing problems may be solved by SC-ESA if they can be transformed into capacitated vehicle routing problems (see for instance Pop and Pop Sitar 2011).

4. EXPERIMENTS

We have developed a software package that implements SC-ESA. The programs as well as their source code written in Haskell are freely available at <http://esavrp.sourceforge.net>.

For our numerical experiments, the benchmark set is composed of seven instances (CMT) from Christofides 1979, eight instances (E) from Christofides 1969 and seventy-three instances (A, B and P) from Augerat 1995. All these instances may be downloaded from the site <http://branchandcut.org>. All instances that we

have considered were defined as Euclidean graphs and we have calculated the costs of arcs as Euclidean distances rounded to whole numbers.

For each instance the solution costs c^{obt} were obtained by running SC-ESA and the relative deviations $c^{rel} = \frac{c^{obt} - c^*}{c^*}$ from the best known solution cost c^* were computed. Values c^* were taken from Altinel and Oncan 2005 or were obtained by running Groer's meta-heuristic 2012.

Table 14: Relative deviations and running times on Augerat *et al.*'s test set A

	Number of generated routes	Best known value	Obtained value	Time needed for routes generation	Time needed for solving the model	Percentage deviation
A-n32-k5	3500	784	784	309	2	0,00%
A-n33-k5	3500	661	661	256	1	0,00%
A-n33-k6	3500	742	742	277	1	0,00%
A-n34-k5	3500	778	778	260	4	0,00%
A-n36-k5	3500	799	799	289	1	0,00%
A-n37-k5	3500	669	669	307	1	0,00%
A-n37-k6	3500	949	949	265	6	0,00%
A-n38-k5	3500	730	730	400	3	0,00%
A-n39-k5	3500	822	822	199	3	0,00%
A-n39-k6	3500	831	831	325	8	0,00%
A-n44-k6	4000	937	937	389	1	0,00%
A-n45-k6	4000	944	944	608	3	0,00%
A-n45-k7	4000	1146	1146	265	88	0,00%
A-n46-k7	4000	914	914	399	2	0,00%
A-n48-k7	4000	1073	1084	362	8	1,03%
A-n53-k7	5000	1010	1011	523	4	0,10%
A-n54-k7	5000	1167	1168	524	11	0,09%
A-n55-k9	5000	1073	1073	860	15	0,00%
A-n60-k9	5000	1354	1355	634	200	0,07%
A-n61-k9	5000	1034	1034	878	64	0,00%
A-n62-k8	5000	1288	1298	573	118	0,78%
A-n63-k10	6000	1314	1315	1072	221	0,08%
A-n63-k9	6000	1616	1624	1076	279	0,50%
A-n64-k9	6000	1401	1409	1100	215	0,57%
A-n65-k9	6000	1174	1178	1437	35	0,34%
A-n69-k9	6000	1159	1159	2194	173	0,00%
A-n80-k10	7000	1763	1776	2489	664	0,74%
Averages:	4518.52			677	78.93	0,16%

Tables1, 2, 3, 4, 5 and 6 contain number of generated routes, best known value, obtained value time needed for generating routes and for solving mathematical model and the relative deviations from the best known solutions values obtained by our implementation of SC-ESA on each test set A, B, CMT, E and P respectively.

Time spent for generating routes using SC-ESA is, on average, 77.25% of the total running time.

Table 2: Relative deviations and running times on Christofides et al.'s test set CMT

	Number of generated routes	Best known value	Obtained value	Time needed for routes generation	Time needed for solving the model	Percentage deviation
CMT-n51-k5	5000	521	521	387	0	0,00%
CMT-n76-k10	6000	830	838	980	90	0,96%
CMT-n101-k8	7000	815	832	774	47	2,09%
CMT-101-10c	4000	820	820	18565	0	0,00%
CMT-121-07c	5000	1034	1036	1719	0	0,19%
CMT-151-12c	6000	1053	1061	538	588	0,76%
CMT-200-17c	7000	1291,45	1334	728	6288	3,29%
Averages:	5714,29			3384,43	1001,86	1,04%

Parameters were manually tuned by running SC-ESA on few instances. After $l = 4$ “unsuccessful” iterations variance was increased by step $v = 0.5$.

Table 3: Relative deviations and running times on Augerat et al.'s test set B

	Number of generated routes	Best known value	Obtained value	Time needed for routes generation	Time needed for solving the model	Percentage deviation
B-n31-k5	1004	672	672	38	22	0,00%
B-n34-k5	1000	788	788	44	1	0,00%
B-n35-k5	1000	955	963	92	2	0,84%
B-n38-k6	2000	805	815	178	292	1,24%
B-n39-k5	2002	549	550	170	1	0,18%
B-n41-k6	3003	829	866	195	81	4,46%
B-n43-k6	3003	742	746	173	24	0,54%
B-n44-k7	3002	909	921	232	340	1,32%
B-n45-k5	3500	751	751	362	178	0,00%
B-n45-k6	3500	678	686	237	38	1,18%
B-n50-k7	4001	741	741	476	614	0,00%
B-n50-k8	1700	1312	1329	88	298	1,30%
B-n51-k7	5003	1032	1016	566	13	-1,55%
B-n52-k7	1700	747	752	251	181	0,67%
B-n56-k7	5500	707	707	821	507	0,00%
B-n57-k7	5500	1153	1140	497	945	-1,13%
B-n57-k9	2000	1598	1600	183	610	0,13%
B-n63-k10	2000	1496	1538	259	108	2,81%
B-n64-k9	2000	861	861	232	106	0,00%
B-n66-k9	2000	1316	1341	185	88	1,90%
B-n67-k10	2000	1032	1050	284	479	1,74%
B-n68-k9	2000	1272	1292	234	110	1,57%
B-n78-k10	2000	1221	1246	414	25	2,05%
Averages:	2626,87			270,04	220,13	0,84%

Table 6 shows different results obtained for the instance E-n101-k14; for different values of the parameter l (number of generated routes).

The time spent for generating routes, the time spent for solving Model (1)-(4) and the total time were measured and the percentage deviation from the best known value was reported.

Table 4: Relative deviations and running times on Christofides and Elion's test set E

	Number of generated routes	Best known value	Obtained value	Time needed for routes generation	Time needed for solving the model	Percentage deviation
E-n101-k14	7000	1067	1082	2512	688	1,41%
E-n22-k4	1500	375	375	48	0	0,00%
E-n23-k3	1500	569	569	81	0	0,00%
E-n30-k3	3500	534	581	235	0	8,80%
E-n33-k4	4000	835	839	189	10	0,48%
E-n76-k14	6000	1021	1021	4320	201	0,00%
E-n76-k7	6000	682	696	836	37	2,05%
E-n76-k8	6000	735	743	893	15	1,09%
E-n101-k8	7000	815	832	774	47	2,09%
E-n51-k5	5000	521	521	387	0	0,00%
E-n76-k10	6000	830	838	980	90	0,96%
E-n30-k3	3500	503	503	235	0	0,00%
Averages:	4750			957,5	90,67	1,41%

Table 5: Relative deviations and running times on Augerat et al.'s test set P

	Number of generated routes	Best known value	Obtained value	Time needed for routes generation	Time needed for solving the model	Percentage deviation
P-n16-k8	100	450	450	2	0	0,00%
P-n19-k2	100	212	219	2	0	3,30%
P-n20-k2	300	216	218	6	0	0,93%
P-n21-k2	300	211	212	6	0	0,47%
P-n22-k2	1000	216	216	21	0	0,00%
P-n22-k8	1000	603	603	41	0	0,00%
P-n23-k8	1000	529	529	36	0	0,00%
P-n40-k5	2000	458	459	109	0	0,22%
P-n45-k5	2000	510	511	144	0	0,20%
P-n50-k10	4000	696	697	460	9	0,14%
P-n50-k7	4000	554	554	425	5	0,00%
P-n50-k8	4000	631	637	409	43	0,95%
P-n51-k10	4000	741	741	487	7	0,00%
P-n55-k10	4000	694	695	488	165	0,14%
P-n55-k15	4000	989	993	586	10	0,40%
P-n55-k7	4000	568	574	403	26	1,06%
P-n55-k8	4000	576	577	393	2	0,17%
P-n60-k10	5000	744	745	647	17	0,13%
P-n60-k15	5000	968	968	903	13	0,00%
P-n65-k10	5000	792	796	726	18	0,51%
P-n70-k10	6000	827	827	1220	19	0,00%
P-n76-k4	6000	593	607	551	2	2,36%
P-n76-k5	6000	627	646	602	13	3,03%
P-n101-k4	6000	681	691	439	1	1,47%
Averages:	3283,33			379,38	14,58	0,65%

Table 6: Detailed results obtained for E-n101-k14

Number of generated routes	Obtained value	Percentage deviation	Time needed for routes generation	Time needed for solving the model	Total time
2000	1095	2,62%	169	6	175
3000	1095	2,62%	402	66	468
4000	1093	2,44%	697	302	999
6000	1089	2,06%	1629	1317	2946
7000	1082	1,41%	2512	688	3200

Comparing to classic implementation of savings algorithm and its extensions, see Stanojević *et al.* 2012, and analyzing the ratio *relative-deviation / running-time* we consider that the results obtained by SC-ESA are very good. The average percentage deviation decreased from 5.13% (obtained by running Clarke-Wright algorithm) to 0.58% (obtained by running SC-ESA) on the same instances. The average running time of SC-ESA was 15 minutes. Negative values obtained in Table 3, for instances B-n51-k7 and B-n57-k7, are due to the number of routes in the solution. SC-ESA does not take into account the predefined number of vehicles.

When SC-ESA is used, the trade-off between relative deviation and time can be easily manipulated. Moreover, the routes generated once can be used with different models defined for different kind of constraints on time, distance, number of vehicles, types of vehicles, etc. Spending more time for generating routes and solving model, a better solution is obtained.

5. CONCLUSION

In this paper one set covering based algorithm for capacitated vehicle routing problem was presented. SC-ESA uses an extended savings algorithm for generating many good routes and then selects a minimum-cost feasible set of routes as solution for CVRP. Due to its last step, SC-ESA can be easily adapted to solve a wide class of vehicle routing problems on the same graph, using the same routes generated only once, just by adding/removing constraints in the set-covering-based model. Models for solving

New group of experiments will be done with Distance-Constrained VRP, Time-Constrained VRP and heterogeneous fleet of vehicles for CVRP.

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MATHEMATICAL MODELS AND TECHNIQUES FOR QUADRATIC ASSIGNMENT PROBLEM

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Abstract: The Quadratic Assignment Problem (QAP) is one of the most interesting and most challenging combinatorial optimization problems in existence. In this paper, a survey of some of the most important formulations available is presented as well as its classification according to their mathematical sources. The main motivation for this survey was continuous interest in QAP, shown by a number of researchers worldwide, for the theory, applications and solution techniques for this problem. The main task was to determine the role of mathematical programming in a wide range of different methods for solving QAP. The mathematical models and techniques for solving QAP are implemented in various solvers, and among them, GAMS solver is the one most frequently used. This paper investigates how far the solutions obtained by GAMS are from the global optimum. Method for this study was testing solvers on a representative instance of the problem and comparison of these results with those obtained by searching a complete feasible solution set. Conclusions can be made that the payoff for speeding the search for the solution is an average of 6% deviation from the optimal solutions.

Keywords: model, solver, NP-hard problem, combinatorial optimization, integer programming, MILP

1. INTRODUCTION

Main reasons, which make the quadratic assignment problem (QAP) extremely attractive, are that the number of real life problems, which are mathematically modeled by QAPs, has been continuously increasing. Also, a number of other well known combinatorial optimization problems can be formulated as QAPs. Typical examples are the traveling salesman problem and a large number of problems in graphs such as the maximum clique problem or the graph partitioning problem. Finally, from the computational point of view the QAP is one of the most difficult problems to solve: solving instances of size larger than 20 is nowadays still considered intractable.

QAP was introduced by Koopmans and Beckmann (1957) as a model for a plant location problem. It was considered the problem of allocating n facilities to n locations, with costs depending on the distance between the locations and the flow between the facilities increased by the costs associated with a facility being placed at a certain location. The objective is to assign each facility to a location such that the total cost is minimized.

Due to its high computation complexity, the QAP has been chosen as the first major test application for the GRIBB project (GReat International Branch-and-Bound search). This project is seeking to establish a software library for solving a large class of parallel search problems by the use of numerous computers around the world accessed by Internet. This paper aims at describing different, but equivalent mathematical formulations, which stress different structural characteristics of the problem, which lead to different solution approaches based on different points of view. This paper propose to collect these formulations, highlighting their most important features to classify them according to used techniques, such as integer programming, discrete and combinatorial mathematics and graph theory. Most of these formulations are equivalent and they allow mathematical resources for the development of new solution techniques.

The paper is organized as follows. Integer models for QAP having quadratic objective function and representations of the feasible set are presented in Section 2. Mixed integer linear programming formulation based on the linearization of the objective function is presented in Section 3. One of the best known solvers, GAMS, was used for solving QAP on the known instance from QAPLIB database of the QAP's problems in Section 4. Obtained results were compared with the global optimal solution obtained by exact algorithm in Section 5.

2. INTEGER QUADRATIC MODELS FOR QAP

QAP represents three $n \times n$ input matrices with real elements $F = \{f_{ij}\}$, $D = \{d_{kl}\}$, and $C = \{c_{ik}\}$, where f_{ij} is the flow between the facility i and facility j , d_{kl} is the distance between the location k and location l , and c_{ik} is the cost of placing facility i at location k . The Koopmans – Beckmanns version of the QAP can be formulated as follows: Let n be the number of facilities and locations and denote by N the set $N = \{1, 2, \dots, n\}$. QAP is finding the permutation σ of elements of N , which minimize Z in (1).

$$Z = \sum_{i=1}^n \sum_{j=1}^n f_{ij} d_{\varphi(i)\varphi(j)} + \sum_{i=1}^n c_{i\varphi(i)} \quad (1)$$

Each individual product $f_{ij} d_{\varphi(i)\varphi(j)}$ is the cost of assigning facility i to location $\varphi(i)$ and facility j to location $\varphi(j)$. In that context, matrices F and D are symmetric with zeros in the diagonal and all the matrices are nonnegative. An instance of a QAP with input matrices F , D and C has quadratic and linear terms and will be denoted by $\text{QAP}(F, D, C)$, or by $\text{QAP}(F, D)$, if there is no linear term. Since the linear term of (1) is easy to be solved, most authors discarded it.

A more general QAP version was proposed by Lawler (1987) and involves costs b_{ijkl} that do not necessarily correspond to products of flows by distances. The Lawler formulation is as follows:

$$Z = \sum_{i=1}^n \sum_{j=1}^n b_{ij\varphi(i)\varphi(j)} + \sum_{i=1}^n c_{i\varphi(i)} \quad (2)$$

Koopmans – Beckmanns version of QAP can be obtained from (2) using $b_{ijkl} = f_{ij} d_{kl}$ for all i, j, k, l where $i \neq j$ or $k \neq l$ and $b_{iikk} = f_{ii} d_{kk} + c_{ik}$ otherwise.

Introducing permutation matrices, objective functions (1) and (2) can be reformulated from permutation to mathematical programming problems. Relationship between permutations and permutation matrix are stated as:

$$x_{ij} = \begin{cases} 1, & \text{if } \varphi(i) = j \\ 0, & \text{if } \varphi(i) \neq j \end{cases}$$

The most commonly used models with permutation matrices are Integer Quadratic Programming model, trace formulations and Mixed Integer Linear Programming model based on the linearization of the objective function.

Integer program with quadratic objective function is given by equations (3) to (6).

$$(\min) \sum_{i=1}^n \sum_{j=1}^n \sum_{k=1}^n \sum_{l=1}^n b_{ijkl} x_{ik} x_{jl} + \sum_{i=1}^n \sum_{j=1}^n c_{ij} x_{ij} \quad (3)$$

s.t

$$\sum_{i=1}^n x_{ij} = 1, \quad j = 1, 2, \dots, n \quad (4)$$

$$\sum_{j=1}^n x_{ij} = 1, \quad i = 1, 2, \dots, n \quad (5)$$

$$x_{ij} = 0 \text{ or } 1, \quad (i = 1, 2, \dots, n; j = 1, 2, \dots, n) \quad (6)$$

Hereinafter $(x_{ij}) \in X_n$, where X_n is the permutation matrix, stands for equations (4) to (6). Term b_{ijkl} in this model has different meaning from $b_{ij\varphi(i)\varphi(j)}$ in the permutation model. In the permutation model b can be presented as $n!$ matrices B of order $n \times n$, in this model b represents one matrix of order $n^2 \times n^2$ which can be defined using Kronecker product $B = F \otimes D$ (Fig. 1).

$$F \otimes D = \begin{bmatrix} f_{11} D & \dots & f_{1n} D \\ \vdots & \ddots & \vdots \\ f_{n1} D & \dots & f_{nn} D \end{bmatrix}.$$

Figure 1. Kronecker product $F \otimes D$

Trace formulation is supported by linear algebra and exploits the trace function (the sum of the matrix main diagonal elements) in order to determine QAP lower bounds for the cost: Finke, Burkard and Rendl (1987). This approach allows for the application of spectral theory, which makes possible the use of semi definite programming to the QAP: De Klerk and Sotirov (2010). It can be proved that exist a matrix with the trace equal to the QAP objective function. The trace formulation, by Edwards (1977, 1980), can be stated as:

$$\min \text{tr} (FXD^T + C)X^T \quad (7)$$

$$\text{s.t. } (x_{ij}) \in X_n$$

Using $\text{tr}(AB) = \text{tr}(BA)$, $(AB)^T = B^T A^T$, $\text{tr} A = \text{tr} A^T$ and $F = F^T$ for symmetric matrices, quadratic term in

(8) can be written as:

$$\text{tr} FXD^T X^T = \text{tr} FXDX^T$$

where D can be non-symmetric. If the instance of the QAP has only one symmetric matrix, problem can be transformed to the problem with both symmetric matrices by introducing a new symmetric matrix $E = \frac{1}{2}(D + D^T)$:

$$\text{tr} FXE^T X^T = \frac{1}{2} \text{tr} (FXD^T X^T + FXDX^T) = \text{tr} FXD^T X^T$$

3. MIXED INTEGER LINEAR PROGRAMMING MODEL

The QAP, as a mixed integer programming formulation, is found in the literature in different forms, all of them replacing the quadratic terms by linear ones: Zhang, Beltran-Royo and Ma (2010), Pryor and Chinneck (2011), Patel and Chinneck (2007). The linearization of the objective function is usually achieved by introducing new variables and new linear (and binary) constraints: Xia and Yuan (2006), Ostrowski, Linderoth, Rossi and Smriglio (2011). The very large number of new variables and constraints, however, usually poses an obstacle for efficiently solving the resulting linear integer programs. Most commonly used linearization of the QAP are Lawler's linearization (1963), which was the first, Kaufmann and Broeckx's (1978) which has the smallest number of variables and constraints, Frieze and Yadegar's (1983) and the linearization of Adams and Johnson (1994). The last linearization which is a modification of Frieze and Yadegar's (1983) unifies most of the previous linearization.

Lawler replaces the quadratic terms $x_{ik}x_{jl}$ in the objective function by n^4 variables: $y_{ijkl} = x_{ik}x_{jl}$ and obtains linear model:

$$(\min) \sum_{i=1}^n \sum_{j=1}^n \sum_{k=1}^n \sum_{l=1}^n b_{ijkl} y_{ijkl} + \sum_{i=1}^n \sum_{j=1}^n c_{ij} x_{ij} \quad (8)$$

s.t

$$(x_{ij}) \in X_n \quad (9)$$

$$\sum_{i,j=1}^n \sum_{k,l=1}^n y_{ijkl} = n^2 \quad (10)$$

$$x_{ij} + x_{kt} - 2y_{ijkt} = 0, \quad (i,j,k,t = 1,2,\dots,n) \quad (11)$$

$$y_{ijkt} = 0 \text{ or } 1, \quad (i,j,k,t = 1,2,\dots,n)$$

It can be observed that this 0-1 linear program has $n^4 + n^2$ binary variables and $n^4 + 2n^2 + 1$ constraints. Kaufmann and Broeckx define n^2 new real variables by rearranging terms in the objective function.

$$\sum_{i,j=1}^n x_{ij} \sum_{k,l=1}^n b_{ijkl} x_{kl} \quad (12)$$

Frieze and Yadegar replace the products $x_{ik}x_{jl}$ of the binary variables by continuous variables $y_{ijkl} = x_{ik}x_{jl}$ and Adams and Johnson introduced a new 0-1 linear integer programming formulation, which was based on all of the previously described linearizations.

4. SOLVING QAP PROGRAMMING MODELS

The continuous interest in QAP is shown by a number of researchers worldwide, for the theory, applications and solution techniques for this problem. Figure 2 presents the number of publications related to the different QAP formulations, classified as Permutations (PM), Integer Programming (IP), Mixed Integer Linear Programming (MILP), Trace (TR), SemiDefinite Programming (SDP) and Graphs (GR). It can be observed

that the QAP approach that identifies solutions with permutations is mostly used followed by IP and MILP formulations. The formulations derived from semidefinite programming and the ones using exclusively graphs are less contemplated in the literature.

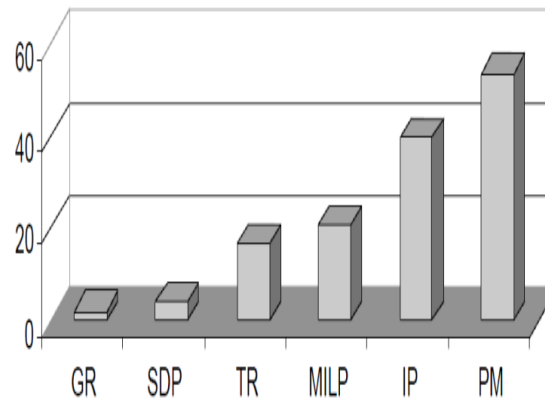


Figure 2. QAP formulations in literature

Conclusion can be made that QAP approach that finds solution using mathematical programming model plays significant role in publications. The main task of this paper is to investigate the solution time and solution quality of the applications having this approach.

Substantial progress was made with the development of algorithms and computer codes to solve large mathematical programming problems. Solution procedures formed only a small part of the overall modeling effort. A large part of the time required to develop a model involved data preparation and transformation and report preparation. Each model required many hours of analyst and programming time to organize the data and write the programs that would transform the data into the form required by the mathematical programming optimizers. Furthermore, it was difficult to detect and eliminate errors because the programs that performed the data operations were only accessible to the specialist who wrote them and not to the analysts in charge of the project. Answer for these obstacles were commercial and open source solvers providing a high-level language for the compact representation of large and complex models and permitting model descriptions that are independent of solution algorithms.

One of the best known solvers with the references from the authors of QAPLIB, a famous collection of electronically available data instances for the QAP, is GAMS from *GAMS Development Corporation, Washington, DC, USA*. Complete procedure is described on the small instance of order 7 in the sake of the clarity of explanation. Modeling language is simply, allowing changes to be made in model specifications simply and safely.

GAMS model for QAP is presented on Figure 3.

```
$Title Model for QAP
$OnText
The model process the input file format defined by the maintainers of the QAPLib
$OffText
```

```
set i / 1 * 7 /; alias (i,j,k,l);
```

```
Table d(i,j) distances between locations
```

	1	2	3	4	5	6	7
1	0	71	11	29	82	82	6
2	71	0	74	30	89	76	76
3	11	74	0	1	50	4	36
4	29	30	1	0	1	15	11
5	82	89	50	1	0	21	61


```

6   82   76   4   15   21   0   76
7   6   76   36   11   61   76   0 ;

```

Table $f(i,j)$ flow between objects

```

      1   2   3   4   5   6   7
1   0   21  95  82  56  41   6
2  21   0   63   6  44  40  75
3  95  63   0  35   9   1  85
4  82   6  35   0  26  91  11
5  56  44   9  26   0  69  56
6  41  40   1  91  69   0  59
7   6  75  85  11  56  59   0 ;

```

* MIQCP model

BINARY VARIABLE $x(i,j)$;

VARIABLE z ;

EQUATION

defobj

assign1(i)

assign2(j);

*defobj.. z = e = sum((i,j,k,l)\$ (d(i,j) * f(k,l)), x(i,k) * d(i,j) * f(k,l) * x(j,l));*

assign1(i).. sum(j, x(i,j)) = e = 1;

assign2(j).. sum(i, x(i,j)) = e = 1;

MODEL QAP /all/;

* Starting point

x.l(i,j) = 1/sqr(card(i));

SOLVE QAP MINIMIZING z USING MIQCP;

Figure 3. GAMS model for QAP

The problem types and their identifiers, which are needed in a solve statement, are listed in Table 1.

Table 1: Types of mathematical programming models

LP	Linear programming. There are no nonlinear terms or discrete (binary or integer) variables in your model
QCP	Quadratic constraint programming. There are linear and quadratic terms but no general nonlinear term or discrete (binary or integer) variables in your model
NLP	Nonlinear programming. There are general nonlinear terms involving only smooth functions in the model, but no discrete variables
DNLP	Nonlinear programming with discontinuous derivatives. This is the same as NLP, except that non-smooth functions can appear as well. These are more difficult to solve than normal NLP problems. The user is strongly recommended not to use this model type
RMIP	Relaxed mixed integer programming. The model can contain discrete variables but the discrete requirements are relaxed, meaning that the integer and binary variables can assume any values between their bounds
MIP	Mixed integer programming. Like RMIP but the discrete requirements are enforced: the discrete variables must assume integer values between their bounds
RMIQCP	Relaxed mixed integer quadratic constraint programming. The model can contain both discrete variables and quadratic terms. The discrete requirements are relaxed. This class of problem is the same as QCP in terms of difficulty of solution
RMINLP	Relaxed mixed integer nonlinear programming. The model can contain both discrete variables and general nonlinear terms. The discrete requirements are relaxed. This class of problem is the same as NLP in terms of difficulty of solution

MIQCP	Mixed integer quadratic constraint programming. Characteristics are the same as for RMIQCP, but the discrete requirements are enforced
MINLP	Mixed integer nonlinear programming. Characteristics are the same as for RMINLP, but the discrete requirements are enforced
MPEC	Mathematical Programs with Equilibrium Constraints
MCP	Mixed Complementarity Problem
CNS	Constrained Nonlinear System

5. OBTAINED RESULTS

The output from a GAMS run is produced on one file, which can be read using any text editor. The output from GAMS contains many aids for checking and comprehending a model. Elements of the standard output are presented in Fig. 4.

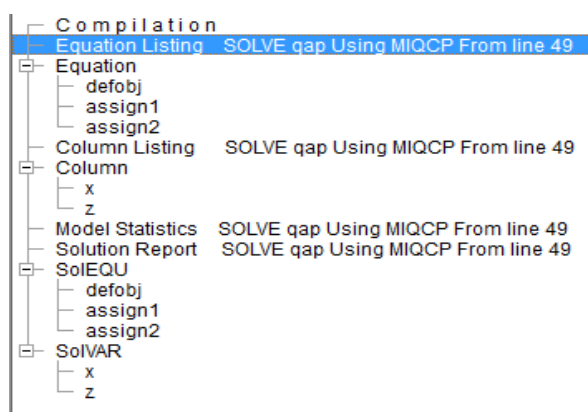


Figure 4. Output of the GAMS solver

One part (SolVAR) of the output of the GAMS solver for the given input instance is presented in Table 2.

Table 2. Resulting permutation and cost of objective function

VAR x									
	LOWER	LEVEL	UPPER	MARGINAL		LOWER	LEVEL	UPPER	MARGINAL
1.1	-	-	1	25,410	4.4	-	-	1	EPS
1.2	-	-	1	20628	4.5	-	1	1	EPS
1.3	-	1	1	18482	4.6	-	-	1	1434
1.4	-	-	1	21376	4.7	-	-	1	EPS
1.5	-	-	1	23442	5.1	-	-	1	EPS
1.6	-	-	1	26216	5.2	-	-	1	8550
1.7	-	-	1	20754	5.3	-	-	1	10030
2.1	-	-	1	36460	5.4	-	-	1	-3984
2.2	-	1	1	43296	5.5	-	-	1	EPS
2.3	-	-	1	33018	5.6	-	1	1	EPS
2.4	-	-	1	38692	5.7	-	-	1	1166
2.5	-	-	1	34022	6.1	-	-	1	6284
2.6	-	-	1	33150	6.2	-	-	1	18332
2.7	-	-	1	23736	6.3	-	-	1	7830
3.1	-	1	1	EPS	6.4	-	1	1	EPS
3.2	-	-	1	10658	6.5	-	-	1	3994
3.3	-	-	1	6408	6.6	-	-	1	1872
3.4	-	-	1	4324	6.7	-	-	1	9052
3.5	-	-	1	8126	7.1	-	-	1	3768

3.6	-	-	1	1622	7.2	-	-	1	EPS
3.7	-	-	1	4880	7.3	-	-	1	3858
4.1	-	-	1	3246	7.4	-	-	1	2868
4.2	-	-	1	9642	7.5	-	-	1	4710
4.3	-	-	1	1758	7.6	-	-	1	6196
					7.7	-	1	1	EPS
VAR z	-INF	63804	+INF						

Obtained objective cost was 63804.000 for the permutation 3 2 1 6 4 5 7. Now, this result can be compared to optimal values obtained by the complete search of the feasible solution set. Obtained results are presented in Table 3.

Table 3. Best and worst orders of facilities

	6 best orders			6 worst orders		
	permutation	cost	deviation	permutation	cost	deviation
1	6 7 3 5 2 4 1	60690	1.0000	5 4 1 3 7 2 6	105844	1.7440
2	6 1 3 5 2 4 7	61196	1.0083	7 4 6 3 5 2 1	103586	1.7068
3	1 5 3 7 2 4 6	62508	1.0300	5 4 7 3 1 2 6	102944	1.6962
4	3 5 6 1 2 7 4	62786	1.0345	5 4 1 3 2 7 6	102936	1.6961
5	3 2 1 6 4 5 7	63804	1.0513	7 4 6 3 2 5 1	102094	1.6822
6	1 6 3 7 2 4 5	64162	1.0572	7 4 6 2 3 5 1	102030	1.6812

From these results it can be observed that the value obtained with GAMS solver is not optimal and is fifth best result. The best schedule is 6 7 3 5 2 4 1 when the target function value is 60,690 which is for 3,114 better result, i.e. deviation of the GAMS result is 5.13%.

6. CONCLUDING REMARKS

QAP, though being relatively young, is widely considered as a classical combinatorial optimization problem. As exact algorithms can only solve small size instances of the QAP, and as finding an approximate solution remains NP complete, heuristics with good performance in both solution time and solution quality are highly desirable. In this paper, we survey some of the most important formulations available and classify them according to their mathematical sources. Mathematical models and techniques that have been used for solving QAP were implemented in various solvers, and among them, GAMS (GAMS Development Corporation, Washington, DC, USA) solver is frequently used. Solvers for quadratic programming obtain only local optimum solutions, so this paper investigates how far these solutions are from the global optimum.

The first conclusion that can be derived from described approach is that the QAP approach that finds solutions using permutations of facilities is mostly used. Despite this, solutions using mathematical programming models play significant role among all types of solution approaches. Unlike other approaches, which require development of special algorithms and programming techniques, solutions based on mathematical models can use the existing solvers. The following conclusions that can be derived from this work are related to the use of solvers, namely, GAMS, one of the most popular for this purpose.

Even for problems of small size, GAMS solution is not optimal one. It can be stated as a significant disadvantage, especially when one considers that the complete search of such a small feasible solution set is not time consuming. For larger problems calculated deviation of an average of 6% is really satisfactory given the enormous savings in computer timework.

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OBSTACLES TO THE IMPLEMENTATION OF EFFICIENT CONSUMER RESPONSE IN SERBIA

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Abstract: *The purpose of this paper is to provide support for wide adoption and implementation of the Efficient Consumer Response (ECR) in the Serbian market. The categorization of ECR components has been done on secondary data sources, while desk research has been applied in combination with conversational research for the identification of obstacles for implementing ECR in Serbia. This study has shown that in Serbia, beside general obstacles that are present in nearly all business environments, there are also specific obstacles specifically related to the Serbian environment. Results of this work can be helpful for both practitioners and academics in the field of logistics and supply chain management, interested in the implementation of the ECR concept.*

Keywords: *supply chain, supply chain management, Efficient Consumer Response, ECR, retail industry.*

1. INTRODUCTION

Efficient consumer response (ECR) is a supply chain management concept that leads to overcoming the inefficiencies in the grocery supply chain. ECR has been successfully adopted since 1993 in the US and in Europe business practice one year later. The ECR Europe Executive Board (ECRE) is founded in 1994 and now includes 24 European ECR national initiatives. In Serbia, ECR is becoming increasingly popular in the academic environment (e.g. Bogetic, 2007; Bogetic & Acimovic, 2009; Jovanovic, 2009; Jovanovic, Vasiljevic & Ilic, 2009; Stankovic & Popovic, 2009) but unfortunately their popularity is still far short in the Serbian business environment. This paper has four objectives: first, to present origins of ECR; second, to categorize ECR components; third, to identify obstacles for implementing ECR, both general and specific which are related to the Serbian environment; and fourth, to contribute to the popularity of ECR in Serbia.

2. THEORETICAL BACKGROUND

ECR was developed during the nineties in order to overcome problems in the US retail and consumer goods industry. It was based on the idea of Quick Response (QR) concept which is applied in the clothing and textile industry. The first Efficient Consumer Response Working Group (ECRWG) was founded in 1992 in the US by representatives of the following companies Borden, Inc., Campbell Sales Company, Coca-Cola Company, Crown/BBK Incorporated, Kraft General Foods, Kroger Co., Nabisco Food Corporation, Procter & Gamble Co., Ralston Purina Company, Safeway Inc., Sales Force Companies, Inc, Scrivner Inc, Shaw's Supermarkets, Inc., SUPERVALUE INC. and The VONS Companies, Inc. with the aim to improve the performance of grocery supply chains (Kotzab, 1999). The plan was to analyse the mass merchant channel with its main competitors Wal-Mart, Target and K-Mart (according to Browning, 1997. given into Kotzab, 1999). ECRWG was engaged the consulting house Kurt Salmon Associates (KSA) for performing needed research because of their experience in the analysis of textile supply chains and development of QR. In 1993, KSA was identified the set of practices which could lead to improvement of the total supply chain performance for consumer goods. KSA showed that ECR could enable distributors and suppliers a higher level accuracy of demand forecasting (Tyana & Wee, 2003).

In 1993, KSA defined ECR as the "grocery industry strategy in which distributors, suppliers and brokers jointly commit to work closely together to bring greater value to the grocery consumer" (Kotzab, 1999, p.366). The project team Joint Industry Project for Efficient Consumer Response in »An ECR Best Practices Report« in 1994 defined ECR as the "strategy in which the grocery retailer, distributor, and supplier trading partners work closely together to eliminate excess costs from the grocery supply chain" (Hoffman & Mehra, 2000, p. 366). According to them, the focus of ECR should be on the following four issues:

1. How to optimize store assortments and space allocations to increase category sales per square foot and inventory turnover?
2. How to streamline the distribution of goods from the point of manufacture to the retail shelf?
3. How to reduce the cost of trade and consumer promotion?
4. How to reduce the cost of developing and introducing new products?

The merits of transfer the ECR concept to the European market belong to the Coca-Cola Retailing Research Group (CCRRG). In 1994, this group presented their meaning of ECR, so-called supplier retailer collaboration (SRC) as acceptance of both retailers and suppliers to “share proprietary internal or external data, and/or share policies and processes” which they used in decision making with the aim of sharing the achieved benefits (Kotzab, 1999, p. 369).

According to these ideas, the ECR Europe Executive Board (ECRE) is founded in 1994 by the group of leading European manufacturers and retailers which consisted of Albert Heijn, Birds Eye Walls, Coca-Cola Germany, Coca-Cola France, Fegro/Selgros, Henkel, ICA, Johnson & Johnson, Mars, Procter & Gamble, UK, Procter & Gamble, Italy, PromodeAs, Tesco and Van den Bergh Foods (Kotzab, 1999; Harris, Swatman, & Kurnia, 1999). The aim of ECRE was to develop ECR models and practices suitable for European business situations (Kotzab, 1999). In January 1996, on the first European ECR Conference which was held in Geneva, the ECRE presented their ECR model, according to (Alvarado & Kotzab, 2001). In the final report »European Value Chain Analysis Study« published in 1996 from the ECRE, ECR is defined as “a “strategic initiative” working to overcome traditional barriers between trading partners, thus eliminating internal barriers that result in costs and time that add little or no value to consumers” (Kotzab, 1999, p. 366). Seven years later the ECRE suggested the following definition of ECR – “the realisation of a simple, fast and consumer driven system, in which all links of the logistic chain work together, in order to satisfy consumer needs with the lowest possible cost” (Reyes & Bhutta, 2005, p. 348). Today, the vision of the ECRE is “working together to fulfill consumer wishes better, faster and at less cost with a shared business process leading to shared benefits across the value chain” (ECR Community, 2012).

ECR is focused on the achievement of some kind of forms of closely cooperation between retailers and their suppliers in order to create possibilities for direct response to the needs of customer in supply chain. The aim is to increase efficiency of flow of goods and use of data which are electronically collected in retail stores, according to Jespersen & Skjott-Larsen (2006). ECR is directed to combination of customer orientation and value-added process orientation. It supposes that companies work together on integration their operations and elimination of obstacles to satisfied customers and eliminated unnecessary costs.

2.1. ECR-US vs ECR-Europe

The first ECR process model, which is recognized as an American model (hereafter ECR-US model), is presented by KSA in 1993 (Figure 1). ECR-US model represents a combination of the following four strategies which lead to improvements in customer satisfaction:

1. Efficient store assortment – represents providing, grouping and arranging the products that customers want;
2. Efficient replenishment – represents maintaining of determined inventory levels for required assortment of products;
3. Efficient promotion – represents harmonizing the promotion activities between manufacturer and retailer; and
4. Efficient product introduction – represents developing and introducing new products that customers really want.

The ultimate goal of ECR-US model is to develop customer-driven distribution system which allow continuous production control based on the point-of-sales (POS) data, according to Kotzab (1999).

The first upgraded form of ECR-US model is a SRC process model which was realized by CCRRG in 1994. The CCRRG was recognized the characteristics of European market and according to them tried to adapt the ECR-US model to their needs.

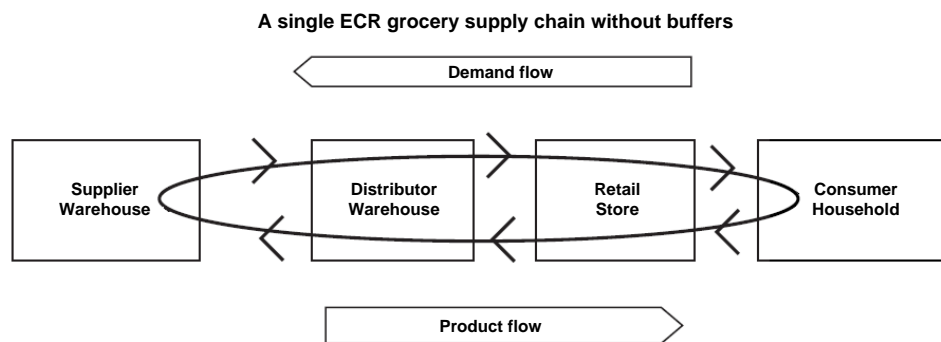


Figure 1: ECR-US model (KSA, 1993, p. 12; Kotzab, 1999, p. 367)

The model adapted for European business environment, known in literature as the ECR-Europe model, was presented by ECRE in 1996. “The ECR-Europe model is a cooperative strategy between retailer and manufacturer to fulfil consumer wishes better, faster and at less cost”, (ECRE, 1996, cited in Kotzab, 1999, p. 370). The group ECRE recommended harmonization of ECR processes through the establishment of focus areas and that will be reflected the deletion of boundaries between functional departments within an organization and between several participating organizations (Figure 2). Focus areas are: production and distribution, logistics and inventory management; sales and marketing; and buying and merchandising. “The interaction of these focus areas leads to improvements of the overall performance, in- and outside the companies involved. Thus, the result is a higher consumer value, which is represented in the ECR-Europe model as a function of quality, trust, variety, service, response time and price”, cited according to Kotzab (1999), p. 371.

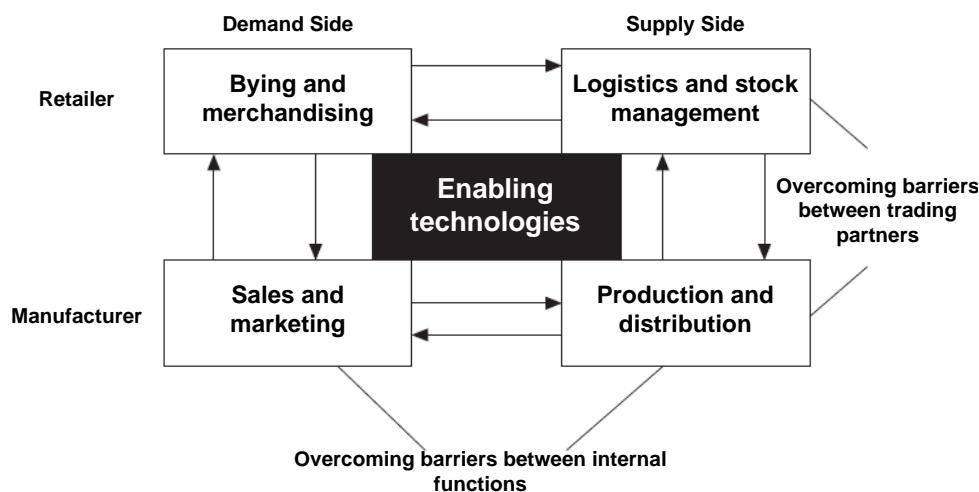


Figure 2: ECR-Europe model (ECRE, 1996, p. 3; Kotzab, 1999, p. 371)

The ECR-Europe model differs between the supply and demand sides, unlike the ECR-US model. The supply side contains all activities in relation to the flow of goods and is defined as a category logistics, (Kotzab, 1999). The action areas of category logistics are: efficient sourcing, efficient replenishment, efficient systems and efficient controlling. The demand side contains all additional activities related to strategic management and is defined as category management, according to the same source.

3. METHODOLOGY

In order to provide support for wide adoption of ECR in the Serbian market, first the theoretical background is given with emphasis on difference between ECR-US and ECR-Europe model, then the categorization of ECR components is suggested, after that the obstacles to implementation of ECR in Serbia are identified, and finally the conclusion and future directions of research are presented. Secondary data (e.g. Zikmund et al., 2010), mostly from the Internet sources and libraries are used for the categorization of ECR components. Desk research (Halldorsson & Arlbjorn, 2005) in combination with conversational research (Zikmund et al., 2010) is used for identification the obstacles to implementation of ECR in Serbia.

4. ECR COMPONENTS

Several different components of ECR and their relations have been considered in practice and literature. For example, consulting house Coopers&Lybrand in 1996 identified 14 ECR components and separated them into the following three categories: category management, product replenishment and enabling technologies. In 1998, Kurnia, Swatman and Schauder, discussed as ECR components four strategic initiatives supported by two operational programs and five enabling technologies. In 2008, Soret, de Pablos and Montes presented a list of ECR components divided into four categories: collaboration strategies, ECR practices, enabling tools and associate concepts. The problem of integration ECR components is emphasized by numerous authors (e.g. Coopers&Lybrand, 1996; Brewer, Button & Hensher, 2001; Aastrup, et al., 2008) because individual implementation of ECR components is not sufficient condition for a truly application of ECR concept. If companies want to achieve full benefits of ECR, they must work on integration of ECR components. For the requirements of this work, the ECR components are categorized into basic and additional.

The basic ECR components are:

- Efficient store assortment;
- Efficient promotion;
- Efficient product introduction;
- Efficient replenishment.

The additional ECR components are:

- Category management (CM);
- Continuous replenishment program (CRP);
- Integrated suppliers;
- »Fast« distribution strategies;
- Activity-based costing (ABC);
- Enabling information systems and technologies; and
- Enabling standards.

Efficient store assortment refers to providing, grouping and arranging the products and services that customers want. Efficiently use of available store shelf space and elimination of stock out risks are necessary to influence increase in customer satisfaction in a purchase. POS data, sales data from earlier periods, as well as some demographic studies can be helpful in analysis the product assortment and in choosing the product shelf location. „The relationship between manufacturers, distributors and retailers is crucial in achieving efficient store assortment” (Kurt Salmon Associates, 1993; Wood, 1996; Harris, Swatman & Kurnia, 1999; Reyes & Bhutta, 2005). Manufacturers, wholesalers and retailers have benefits from more accurate forecasts which are reflected in fewer days products stay on inventory, lower levels of safety stock and lower operating costs in the supply chain (Reyes & Bhutta, 2005). It is recommended that manufacturers, wholesalers, distributors and retailers should accept the CM concept in order to achieve efficient store assortment.

Efficient promotion refers to harmonizing the promotion activities between manufacturer and retailer. The proposition is to eliminate inefficient trade promotions and introduce better solutions for organization of promotion activities. Examples of good ideas for promotion introduction, based on Harris, Swatman & Kurnia (1999) and Reyes & Bhutta (2005) are:

- rewarding system for retailers on the basis of the quantity of sold products (»pay for performance«) – which mean rewarding retailers on the basis of how many products they sell to customers, rather than how many products they order from manufacturers;
- one order – several smaller deliveries (»forward commit«) – refers to organization and realization of shipment of one order into several smaller deliveries;
- electronic coupons;
- every day low prices (EDLP); etc.

The reengineering promotion activities enable elimination of all unnecessary and excessive costs. It is recommended to accept the CM concept in order to achieve efficient promotion.

Efficient product introduction refers to developing and introducing new products that customers really want. Manufacturers should to involve other primary supply chain members in the early phases of development of new products in order to reduce risks of wrong development and introduction new

products into marketplace. „Manufacturers, distributors and retailers must work together as allies to reduce the costs of product development and to produce only products anticipated and demanded“ by the customers (KSA, 1993; Harris, Swatman & Kurnia, 1999; Reyes & Bhutta, 2005). The proposition is to accept the CM concept in order to achieve efficient development and introduction new products on the marketplace.

Efficient replenishment refers to maintaining of determined inventory levels for required product assortment. The process focuses on delivering of required product mix to the store shelves with minimal time and costs, according to Kotzab (1999). It is based on a pull system driven by customer demand, and it is controlled by POS data which enable the product replenishment ordering and delivery (Reyes & Bhutta, 2005). The aim is to optimise time and cost in the inventory replenishment system by ensuring the right products to the right place, at the right time, in the right quantity and in the right way (adapted according to KSA, 1993; Harris, Swatman & Kurnia, 1999; Reyes & Bhutta, 2005).

The efficient replenishment is the basic „holder“ which supports the ECR concept and it contributes to more than half savings from ECR implementations (according to KSA, 1993; Harris, Swatman & Kurnia, 1999; Reyes & Bhutta, 2005). It coordinates the flow of goods and information in the supply chain in order to create a continuous flow of products, according to Reyes & Bhutta (2005). This ECR component enables retailers to keep smaller quantities of products in stock, which leads to a reduction in holding costs and shorter lead times, according to the same source. Numerous authors (see Harris, Swatman & Kurnia, 1999; Reyes & Bhutta, 2005) suggested the application of CRP concept in order to eliminate inefficiency in product replenishment.

Category management (CM) represents joint interactive process of retailer and manufacturer which enables management of categories as strategic business units within each retail object in order to gain customer loyalty. The essence of CM is a strategic assortment management (Seifert, 2003). The term CM was first appeared in 1987 when some companies (e.g. Procter & Gamble) changed orientation from brand management to management »by category«, according to Harris, Swatman & Kurnia (1999). The retail chain Real, a division of Metro Group, has first introduced the concept of baby care centres in retail objects, according to Seifert (2003).

Category includes all products and services which can satisfy specific customers' needs. Category is a group of products and services – substitutes and complements. Substitutes can replace each other from the customer viewpoint (e.g. milk from two different manufacturers). Complements can supplement each other from the customer viewpoint (e.g. milk and instant cocoa beverage).

The CM planning process aims to provide the structured application of CM (Seifert, 2003). This process „creates a balance between product and process investment and takes into consideration all required activities of the whole system from manufacturer to retailer to consumer“, cited according to Seifert (2003), p.13. It is consisted of the following nine phases: (1) strategy analysis; (2) category definition and segmentation; (3) determination of category roles; (4) category assessment; (5) category performance analysis; (6) development of category strategies; (7) determination of category tactics; (8) category plan implementation; and (9) category performance measurement and continuous improvement of CM.

Continuous replenishment (CRP) supposes a leaving of push strategies by which the products are „pushed“ from inventories, and adoption of pull strategies by which the products are „pulled“ on the retail store shelves according to real customer demand. Retailer shares sales and inventory data with supplier which continually replenish their inventories. On the other hand, supplier have opportunity to better manage with its inventories and capacities based on available sales data and inventory levels at retailer.

The concept of Integrated Suppliers (IS) represents achieving a form of business cooperation between manufacturer and their suppliers of ingredients, raw materials and packaging in order to eliminate all activities which lead to losses in time and money. The idea for development of IS concept was came in 1996 from »ECR Europe VCA Study« which presented the sources for potential costs reduces in the total supply chain. In 1998 ECR Europe Supply Side Steering Committee founded a working group tasked with analyzing the benefits of application the IS concept. The IS concept incorporates demand management, efficient product change management, synchronized production, Supplier Managed Inventory (SMI), methods and tools for reliable and efficient supply and self billing. The Global Upstream Supply Initiative (GUSI) develops the Upstream Integration Model (UIM) based on idea of IS concept. The UIM model

enables standardization of business processes and data interchanges upstream between manufactures and suppliers in order to support interoperability between them, according to GUSI (2006).

Under the »fast« distribution strategies that support ECR here are supposed direct-to-store distribution strategy and cross-docking. These distribution strategies enable fast delivery of right products from suppliers to retail objects. Direct-to-store delivery refers to direct delivery of products from suppliers to retail objects without crossing through the distribution center. Cross-docking refers to delivery of products from suppliers to retail objects with crossing through distribution center that have the role of product coordinator.

Activity-Based Costing (ABC) enables consideration of real costs required for realization of determined activities. The prerequisite of application ABC are accurate data in relation with real costs of products, services, processes, activities, distribution channels, customer segments, contracts and projects (according to Miller, 1996 in Harris, Swatman & Kurnia, 1999). Real direct and indirect costs have been allocated to activities, and then better solutions for costs reduction tend to be found.

Computer-Aided Ordering (CAO) is one of the enabling specialized software tools that can be used for ECR support. It is a module of retail system whose function is to automatically (or semi-automatically) release procurement orders for products which reach predetermined signal inventory. The most frequently used technologies for support ECR are: e-mail, Electronic Data Interchange (EDI), bar-code, Radio Frequency Identification (RFID), extranet.

Development of ECR is supported by numerous standards. Voluntary Inter-industry Commerce Standard (VICS), which is a subset of the American National Standards Institute Accredited Standards Committee X12 (ANSI ASC X12), is widely used in merchandise retail industry. Uniform Communications Standard (USC) for interchange key EDI documents, also subset of the ANSI ASC X12, is used in grocery and food industry. GS1 is the most widely used system of global standards for identification and communication of information in relation with products, services, assets and locations in supply chains. It is developed by the same name global association GS1 (Global Standard One) which has over 110 member organizations in over 100 countries. GS1 system includes, according to GS1 (2012): global standards for application of bar codes that use GS1 identification keys for automatic identification trade items, locations, logistic units and assets; global standards for electronic business messaging that allow fast, efficient and accurate transmission of business data between trading partners; Global Data Synchronization Network (GDSN); and global standards that combines RFID technology, existing communications network infrastructure and the Electronic Product Code (EPC) to enable immediate and automatic identification and tracking of an item through the whole supply chain.

5. OBSTACLES TO IMPLEMENTING ECR IN SERBIA

The process of transition in Serbia trade lags behind most countries in Europe. Serbian market has been opened for foreign investments since the end of 2000, and in trade sector, interest has been observed for green-field investments like in other sectors, according to Bogetic, Veljkovic & Stankovic (2011). Changes in customer buying behaviour, importance and role of retail objects and relationships between retailers and their suppliers are some of the most important changes in the Serbian market. Serbian customers are increasingly going shopping once a week or once in two weeks and looking to purchase high quality products with low prices. The economic crisis forced Serbian customers to decrease their spending on non-essentials products and in some cases to go shopping less frequently (Euromonitor, 2012). The importance and role of large retail chains is strengthening and the importance and role of small and medium-sized retail objects is weakening in the Serbian market (see e.g. Bogetic, Veljkovic & Stankovic, 2011; Radosavljevic, Maksimović & Borisavljević, 2011). Small and independent retailers are striving to survive beside large retail chains and their positions are even more affected by economic crisis. Large retailers are increasing the pressure on their suppliers, and for them the "ideal supplier" (according to researches of Bogetic, Veljkovic & Stankovic, 2011) is one which give best prices and margins, have supply continuity, wide assortment of quality products, do business professionally and honestly and have short lead times. On the other hand, they demand long terms of payment and even then they will not probably meet time deadlines for payment. Position of suppliers are more complicated with their obligations to pay value added taxes after sending invoice, whether products have been charged or not. These changes put pressure on all supply chain members to apply customer driven supply chain strategy and to make their operations more efficient (Lohtia, Xie & Subramaniam, 2004). ECR is one concept that can contribute to these objectives and can provide numerous benefits to supply chain members.

Potential benefits for the Serbian retail supply chains from ECR can be gain through cost reductions and increases in revenue in the supply chain. Some benefits from the ECR “winning combination” between customers, retailers and manufacturers are given in Seifert (2003). A detailed consideration of numerous ECR benefits is presented in Bogetic & Acimovic (2009). Lohtia, Xie & Subramaniam (2004), Soret, de Pablos & Montes (2008), etc are some of the other authors that indicated benefits from successful ECR implementation.

Obstacles to wide implementation of ECR in Serbia are identified and categorized as follows:

1. General obstacles and
2. Specific obstacles.

General obstacles are presented in nearly all business environments and they are:

- Lack of ECR understanding, expertise and skills. Members in the supply chain are usually not enough familiar with ECR and their potential benefits (see e.g. Lohtia, Xie & Subramaniam, 2004; Aastrup et al., 2008). Lack of necessary expertise for organization and use of ECR initiative is particularly presented in developing countries, according to Reyes & Bhutta (2005).
- Lack of cooperative orientation. Supply chain members generally have sceptical attitudes towards information sharing, common goals, mutual trust, common decision-making and benefits and risks sharing. Non-cooperative relationships between members in the supply chain are still present although numerous initiatives were undertaken in order to contribute to the improvement of collaboration between them.
- Lack of technology capabilities. ECR requires technology skilled workforce, compatible hardware and software, management information system resources and the integration of systems across members in the supply chain (see e.g. Lohtia, Xie & Subramaniam, 2004).
- Costs of ECR implementation. Financial reasons are always big barrier to change and adoption of any new concept and the situation is the same in the case of ECR adoption. Accurately estimation of initial investments and implementation costs is prerequisite for successful ECR implementation.

Specific obstacles are related to the Serbian environment and they are:

- Lack of national ECR initiative. To date, the ECR Serbia has not been formed (ECR Europe, 2012). Some steps have been taken in this direction (GS1 Serbia, 2009), but without the final realization. Over the last few years several academic researchers often talked about the importance of formally organized initiative ECR Serbia (see for example Bogetic, 2007; Jovanovic, Vasiljevic & Ilic, 2009). It is also interesting to note that the only one former Yugoslav republic has established the national ECR initiative in 2006.
- Insufficient legal protection of manufacturer rights. Manufacturers in Serbia are subordinated by the large retail chains and one gets the impression that they don't have adequate state support. For example, the payment due dates can go up to 180 or 240 days. The new Law governing regularity of payments for goods and services is still in preparation and it is expected that it will be promulgated as soon as possible.
- Insufficient legal protection of customer rights. The new Law on Consumer Protection entered into force on January 1, 2011, but in practice customers continue to have problems with exercising their rights. It should also be noted that the National Consumer Organisation of Serbia is still not a member of the European Consumers' Organization (BEUC The European Consumer Organization, 2012).

6. CONCLUSION

Application of modern supply chain management concepts in Serbia lags behind most countries in Europe; and the situation is the same with the implementation of ECR. This study identified prevailing obstacles to wide adoption and implementation of ECR in the Serbian retail and consumer goods industry. The three specific obstacles related to the Serbian environment are identified besides general obstacles which are presented in nearly all business environments. They are: lack of national ECR initiative, insufficient legal protection of manufacturer rights and insufficient legal protection of customer rights. Ways for overcoming these specific obstacles must be find as soon as possible, while parallel coping with general obstacles is done. Thus, the ECR Serbia initiative must be included, as soon as possible, in ECR Europe, the new Law governing regularity of payments for goods and services must be entered into force and applied in practice in a right and fast way, and better legal protection for customers on the Serbian market must be provided. Further researches and initiatives in the Serbian retail and consumer goods

industry are needed in order to support the vision of the ECRE - "working together to fulfil consumer wishes better, faster and at less cost with a shared business process leading to shared benefits across the value chain".

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IMPROVEMENT OF SUPPLY CHAIN MANAGEMENT BY BULLWHIP EFFECT REDUCTION

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Abstract: *Theme/Problem:* Experts in production practice are well aware of the fact that the Bullwhip Effect (BWE) is one of the problems encountered by Supply Chain (SC) member companies. A phenomenon where every member of the SC plans its own business activities and inventories based on the forecasted demand of its first downstream member within the SC, by getting farther away from the source of end (consumer) demand (of the market), will cause even greater variations in the forecast demand for every following predecessor within the SC. Consequently, this will lead to even greater exaggerations when it comes to planning the business volume and 'safety stocks' of the observed SC member; with respect to the graphical interpretation of this phenomenon, it was named the Bullwhip Effect (BWE). BWE significantly reduces the quality of SC management (by unrealistic planning that leads to an increase not only in material resources inventory, but also in costs and time of commitment of assets), and thus reduces the final business result and competitiveness of the SC (members). (Out of three most important groups of management performance – quality, deadlines, and price/costs – BWE most visibly affects (through safety stocks) the costs (prices), but the other two groups (of performance) are also associated with BW. That is why we are looking for solutions – innovations in the SC management, which are to reduce BWE.

Idea/Intention/Purpose: The presumption (idea) is that the modern science and practices of production companies have already developed solutions for reducing BWE in the SC. Therefore, there is an intention to investigate/examine the possibility of applying modern solutions for management (firstly for planning) over production companies in an attempt to improve/innovate management in the SC and overcome problems caused by BWE. Performances that examine the validity of an idea refer to amounts and costs of inventory holding in the SC (for every SC member, and integrally – for the entire SC). The expected solutions should improve the SC management and make its products more competitive and cheaper. For that reason, the ideas presented in this paper are mostly intended for planners within SC member companies.

Result: This paper generates some (potentially applicable) solutions for BWE problems in the SC: a) The application of the 'modern planning tools' package (Advanced Planning and Scheduling – APS) in all SC members, b) Change of practice, i.e. true management collaboration among SC members, that would result in increasing the planning quality in every SC member – by creating their plans on the same initial data on end-demand, and c) other innovative solutions from the 'Package 4' for eliminating or reducing (discussed in this paper) the four causes of BWE.

Key words: improvement of Supply Chain Management, Bullwhip Effect, Advanced Planning and Scheduling (APS)

1. INTRODUCTION

The overall Supply Chain (SC) for an item, from the moment of preparing for production (resource supplying), through production, until the moment of product placement at the shelf of retail facilities, is accompanied by a great amount of inventories in every 'inter-station' – SC member company. The lack of information or/and incomplete information, the same as fear of impossibility to meet the demand (and thus miss the income and maintain or improve market share) affect stock creation in every SC member – starting from stocks in the raw material warehouse of producer, through inventory of finished goods of the producer, stocks in the central distribution warehouse, in local wholesale warehouses, and even in the warehouses of retail facilities. (The SC members are the first, the second, the third, etc. successor to each other (observed from the raw material suppliers, through producers, to retail companies), i.e. the third, the second, the first predecessor – observed in the reverse direction).

As a rule, the inventories are the indicator of the malfunction of managing the business system, including the SC. With the goal of increasing the successfulness of SC members and the SC as a whole (supply chain needs to increase the competitiveness since it competes other supply chains in the market), the quantities of goods on stock need to be reduced, the same as the time of keeping them – as (here observed) performances of management quality. This further requires improving not only the quality of business system management (Omerbegović-Bjelović J., 1998) but the management of the SC as well, after which follows generation of ideas for innovating systems of SC management.

The ideas for the SC management innovation are looked for in the existing business practice of the SC 'production' members, since the production companies participate in different chains, i.e. supply chain networks. Management (and meta-management) solutions (concepts, models, methods, tools...) – that improve stock management (with planning and total management) in the production practice – should be reexamined and eventually adjusted, and then applied on all SC members. The expected result is the improvement of stock management (and even the management of SC members and the SC as a whole) within the entire SC, i.e. the reduction of BWE.

2. BWE PROBLEM AND HOW TO SOLVE IT BY APS & PACKAGE 4

Hence, we thoroughly investigate: a) The BWE phenomenon (causes, manifestation, consequences), and b) Practice of good, contemporary management (firstly the 'advanced planning'). The solutions could contribute to BWE reduction. We further observe the possibilities/conditions of solution transfer – as innovative ideas for improving the SC members' behaviour, that is, for improving the management quality (and planning) of the SC. Therefore, we could expect the quality of the SC management (improved by introducing innovative solutions) to improve performances such as amount and duration of stock keeping, and also to improve competitiveness of the SC and successfulness of business subjects – SC members. .

2.1. Bullwhip effect

Supply chain (SC) could be observed as a set of activities that provide the transformation of raw materials into final products, with the delivery of finished goods to the buyer. Certain activity groups are being realized in separate economic entities/companies. Management over supply and meeting the demand, as a component of business management, has a goal of satisfying customer demand, and it is accomplished through: understanding of demand flows (within a SC), identification of market relations, and providing additional value to the buyer. Discrepancy between the planned and future/real activity scope (and also between the forecasted demand and real future demand) increase in every preceding member within the SC due to the increase in safety of adequate response to future demand of the first successor within the SC. Therefore, the orders (towards the SC 'source') increase. In some cases, the order from the retail sale to the wholesale is the smallest; the order from the wholesale to producer is bigger, while the order from producer to supplier of raw materials is even bigger.

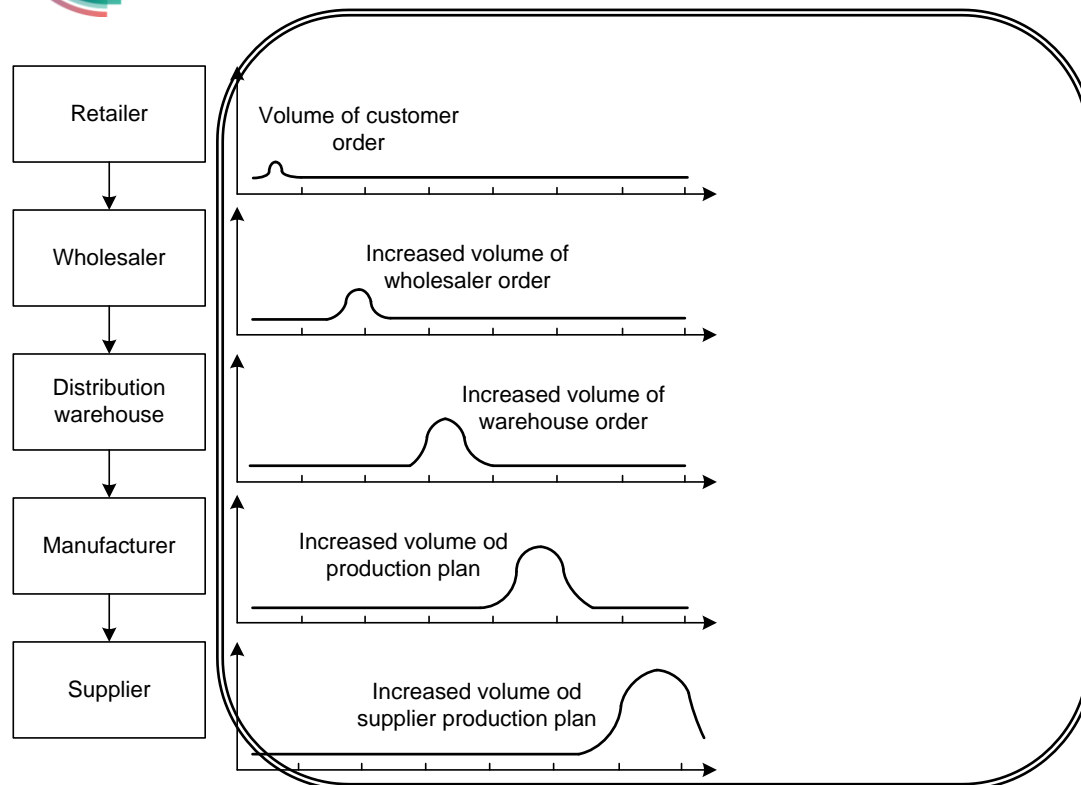


Figure 1: Bullwhip effect on planned business volume in SC members

(Adopted and modified from Warburton, 2004)

The basic reason for keeping the unwanted amount of stocks is to be recognized in a desire to prevent following situations from emerging: a) Lack of goods on stock, and b) Failure to sell and thus losing incomes, i.e. failing to provide adequate customer service (through complete and timely satisfaction of their orders). Therefore, the management of every SC member company brings decisions on increasing the 'safety' stocks, which results in unwanted amounts of stocks in the SC. Even in case when the demand of end buyer/user in the SC (in terms of amounts and delivery terms) is known and stable, the orders forwarded by seller (certain retail facility) to distribution warehouse exceeded it (i.e. they vary by dynamics and amount), while the orders forwarded by distribution warehouse to producer vary even more. The increase in variation of stocks in every next predecessor in the SC leads to an increase in amounts (and keeping costs) of goods on stock, not only for individual members of the SC, but for SC as a whole. This phenomenon is known as the 'bullwhip effect' (BWE). APICS defines BWE as 'an extreme change in the supply position upstream in a supply chain generated by a small change in demand downstream in the supply chain' (Blackstone J., Cox J., 2005).

Lee & Padmanabhan & Whang (1997, p. 94) gave a full scale definition of BWE; they have observed BWE on the relation between retailer and his supplier (producer or distributor/wholesaler). They have identified the discrepancies between the demand of end customer (hereafter: end demand) and size of orders delivered by the retail facility to supplier/deliverer. As stated by Warburton (2004) when defining BWE through '*Law of Industrial Dynamics*', if the signal on demand has been processed with the goal of determining amounts needed for replenishing own stocks, the demand variations increase with every new use of demand signals (for planning and determining the amount for stock replenishment) in every predecessor within the SC (Figure 1).

It is common for SC members to communicate only with their first predecessor (supplier) and first successor (buyer). For that reason, the forecast of future demand of the first successor and the decision on necessary amounts are based only on current and historical information on needs/demand obtained from the first successor/buyer. The history of orders (reports on previous demand) is greatly the reflection/model of customer behaviour (the first successor in the SC) and SC infrastructure (consisting of SC members, rules of their behaviour, communication means, etc.).

Lee & Padmanabhan & Whang (1997, pp. 95-98) have identified four major causes of the BWE appearance:

C1) Demand forecasting: Companies in a SC ground their business on forecasting demand of their first successor, which results in plans for necessary capacities, stocks (own output), necessary input (materials and raw materials), etc. Demand forecasting is based on the order history that the SC member company (supplier) obtained from the first successor in the SC (buyer). In this way, every time a buyer sends an order form, those responsible for demand forecasting (at the supplier's) identify this as a signal for future demand. In line with (regularly updated) *order history*, demand forecasting affects certain company (planning of stocks, amounts for production, capacities), the same as the predecessors in the SC (suppliers). In this way, every participant in the SC creates its own demand forecasting and further operations. Every increase in discrepancies in new orders, compared to the historical average of ordered amounts, forces company to update (usually increase) the level of safety stocks in order to be able to meet (potential) future demand. Due to such increase, variations in orders transmit to every preceding member in the SC, and consequently, the need for creating bigger amount of safety stocks 'spillover' to every predecessor in the SC.

C2) Order batching: In the SC, a company creates its own order in line with actual inventories and needed amounts, taking into consideration the economic logic of making orders. A company does not send an order form to the supplier (predecessor in the SC) just for one (the first) moment that identifies need for new entries; it *selects optimal moment for order making* in which (for which) to order bigger amount (transport packaging, entire palette, a whole truck) – in order to make cost saving through the economy of scale (lower unit price for bigger amount ordered, lower transportation costs per unit of product, etc.). Such ordering logic brings to weekly, monthly, or even quarterly orders, which increase risks in assessments of future needs for input, increase in inventory, and increase in the intensity/influence of BWE. The practice shows that the BWE effect is getting weaker due to shortening the period between orders.

C3) Price fluctuation: Continual market game led both manufacturers and distributors to periodically offer *special promotions* like *price discounts* and *quantity discounts*. In the same way, price fluctuations occur between every two members of the SC. The result of such phenomena is that customers buy in bigger quantities then needed in the following period, and stock up for the future, which affects the increase in BWE intensity. Economic profitability of such purchases is transient (i.e. disputable), bearing in mind that the accomplished positive price difference should exceed costs of warehousing and using funds during this prolonged period of 'keeping' extra stocks. In this case, bigger orders deviate from historically based purchase trends; this leads to creating bigger amounts of 'safety' stocks in the SC (not only in case of retailers and distributors, but the manufacturers as well), thus increasing the BWE intensity.

C4) Allocation of limited capacities/stocks: In cases when demand (of first successors, for example, couple of retail stores in the same town) exceeds the availability of the observed member of the SC to deliver orders (because of limited capacities), follows the allocation of available amounts in line with the proportional participation of order of individual customer/successor in the overall amount. On the other hand, buyers create '*artificial*' demand with the goal of maximization of amounts to be delivered. Such demand is based on orders of buyers that have been unrealistically amplified (also known as '*phantom*' amounts). Upon the end of such situation, i.e. upon the abatement of limited supply (reduction of real demand, increase in capacities, outsourcing production, etc.), buyers simply cancel such 'artificial' orders and return to real-necessary amounts. However, the manufacturers have taken into consideration such 'artificial' orders as a real demand, and based on that, they have created data on safety stocks for future deliveries, increasing their own orders of raw materials and materials (in this way leading all predecessors in the SC to do the same).

Bearing in mind the adversity of the existence of unjustifiably large inventories, the SC members tend to establish a system of BWE control. Until now, two approaches of reducing BWE have been used in the practice (Lee & Padmanabhan & Whang, 1997, p.95):

- a) Modification of SC infrastructure, i.e. change in behaviour of SC members of one to another (for example, using the right of SC members to 'skip'/omit some SC member in certain circumstances, if his participation is not necessary);

- b) Affecting the common behaviour of buyers (which requires changes: calculation techniques of necessary quantities, ways of making decisions on ordering date, defining priorities in case of limited financial means, existing model of stock management, etc.).

Better understanding of BWE allows for more reliable conclusions with respect to potential ways for reducing BWE in the SC. Identified characteristics of BWE have implied to direct relation between the planning process and BWE intensity (Chen et al., 2000, pp. 436-443). Availability of information on demand directly affects not only the quality of planning (and management), but the intensity of BWE as well. According to Kaipia & Korhonen & Hartiala (2006), fluctuations in demand - that occur in the end of SC (in the retail store) – and identified changes in demand and stocks in predecessors in the SC are quite different. Every SC member analyses demand from own perspective and puts it in the context of characteristics of own management (and even planning and demand forecasting) and operations (available resources, limited capacities, etc.). Therefore, this paper examines the possibility and justifiability of the application of modern tools for planning (and for management as well) in ‘fight’ against BWE in the SC.

2.2. Advanced planning and scheduling

In order to come to more credible conclusions on the idea for application of modern planning tools in ‘fight’ against BWE in the SC, we need to get to know basic characteristics of these tools, as well as conditions/possibilities of their application in the SC.

Advanced Planning and Scheduling (APS) system allows for immediate response to customer demands by providing timely and reliable information from business system. APS approach has been developed as a solution intended for production companies, with the goal of including two important factors in their business planning – company’s resource limitations, and demand/sale forecasting. The concept on which the APS system is based on is applicable in cases when a company plans to produce final products based on available production capacities, capacities of distribution and transportation. According to APICS Dictionary (Blackstone & Cox, 2005), APS system is ‘a computer program that uses advanced mathematic algorithms or logic with the goal of optimization or simulation of fine planning (of capacities, terms, supplies), resource usage, tactical planning, forecasting, and demand management’.

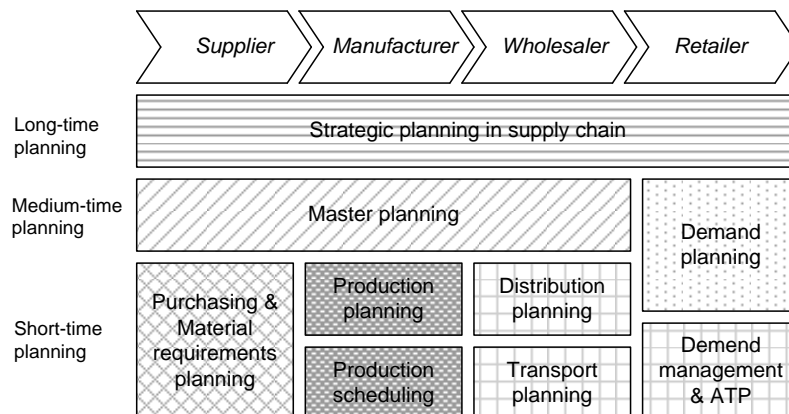


Figure 2: Basic APS modules and appropriate business functions (Adopted from Lambert & Pohlen, 2000)

These techniques simultaneously examine limitations and business rules with the goal of timely provision of plans, adequate decisions, responses to demand questions; for example, the concepts applied are ATP (*Available-to-Promise*, i.e. the demand is accepted having in mind that there are wanted amounts already on stock), and CTP (*Capable-to-Promise*, i.e. demand is offered stocks that will be available in near future).

Modularity is also an important feature of APS. Modular system of APS (approach to examining planning tasks grouped into modules), called ‘APS matrix’ and developed by Gruat-la-Forme & Botta-Genoulaz & Campagne & Millet (2005), indicates to which area of SC a certain module of APS system refers to. Authors Lambert & Pohlen (2000) present the improved APS matrices by grouping the APS activities in

line with the functioning of the SC. The improved APS matrices (Figure 2) shows that production planning and scheduling terms make one subgroup, while distribution planning, demand planning and demand satisfaction (Demand management & ATP) make other subgroup of related activities.

Stadtler & Kilger (2005) identified three basic characteristics of APS system:

- (1) Integrated planning of the functioning of the overall business system/company (including its buyers and suppliers), i.e. planning in the company – from the supplier to buyer;
- (2) Optimization of clearly defined variants of models (goals and limitations) for different business situations and the application of optimization and heuristic methods in planning;
- (3) Hierarchical system of planning that allows for the expression/accomplishment of the previous two characteristics.

The possibilities of APS system in managing capacities, optimization of distribution network, scheduling, resource planning, management over limitations, tracking the performances, etc., are discussed/given in Table 1 (that emerged by modifying sources Setia & Sambamurthy & Closs, 2008).

Table 1: Application capabilities and solution details of APS systems (Adopted from Setia et al., 2008)

APS capabilities	Description	Example Application and Solutions
Capacity modelling	Exact definition of resources and constraints	
Route modelling	Create routing on a product by-product basis, set up alternate workstations and operations workflows that help tie workstations together and allocate/split operations to separated tasks, and identify limitations or special setup for specific operations	Demand planning , supply chain planning, factory planning, transportation optimization
Scheduling and optimization	Schedule and optimize various jobs and process performance criterion based on available operators and resource constraints	
Planning capabilities	Plan resource and facilities for the long term, through what-if analysis support the available to promise quantities improve processes and identify production constraints, and allocate resources to specific tasks	Demand planning, supply management, network design and optimization
Constraint management and analysis	Identify constraints and reschedule resources, allocate resources according to demand priorities	Production planning and detailed scheduling, available to promise (ATP)
Execution control	Manage the operations by exceptions and real time reporting	

Companies implement APS in order to efficiently manage the funds in use, and also due to stock optimization, harmonizing demand and supply, minimize time loses and reduce transportation costs. The expected benefits from the implementation of APS system are not only based on possessing information technologies (which represent the ground of APS system), but also on clearly identified business processes and adequate training of human resources. Benefits from APS could be divided in quantitative and qualitative (Adopted from Louw, 2006).

Expected quantitative benefits from the implementation of APS system are identified through the improvement of key performance indicators:

- Increase accuracy in demand forecasting (from 40 to 80 pct)
- Improving customer service (from 70 to 90 pct)
- Stock reduction (by 13-50 pct)

- Increase in coherence of production launching with identified customer needs (improvement from 43 to 82 pct), so that the final product is held on stock for shorter period of time
- Reduction of time period (duration) of stock shortage – Stock out (reduced by 5 pct)
- Sales increase through reduction of stock out situations (increase in sales by 5 pct)

Expected qualitative benefits from the implementation of APS System:

- Improvement of precision of demand forecasting, which contributes to the reduction of stock level or/and improvement of service level with the same stock level
- Optimization of combination (type and/or quantity) of stocks, so that the overall stocks remain unchanged (in quantities or/and value), while the products on stock are in line with the participation in the overall demand
- Capability of planning stock location in order to prevent situations where company disposes of stocks of certain product, but not on the location (in the warehouse) where the demand is identified (which would require additional time and costs of stock transfer)
- Better planning of deliveries and transportation
- Offering real insight into demand, stocks on hand, and planned supplies through integrated survey and coordination, etc.

2.3. Possibilities for BWE effect reduction with APS system & Package 4

The efficiency of SC directly depends on coordination between different SC members, which imposes the necessity for them to recognize their role in this complex business system. All companies in the SC have a unique task, which is to provide the desired level of customer service – satisfying the identified end demand. Even though every company in the SC is independent in its operating, it is necessary for the performances of one company to directly affect other members of the SC. Namely, a problem of one member creates issues both to predecessors and successors in the SC, thus putting into question the effectiveness of the entire SC (Paik & Bagchi, 2007, pp. 308-324).

The understanding of BWE causative agents provides valid foundation for creating the adequate strategy of elimination or at least partial BWE reduction – in some segments or/and in the entire SC. This is a reason to present ‘**Package 4**’ for earlier stated four major causes of BWE (that is, adequate, innovative solutions for reduction/elimination of 4 causes of BWE through application of APS tools and other potential innovations).

S1) Solution for elimination/reduction of BWE caused by the method of demand forecasting: The fact is that every following predecessor of the retail sale in the SC (being the last ‘link’ in the SC) base its demand forecast on the demand of the first successor (and thus makes plans for needed capacities, necessary stocks – own output, necessary input of materials and raw materials). In this way, the reality in demand forecasting and planning (structure and volumes) of business engagement is lost. In other words, going upstream towards the ‘source’ of SC, mistakes in assessment and planning (management) become even bigger. This results not only in unjustifiably great amounts of safety stocks and ungrounded costs, but also in the loss of competitiveness and endangering the survival of SC members.

With the goal of preventing mistakes in demand forecasting (and planning), the recommendation is to make information from the source of demand (end demand, customer demand) available not only to the first predecessor in the SC, but for all other predecessors in the SC (Figure 3). Based on the *availability of information on end demand* for all members of the SC, every participant in the SC has a possibility to develop his plans with regard to the same source (end demand), and to suffer less influence of BWE (thanks to omitting the ‘middleman’ in the SC).

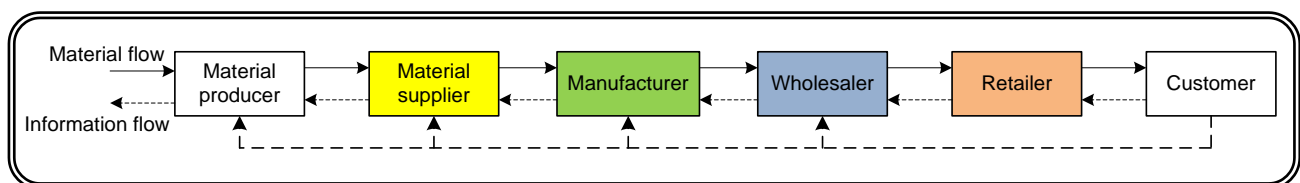


Figure 3: Forecasting of end demand in SC – graphical model

S2) Solutions for eliminating/reducing BWE caused by the model of order-making on behalf of the customer: In SC, company-members create their orders in line with own logic (and also in accordance with actual stocks, needed quantities, transportation, costs); at the same time, they decide both on quantities and the moment the order is made for. They prolong periods for which they order needed resources, thus increasing the BWE.

However, in order to avoid danger from jeopardizing the actuality of structure and volume of orders that could occur due to an increase in time horizon for which the order is made for, i.e. in order to avoid excessive ordering, it takes a lot of information and efficient management (planning) mechanisms. Here, the reduction of BWE is due to reorganization of planning function in the entire SC.

The idea is for the members of SC to switch from classic planning of own supply to an advanced method that is 'suitable' for SC. In this way, every predecessor plans supply (own delivery/sales) for its first successor. Hence, the recommendation is that the supplier/deliverer should plan the supplies for his own customer. In this case, it is necessary for a vendor to dispose information on end demand, the history of supply of the observed buyer, the needs of the customer in (the shortest) systematic period, current inventory at the buyer's, and maximal allowed level of stocks at the observed buyer. Based on this (and on circumstances), he creates a supply plan for his customer. In this case, the customer becomes a passive participant in the SC. Such approach is called VMI (*Vendor Managed Inventory*). Special case is when/if the supply plan is confirmed by a customer, which is called CMI (*Co-Managed Inventory*). Except for helping to eliminate customer supply planning problem by input, such approach also affects the reduction of BWE in the SC.

The second solution that is applicable with the same goal of reducing BWE concerns the *logic of choice (and costs) of transportation* (since excessive amounts are being ordered from the predecessors in the SC with the goal of maximization of transportation use). The recommendation is to use some of the variants of the ordering model that could significantly contribute to order reduction, and even to mitigating the BWE intensity through: a) Organization of transportation of different kind of products (from seller to buyer – first successor) with the same transportation means (for example, by truck; b) Transportation of products of different suppliers for the same buyer (if the buyer is in charge of the transportation); or c) Transportation of products of the same supplier for different buyers – with proportional allocation of transportation costs. (Of course, it is not important whether we talk about own transportation, or *outsourcing*).

S3) Solution for eliminating/mitigating BWE caused by price fluctuations: As stated earlier, the oscillations in product prices also exert significant influence on BWE, which could be reduced by elimination of promotions and limited time period of price discounts – at least for the SC members (since the common interest of all SC members is to contribute to SC competitiveness with real prices). In addition, the elimination of quantity discount (at least for the members of the same SC) reduces the possibility (and need) to order goods without real end demand. The SC members must be aware of the fact that they act as a single system (and compete with other SC), and they are motivated in mutual cooperation to be realistic (or/and to design and contract the allocation of business results accomplished by SC in timely manner). Adequate sale techniques that could be applied in the practice (in the concrete SC) are as follows: *Everyday Low Price* (EDLP), and *Value Pricing Strategy*. Generally, the members of a concrete SC are advised to analyze the profitability of purchasing unnecessary amounts at favourable prices (through *Activity-based costing system*).

S4) Solution for elimination/reduction of BWE caused by the method of allocation of limited capacities/inventory: Having in mind the phenomenon of 'artificial' demand (when the capacity of delivery of the first predecessor of the observed member of the SC is lower than the total demand of its first successors), and also with respect to the danger of distortion of data on safety stocks (which would lead to an increase in BWE), the allocation of limited funds must be grounded on the logic different than 'allocation of available quantities in line with the proportional participation of orders of individual buyer/successor in total order'.

Elimination of the phenomenon of 'artificial' orders is possible if suppliers (first predecessors in the SC) carry out the *allocation of limited quantities in line with the history of orders* from the buyers/first successors, and also in accordance with end demand, and not in line with currently placed orders.

However, irrespective of 'Package 4' innovative solutions for reducing BWE in the SC, the idea is *for all members of the SC* (no exceptions) *to apply modern APS solutions* (for innovative planning, thus improving the quality of SC management). APS system of SC grounds its functioning on phase and independent (according to SC members) analysis of the latest available information from the market (in the process of end demand forecasting), with the goal of creating more quality plans for the members in the SC. Based on the latest available information, and after applying APS, manufacturers – members of the SC generate new plans or update the existing ones and launch new production orders and place new orders of raw materials and materials. On the other hand, the members of a distribution warehouse, wholesale and retail sale, create orders for stock replenishment. Raw material supplier in the SC (who is at the same time at the greatest distance from the end demand) base his decision (plan for supplying buyer-manufacturer) on the history of production needs, as well as on information on end demand and forecasting needs of his successor – manufacturer. Manufacturer (who is by one position 'closer' to end demand) grounds his decision on the size of production series on the history of needs of distribution warehouse, end demand from the market, and forecasting needs of his successor – wholesale. After that comes the wholesale, which uses the history of orders from the retail sale (the first successor in the SC) with the goal of generating the decision on the size of the order for stock replenishment, as well as information on end demand and forecasting the needs of its successor – retail sale. Retail sale (which is the 'closest' to end demand) base its decision on the size of order for stock replenishment on the end demand from the market and forecasting trends of end demand oscillations. Such arranged APS system in the SC allows for an arranged approach to planning and demand forecasting through analysis and planning needs of every 'buyer' – successor in the SC - on one hand, and analysis and forecasting market needs as a final buyer of the overall SC, on the other hand.

When the system of advanced planning in the SC is arranged/designed in the previously defined way, then the APS system is to be implemented/used. It minimizes BWE in the overall SC. The authors of this paper came to a conclusion that the implementation of APS system in every participant of the SC could lead to accomplishing maximal effect in reducing BWE (see Figure 4). Starting from the justifiability of applying the principle of APS in a company – member of the SC, APS could be applied on the entire SC the same way. In this case, the retailer would base his sale plans on own demand forecasting. However, while defining the stock level in the retail facility, he would use information he receives from his predecessor (by applying available-to-promise and/or capable-to-promise techniques), as a result of their APS system, as well as actual end demands and histories of end demand. The wholesale would base its demand forecasting on information on demand that it receives as a result of the application of APS system in its successor (retailer) and predecessor (manufacturer), as well as based on own insight into current condition of end demand and its history. The same way, the manufacturer would base his plans on the results of the application of APS system in the wholesale (as a successor) and supplier (as a predecessor), including the current condition of end demand and its history.

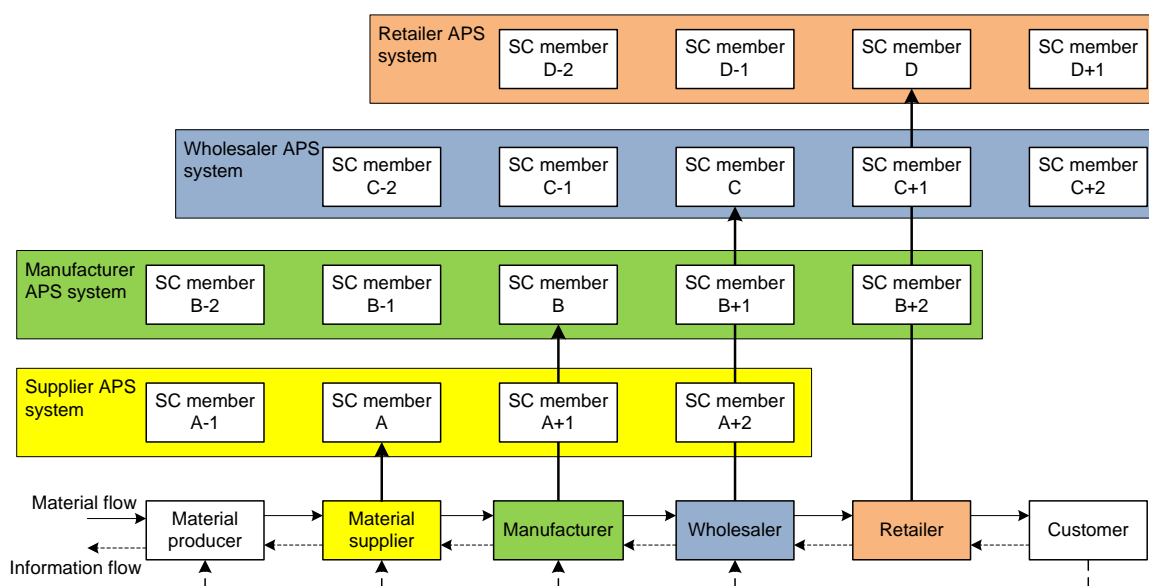


Figure 4: Overlapping APS systems of different supply chain participants

Direct benefits from APS system applied in the SC (without Package 4) are also mentioned in PWC publication (1999):

- a) Increase in sale – due to higher level/quality of customer service (2-15 pct)
- b) Stock reduction (20-70 pct)
- c) Cost reduction in SC (12 pct), and
- d) Reduction of assets - through lower level of inventories (15 pct).

The abovementioned benefits from the implementation and adequate application of APS system confirm the presumption that the adverse effects of BWE are possible to eliminate, or at least to mitigate its intensity, and thus accomplish significant improvements of management performances over production company and other companies – members of the SC, and also to increase efficiency and competitiveness of the entire SC, with coherent application of APS in all SC members.

3. CONCLUSION

As presented, the APS of production could represent an 'umbrella' that covers the overall SC and allows for securing timely information for its participants. Timely and reliable information in the SC allow for generating the acceptable/quality (real, unique, timely, feasible, etc.) plans for supplying, production and distribution with the goal of accomplishing the desired SC management quality, competitiveness and preferable customer service. The role of APS systems and Package 4, as innovations in classic planning (and management) over SC, in planning (stocks, etc.) and scheduling, and even in the overall SC management, is based on the consideration of end-demand and available capacities while creating the 'feasible plan' – in every SC member. (After that, the proposed plan is applied to operative and schedule plans with the goal of creating a detail list of operations, by showing the method of booking resources/allocation of available capacities of those resources. After that, future available capacities are being identified based on the schedule, the same as the possibilities of meeting future customer orders).

It should be stressed that every SC member allows the implementation of APS in line with its own possibilities and business characteristics. By accumulating profit from the implementation of APS systems, every SC member provides the improvement of business performances with the improvement of indicators' value: precision of demand forecasting, inventory optimization, number of cases with inventory shortage, assessment of the customer service, etc. As earlier stated in this paper, the expected benefits from the implementation of APS system in SC and the application of other innovative solutions in SC management (from Package 4) directly affect the BWE reduction, which contributes to performance improvement (greater efficiency and competitiveness) not only in the SC, but in all SC members as well.

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SUPPLY CHAIN RISKS GENERATED BY NATURAL HAZARDS¹

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Abstract. *The aim of this paper is to elaborate the implications of risks generated by natural hazards to the functioning of supply chains, from the point of view of up-to-date and relevant scientific literature. The starting point is the explanation of the nature of risks and forms of their manifestation within the supply chains. Finally, the paper offers insight into economic influences of such risks caused by three natural disasters on the supply chains of particular companies.*

Key words: *risk, supply chain risk, risk sources, types of risk, natural hazards.*

1. INTRODUCTION

Risk is an everyday notion. The basis of a risk is the lack of knowledge about events that may affect companies, and incapability of managers to manage these events. Company managers cannot still measure accurately the levels of their own exposure to supply chain risk, and, consequently, they cannot manage such risks. Moreover, the common terms regarding supply chain risks, which would be widely accepted, have not been used in referential literature yet. Nevertheless, the number of companies in which the management of supply chain risks is of a strategic importance increases.

To define the concept of risk has been a challenge for the scientists and managers for more than a century. This concept is understood quite differently. For that reason there are probably as many definitions as authors concerning this topic.

Negative effects of natural hazards force company managers to pay more attention to implementation of strategies for efficient management of supply chain risks. Such a strategy becomes a key to global competition and survival of companies.

Numerous *unexpected natural phenomena* cause serious problems in supply chain functioning. Having that in mind, we start this analysis by the description of disturbances in supply chain of Nokia and Ericsson company, caused by the fire at their supplier in New Mexico. In the second part of the work we briefly present the problems in supply chain functioning in European air transport companies, caused by the volcano activation in Iceland in 2010. In the last part of the work we analyze the problems that the Japanese companies faced in 2011 due to interruption of supply chain after the disastrous earthquake.

2. RISK UNDERSTANDING

Definition of the notion of a "risk", as well as of the instruments used for the risk measurement, mostly depends on the chosen research area [1, p. 5]. The risk definitions are most frequently based on volatility of possible returns, lack of adequate information and readiness to accept possible loss when expecting positive returns. According to traditional decision-making theory risk is defined as a variation of potential results distribution, probability of their occurrence and their subjective values. In this case, deviations (both positive and negative) of real value from the expected value are quantified by the means of variance. However, *March and Shapira* claims that, in everyday business running, the risk means negative deviations of the real value from the expected value, whereas positive deviations of the real value from the expected value are treated as "chances". Analogous to this, risk can generally be defined as the product of probability of negative event occurrence and the consequence (damage) caused by such event [2, pp. 1404-1418].

In academic literature, risk is frequently defined as “quantitatively presented possibility of the occurrence of defined danger. Thus, the risk combines the level of probability of primary event(s) occurrence with the scope of consequences of such event(s)” [3, p. 4]. So, risk estimation means measurement of probability of a particular event occurrence and measurement of consequences of that event. In accordance to this, the risk in business can quantitatively be expressed as following:

$$\text{Risk} = \text{probability of a particular event occurrence} \times \text{impact of that event on the business}$$

This definition makes it easier to classify risks into the matrix whose dimensions are *probability* and the *impact of a risk on business* [4].

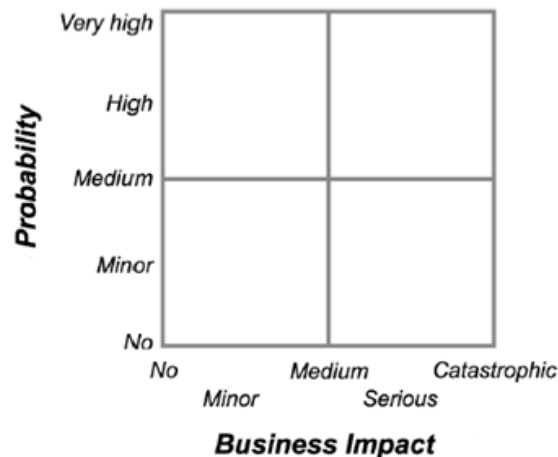


Figure 1: Risk matrix [4]

Risk classification by the means of the matrix shown is a precondition for identification of the risks and for taking measures to alleviate them.

Risk is also presented as the level of uncertainties exposure of a company, which must be understood and efficiently managed [5]. In practice, the expressions *risk* and *uncertainty* are frequently used as synonyms, although they technically describe different situations. Uncertainty is often considered to be the risk generator, since the decision-maker, due to lack of information or knowledge, cannot identify all possible returns, their consequences or the likelihood of their occurrence. Usually, uncertainty is the result of the lack of information and knowledge about potential returns and about likelihood of occurrence of particular events, as well as the possible consequences of those events. However, the clear risk, which is located on the other end of the continuum, usually represents a completely defined scenario of the possible returns, objective likelihood of the event occurrence and completely determined consequences of all returns. The way the periods of decision-making, variables and returns are increased, the bigger are the difficulties in identifying, estimating and measuring those parameters, i.e. uncertainty increases.

Ritchie and Brindley [6, pp. 303-322] claim that risk definitions mostly have three elements in common: 1) *likelihood of occurrence*, 2) *consequences* of the event that occurred and 3) *causal pathways (sources)* of the event. In theory, these elements are measurable and easily recognizable. But, practical determination of these elements, for the purposes of risk management, is accompanied by a great number of various challenges.

Likelihood of occurrence of an event, which can be estimated both objectively and subjectively, can certainly be measured. The objective estimation of likelihood of occurrence is based on available data on the event. The subjective estimation of likelihood of occurrence of a certain event relies more on the previous experience and intuition concerning that particular event. In practice, subjective estimations of the likelihood of occurrence of an event have been made on the basis of certain objective data.

Consequences of the event that occurred are commonly expressed as multiple, simultaneous returns, many of which are in interaction. For example, an unsuccessful launching of a new product can have a negative impact on the reputation and profitability of the company, as well as on the leadership position of

its products. Consequences should not be considered as necessarily, or primarily, negative, since taking risks, in its essence, represents a possible chance for generating positive returns.

Causal pathways have significant implications on risk management. Getting to know the causal pathways (sources) and nature of events or circumstances which may have an impact on the type and the scope of consequences (both positive and negative), as well as getting to know the likelihood of occurrence of consequences, is the basic demand of a successful risk management.

3. SUPPLY CHAIN RISK

The supply chain risk can be defined as a consequence, estimated on the basis of the likelihood of its occurrence, caused by the event in the company, in its supply chain or in its surroundings, which has a negative impact on the business process of at least one company in the supply chain [7]. Unlike the general risk definition mentioned above, this definition includes the origin and the sources of potential risks, as well as all companies that the risks have an impact on.

The risks of a company can be classified by their sources. On the basis of this parameter, different classifications of risks can be found in referential literature. For example, Christopher and Peck state five groups of risk sources within 1) a company, 2) supply chain and 3) surrounding [8, pp. 1-13]. Process risks and control risks are located inside the company. Process risks include the interruptions in the production process, whereas control risks include the mistakes in management and wrong, or inflexible decisions which lead to numerous problems in the company business. The supply chain risks are mainly caused by the interruptions of material, information or capital flows among the chain members. Starting from the risk direction, they can be divided into risks of offer and risks of demand [9, pp. 120-141]. When a company moves its, mostly internal, risks to its partners, what happens is the increasing of risk portfolios of all companies in their supply chain. However, companies often cannot react to their risk portfolio thus widened because the risk sources are unknown to them, or because they cannot control them. Thus, companies mark such risks as offer risks and demand risks. As opposed to this, the surrounding risks are generated by socio-political, macroeconomic or technical changes [10].

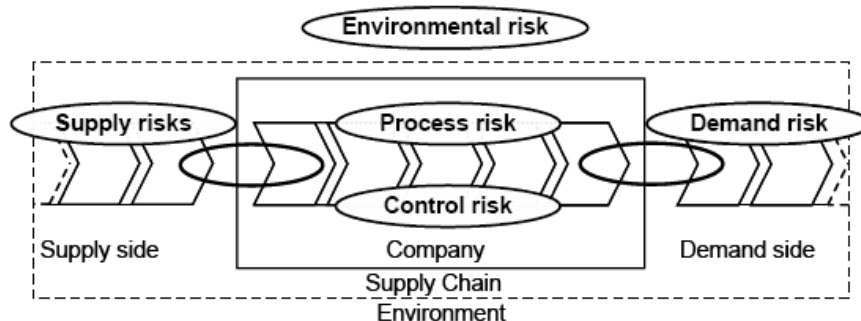


Figure 2: Risk sources in supply chain [11]

Besides, demand risks, which are caused by the quality or financial problems, occur very frequently. When Delphi company filed a petition for bankruptcy in 2005, serious interruptions occurred in the supply chain in majority of car manufacturers [12, pp. 109-127].

The high risk levels in business nowadays, especially those caused by natural disasters, are the explanation of increased interest of the researchers in supply chain risk management (SCRM), which consists of identification, estimation, analysis and processing (decrease) of vulnerability and risk in supply chains. Further on, we are paying attention to the analysis of business implications of risks caused by certain natural disasters.

4. RISK CAUSED BY NATURAL DISASTERS

This kind of risks includes the events which have enormous consequences for companies and their supply chains. Indeed, in many world regions, *natural hazards* such as tsunami, thunderstruck, droughts, earthquakes, hurricanes and floods represent a constant threat to societies in general, and especially to companies [13]. The negative impacts of such disasters on supply chains are obvious. Production and

transport are particularly endangered by those catastrophes. Due to market globalization and global supply chain operations, local natural disasters cause more indirect global consequences.

There are numerous examples of unplanned natural disasters that significantly decrease the stock values and financial result of the affected companies. We are going to explain the impacts of three events of this kind on the functioning of supply chains. The first one is the interruption of supply chain in Nokia and Ericsson, caused by the fire at their supplier – the Phillips factory for microchips manufacturing in New Mexico. After that, we are going to analyze the consequences of the volcano eruption in Iceland in the course of 2010 for the functioning of supply chains of European airline companies. Finally, we are going to focus on the economic implications of the interruptions of supply chains in Japanese companies, caused by the tsunami that hit Japan in March 2011.

The number of risks in most companies is significantly changing because of the changes in market conditions. Beside the “traditional” risks, caused by the business activities of every single company, the new risks appear, which is often the result of cooperation [14, pp. 698-713]. Juttner [9, pp. 120-141] set the following risk sources:

- globalization of supply chains,
- decrease of the safety supply levels,
- centralization of distribution,
- lessening of the number of suppliers,
- outsourcing and
- production centralization.

Those sources generate the increasing of the number of risks for all members in a supply chain.

For example, globalization increases geographical complexity of supply chains, whereas outsourcing and centralized distribution increase organizational complexity of the company, as well as of logistic processes. The function of outsourcing and lessening of number of suppliers contribute to greater interdependence of the companies in supply chain. The risks related to supply interruptions caused by insufficient levels of the company supplies can be resolved by increasing of the safety supplies levels.

The company relying on a few or on just one single supplier can result in the interruption of global production operations of the company. It can be more thoroughly explained using the example of the supply chain of the companies Nokia and Ericsson.

4.1. The supply chain interruption in the Nokia and Ericsson companies caused by the fire in the Philips factory in New Mexico

The fire caused by a thunder struck in the Royal Philips Electronics, N. V. in Albuquerque, New Mexico, on March 17th, 2000 damaged millions of microchips and caused the 400 million dollars loss in the sale of Telephone AB L. M. Ericsson [4]. The fire was extinguished in less than ten minutes. According to the routine investigation, nobody was hurt in the incident, and the damage was minor, so the report wasn't sent to the main offices management of the Philips company in Europe. But, the true drama had just started since nobody could imagine that this minor accident would have such negative effects on the future of these two Scandinavian companies. When the managers of Nokia were informed about the problem, they began thinking in two different directions: 1) to compensate the deficiency of microchips from the supplies or 2) to cooperate with other microchips suppliers.

The representatives of the Philips company promised to revive the production within seven days. They refused the help that Nokia had offered to them. About fifteen days after the fire, the managers of the damaged factory informed the Nokia representatives that the reparation would last for several weeks, or even several months. The Nokia experts estimated that would cause the sale decline for 5 percent, so they made a team of thirty experts who found new suppliers for three out of five types of microchips that Nokia was purchasing from the factory in New Mexico. Nokia chose the pressing orders within five days and succeeded in continuing its production. The Philips factory in Eindhoven (the Netherlands) delivered 10 million microchips to Nokia. Another Philips factory, in Shanghai, worked with maximum capacity for the demands of Nokia, as well. The Nokia engineers suggested new alternatives in order to produce another two million microchips until the factory in New Mexico starts working again.

On March 20th 2000, three days after the fire, the Ericsson managers were also informed about the incident. However, they reacted in a completely different way than the Nokia managers. The Ericsson managers were passive and consensual, which is characteristic for Swedish culture, whereas the Nokia managers, due to Finnish culture, shown more individuality and aggressiveness.

Since the fire didn't cause serious damage, the Ericsson management assumed that Philips would be able to deliver the microchips within seven days after the information about the production interruption had reached them. When people in Ericsson finally realized that Philips wouldn't be able to fulfill the promise, it was too late. In order to solve the problem, Ericsson turned to Philips for help, but they said that their full capacities were assigned to the demands of Nokia. Ericsson then turned to other components manufacturers, but they found out that there was no adequate substitution for the components produced in the factory in New Mexico. Jan Ahrenbring, the marketing vice president, admitted that Ericsson hadn't had a reserve option!

It can be said that Philips suffered the clear damage in the amount of about 39 million Euros [15] because of the fire in Albuquerque. The loss of sale of this company amounted less than 0.6 percent in respect to 6.8 billion dollars worth transmitter production in the year 2000. However, since Ericsson didn't provide the necessary components in the spring 2000, which was necessary in respect to the dynamics of the demand of cell phones, they suffered the loss in the amount of between 430 and 570 million dollars [16] prior to taxation. The loss itself many times exceeded the loss of Phillips. By the end of 2000, Ericsson suffered the loss of 2.34 billion dollars in cell phones production division.

Six months after the fire, Nokia has increased its market share from 27 percent to 30 percent, whereas the share of Ericsson decreased from 12 percent to 9 percent. One year after the fire the representatives of Ericsson declared the continuation of manufacturing. In April 2001, the Ericsson managers concluded a joint venture contract with Sony.

4.2. Interruption of supply chains of European airline companies caused by the volcano eruption in Iceland

There are about 140 volcanoes in Iceland, 26 of which are active. Reykjavik (translated "the city of surprise") is the most northern capital on our planet. Eruption of Eyjafjallajökull volcano in Iceland in April 2010, made airline companies cancels their flights all over Europe. Over 120,000, out of 300,000 population of Iceland, live in it. The volcano dust caused cancellation of 100,000 flights, and eight million passengers couldn't reach their destinations. The overall loss of airline companies is estimated to be about 2 billion dollars. Besides, the air traffic over Iceland was stopped on May 1st 2011, after the eruption of Grimsvoten volcano. The eruptions of those volcanoes not only paralyzed the air traffic of European companies, but they also caused the disturbances in supply chain functioning of the airline companies all over the world.

It has been shown, due to connections of airline companies in supply chains, that if one of them meets a risk – other companies are at risk, too. The business problems of one company are quickly transferred to its partners in the complete supply chain, regardless of the fact that they are often dispersed over the world. Thus, the benefits of airline companies, when motivating their partners in supply chain to efficiently manage their internal risks, have become more emphasized.

It is obvious that the increase of the number of partners in supply chain of the main European airline companies led to the higher level of complexity of coordination and management of their processes in that chain. It also becomes more clear that in such supply chains different levels of responsibilities must be respected, both within a single company and within the supply chain of that company. According to that, the focus on risks management had to be moved from a single airline company to the complete supply chain of the company, even to the supply chains of transport companies all over the world.

The volcano eruption in Iceland imposed the question of risk share among airline companies in their supply chains. Although the company managers and the researchers in academic fields have become more conscious of this problem, in the referential literature, unfortunately, an adequate answer to it has not been given yet.

4.3. Interruptions of supply chains caused by the earthquake in Japan

The earthquake which occurred in Japan in March 2011 enlarged the threats to supply chain members. The interruption of the supply chains of Japanese companies significantly slowed down the growth of Japanese economy, as well as of the economies of other countries. Nevertheless, the company managers all over the world recognized the importance of implementation of new strategies in risk management, both in their own companies and the supply chains.

The devastating earthquake that hit Japan on March 11th 2011 caused the interruptions of supply chains of the leading companies in *car industry*, as well as in *microchips production*. The supply chains of these companies were resistant to the consequences of the earthquake to a different degree. The Japanese companies which had more supplies and globally dispersed manufacture capacities suffered minimum damage.

The earthquake has an extremely negative impact on car manufacturers and car components manufacturers in Japan. They were affected by electricity shortage and damaged infrastructure. Since the end of March 2011, in the report of Japanese Association of Car Dealers, it is emphasized that the car sale in Japan decreased in March 2011 for about 37 percent in respect to March 2010, because of the earthquake. In their report, the experts of IHS Automotive Institute emphasize that the deficiency of Japanese car components could contribute to the decrease of car manufacturing in the world for about 30 percent [17], just in March and April 2011.

Because of the shortage of car components and electricity, Toyota suspended all 12 car assembly factories and postponed the presentation of two new hybrid models in Japan. The company couldn't bring deliveries and demands into line, which caused the interruption of manufacturing and the sale decline. In the end of March 2011 Toyota suffered the 46 percent sale decline, except for model Lexus, 38 percent for Nissan and 28 percent for Honda Motors [18]. It has been the biggest car sale decline in Japan since 1968.

According to the IHS Automotive Institute experts' estimation, the global daily production could be decreased for 100,000 cars, because of the shortage of car components after the earthquake. The car manufacturing decrease was not the case only in Japan, but in North America, Europe and China as well. In March 2011 General Motors stopped the manufacturing of multi-purpose trucks in their factory in Shreveport (Louisiana), because of the problems with components delivery from Japan. Immediately after the earthquake, Honda stopped the production until April 3rd 2011. Opel, the branch of General Motors, due to the interruption in electronic components delivery from Japan, introduced restrictions in two European factories in which the Corsa model was made – the first was in Eisenach, where two out of three shifts were called off, and in Saragosa (Spain) where they stopped manufacturing on March 21st 2011. Some Toyota factories in North America decreased and/or stopped their production in March and April 2011, since 15 percent out of 20 percent of components used for car manufacture by Toyota in North America are being delivered by the suppliers from Japan.

The consequences of the earthquake in Japan were felt in Peugeot – Citroen alliance (PSA) as well. In the end of March 2011, they had to temporarily lay off several thousand workers because of the shortage of components from Japan. But, the Nisan company production was less affected by the earthquake since about 95 percent of the components were being produced in their factories outside Japan, and only the rest in Japan [19].

Because of the interruption of supply chain after the earthquake, the Toyota managers intensively started to consider the option of moving some factories in which components are produced to China. One of the reasons for such option was the fact that they couldn't predict how long would the slowed work last in the factories in the USA, Canada and Mexico. The majority of car components (about 70 percent) in China are delivered by local manufacturers and foreign companies which have their factories there. The Japanese car manufacturers are not motivated to start the local production of the key components in China, regardless of the fact that their share in total car sale in China was 23 percent in 2010. However, in case an earthquake, or any similar event happens, that is, if they face any bigger difficulties in supplying the Chinese assembly workers, they can decide to change their opinion.

The earthquake in Japan temporarily also stopped the production of flash memory microchips which are the major component of tablet computers and smart phones. Thus, immediately after the earthquake, the American SanDisk company, which is supplied with NAND chips by the Toshiba factory located in Yokkaichi, stopped the production for a while. The reason was the discontinuity of production in the Yokkaichi factory, caused by the problems in railway, road and other kinds of transport.

The interruptions in manufacturing high technology products in Japan, caused by electricity shortage, negatively affected the economies of other countries in the region, especially of China, since Japan is the biggest importer of Chinese products. Some estimations have been made that the stopping of production in Toshiba factory for NAND chips manufacturing for a bit of a second, in the end of 2010, would cause the production decrease up to 20 percent in the following two months, so it is not difficult to estimate the consequences of production interruptions in the companies all over Japan which lasted for several days.

5. CONCLUSION

The terms risk and uncertainty are frequently used as synonyms, since risk often includes decisions which are somewhere in the middle of risk – uncertainty scope. The consequences are not always negative. Essentially, risk taking is a possible chance for obtaining positive results (returns).

The level of vulnerability of the supply chains in respect to natural hazards is proportional to the level of interdependence of their members. Since companies are mutually connected in a supply chain by cooperation, and the importance of cooperation for companies' performances is constantly growing, the vulnerability of the whole supply chains and of some of the companies within them, is going to enhance.

The greater the level of integrations of the companies within the supply chain is, the bigger is the probability of dependence of one company on particular partners in that chain. The companies in which such relations are not recognized, or they are ignored, often fail.

The supply interruption by one company can make business problems to other partners in the supply chain, regardless of their geographical dispersion. Nokia and Ericsson have never imagined that a thunder struck into a factory which manufactures five kinds of microchips in New Mexico, can decide on the result of the battle these two companies had been waging in cell phones industry. Namely, Ericsson, unlike Nokia, did not succeed in finding other suppliers quickly after the stoppage of cell phones chips delivery by Phillips factory in New Mexico, so they suffered an enormous decline in sale of their products. A slow reaction to the interruption of supply chain cost Ericsson much more than Nokia.

The eruption of Eyjafjallajökull volcano in Iceland, in 2010, paralyzed the air traffic in Europe for almost eight days. The bigger airports in Europe were closed, and the European airline industry suffered the damage which exceeds 2 billion dollars. Apart from that, these interruptions caused problems in supply chains of transport companies worldwide.

The earthquake which hit Japan in March 2011 caused the frequent electricity shortages, as well as the problems in infrastructure, so the deliveries of orders, both to the national and foreign markets, were problematic for several weeks. The earthquake caused the interruptions of supply chains of car manufacturers, car component manufacturers, computers and electronic components manufacturers, both in Japan and other countries' markets. Because of that, while developing strategies for management of supply chain risks, the Japanese companies managers are more devoted to the principle that " nothing should be ordered from one source only".

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CONCEPTUAL FRAMEWORK FOR LOCATION CHOICE IN RETAIL INDUSTRY USING CONJOINT ANALYSIS

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Abstract: Location choice is a strategic decision which has influence on both revenues and costs, and the main question for starting a business is where to locate the facility, particularly in this age of global markets and global production. Retail services have also seen rapid growth over the past decade, so their facility location was one of the most frequent questions in business. An important step in location analysis is the identification of factors affecting location choice and determining relative importance for each factor. Various theories and methods so far have been developed to provide insight into the factors that determine retail option demands. Nevertheless, these have often been of limited use. The objective of this paper is to propose a methodological framework for location choice which takes into account customers' preferences and decision makers' demands. To determine relative importance of key factors affecting customers' choice, we propose a conjoint analysis. By using a conjoint analysis it is possible to determine which attributes regarding retail location are important to certain customers or market segments. The represented steps in making retail location decisions may assist companies in conducting, analysing and evaluating their location choices. The findings may be of benefit to companies by bringing more understanding and a broader view of factors important in dealing with retail location choices.

Keywords: Location analysis, criteria selection, customer preferences, conjoint analysis.

1. INTRODUCTION

Retailers need to think about shoppers not just about a format as understanding the shoppers' dynamics holds the key to such a business. Retailers would have to create new delivery formats that can cater to the huge mass of consumers. The choice of a store location has a profound effect on the entire business life of a retail operation. A bad choice may all but guarantee failure, a good choice success (Jain, 2009).

To ensure the efficient execution of spatial location, it is essential that the authorities have adequate knowledge of the various factors which determine the choice of location. To date, policy makers lack this information. That was the reason to undertake a study with as objective to gain more insight into the determinants behind retail service facilities choice of location (Van Noort & Reijmer, 1999).

Various theories and methods so far have been developed to provide insight into the factors that determine retail option demands. Nevertheless, these have often been of limited use. Poor quality of available data at high costs, or the impossibility of obtaining better data, has resulted in untested models as well as models that do not include the variables that are managerially the most relevant.

The objective of this paper is to propose methodological framework for location choice which takes into account customers' preferences and decision makers' demands. Application of this framework will lead us to getting answers to the following questions: (1) What factors determine the choice of location for retail? (2) What is the factors relative importance?

To determine relative importance of key factors affecting customers' choice, we propose conjoint analysis. It is a consumer research technique developed to provide a method for determining the relative contributions of multiple factors to consumer satisfaction. Using conjoint analysis it is possible to determine which attributes regarding retail location are important to certain customers, or market segments. This information allows stakeholders to efficiently allocate resources to best respond to consumers demand.

The main advantage of conjoint analysis over other analytical techniques is that it incorporates realistic trade-offs when measuring consumer preferences. It has been widely used in several fields of economics as well as in marketing research (Dellaert et al., 2003; Kuzmanović, 2006). However, there have been only few applications in retailing. Some researchers used conjoint analysis to model the customers' choice of a shopping centre or retail destination (Oppewal, 1995). Dariana et al. (2005) used conjoint analysis to investigate the relative importance of prices and salesperson service attributes to consumers, while Louviere and Johnson (1991) used it to measure the retail image. Certain researchers used conjoint analysis to measure retail service quality, or for preference-based segmentation (Oppewal & Vriens, 2000). In particular, Amirani and Baker (1995) used conjoint analysis to determine which cues potential customers use to form service quality expectations, and what the importance of those cues is in their decision making process. Kuzmanovic et al (2011) used conjoint analysis to investigate the relative importance of price and selected service attributes to the consumers of supermarket chains in Serbia.

The paper is organized as follows: section 2 describes location choice basics with a detailed view on criteria selection. The Conjoint analysis, including the procedure for the determining the criteria importance is given in the Section 3. The proposed methodological framework location choice which takes into account customers' preferences and decision makers' demands is given in the Section 4. Finally, main conclusions are summarized in Section 5.

2. LOCATION CHOICE

Location choice is strategic decision which has influence on revenue and costs also, and the main question for starting a business is where to locate facility, particularly in this age of global markets and global production. Dramatic changes in international trade agreements have made the world truly a "global factory," allowing companies greater flexibility in their location choices (Bartness, 1994). Two most important competitive imperatives in facility location choice is: (1) The need to produce close to the customer due to time-based competition, trade agreements, and shipping costs; and (2) The need to locate near the appropriate labour pool to take advantage of low wage costs and/or high technical skills (Bartness, 1994).

The choice of business location differs from sector to sector. Enterprises in the services sector, because of their public function, are mainly in the urban area. Industrial enterprises are usually to be found on industrial sites and are often suppliers for large companies. Wholesale enterprises also have an affinity with industrial sites because of the easy accessibility to highways. Construction companies, because office functions are not part of their core business, have no specific preference and are well represented at all types of locations. The commercial service enterprises are located mainly in towns (town centre and residential areas) because of their important public function. The industrial enterprises are mostly on industrial sites; wholesalers are also on industrial sites because of the easy access to the highway (Van Noort & Reijmer, 1999). Because of the variety of service firms and the relatively low cost of establishing a service facility compared to one for manufacturing, new service facilities are far more common than new factories and warehouses (Bartness, 1994).

Retail services, also has rapid growth in last decade, so their facility location was one of the most frequent questions in business. Where you choose to locate your retail business will have a major impact on everything your shop does. The difference between selecting the wrong location and the right site could be the difference between business failure and success (Waters, 2012). Facility location problems are solved to minimize the total cost of serving all customers (e.g. a service center). Retail location problems, on the other hand, center on how to identify a location that can maximize the number of shoppers (Cheng & Heng, 2004). Generally, most of the objectives can be classified into one of the four general objective function categories suggested by Current et al. (1990), which are cost, demand, profit and environment. One of the important steps in location analysis is identification of factors affecting location choice and determining relative importance for each factor.

To identify factors or criteria for location choice it should start from product or service characteristics. Product and service characteristics include very varying types of product, the quality of the product, the nature of the product, the serviceability of the product, delivery time and delivery date. All these product properties make certain demands on the production process and, indirectly, also on the business location. When a business has to deliver a product frequently, then accessibility is an important location factor. In practice this usually means that the enterprise is situated close to a road in the proximity of a highway or port (Van Noort & Reijmer, 1999).

It is very important for retail store to consider if it is a convenience store, a specialty shop or a shopping store. Convenience goods require easy access, allowing the customer to quickly make a purchase. A mall would not be a good location for convenience goods. This product type is lower priced and purchased by a wide range of customers. Specialty goods are more unique than most products and customers generally won't mind travelling out of the way to purchase this type of product. This type of store may also do well near other shopping stores. A shopping store usually sells items at a higher price which are bought infrequently by the customer. Furniture, cars and upscale clothing are examples of goods found at a shopping store. Because the prices of these items are higher, this type of customer will want to compare prices before making a purchase. Therefore, retailers will do well to locate their store near like stores (Waters, 2012).

MacCarthy and Atthirawong (2003) identified a comprehensive set of location factors and sub-factors relevant in the decision making process for facility location, and those factors are represented at table 1.

Table 1: Summary of major factors and sub-factors affecting international location decision (MacCarthy & Atthirawong, 2003)

Major factors	Sub-factors
Costs	Fixed costs; transportation costs; wage rates and trends in wages; energy costs; other manufacturing costs; land cost; construction/leasing costs and other factors (e.g. R&D costs, transaction and management costs etc.)
Labour characteristics	Quality of labour force; availability of labour force; unemployment rate; labour unions; attitudes towards work and labour turnover; motivation of workers and work force management
Infrastructure	Existence of modes of transportation (airports, railroads, roads and sea ports); quality and reliability of modes of transportation; quality and reliability of utilities (e.g. water supply, waste treatment, power supply, etc.) and telecommunication systems
Proximity to suppliers	Quality of suppliers; alternative suppliers; competition for suppliers; nature of supply process (reliability of the system) and speed and responsiveness of suppliers
Proximity to markets/customers	Proximity to demand; size of market that can be served/potential customer expenditure; responsiveness and delivery time to markets; population trends and nature and variance of demand
Proximity to parent company's facilities	Close to parent company
Proximity to competition	Location of competitors
Quality of life	Quality of environment; community attitudes towards business and industry; climate, schools, churches, hospitals, recreational opportunities (for staff and children); education system; crime rate and standard of living
Legal and regulatory framework	Compensation laws; insurance laws; environmental regulations; industrial relations laws; legal system; bureaucratic red tape; requirements for setting up local corporations; regulations concerning joint ventures and mergers and regulations on transfer of earnings out of country rate
Economic factors	Tax structure and tax incentives; financial incentives; custom duties; tariffs; inflation; strength of currency against US dollar; business climate; country's debt; interest rates/exchange controls and GDP/GNP growth, income per capita
Government and political factors	Record of government stability; government structure; consistency of government policy; and attitude of government to inward investment
Social and cultural factors	Different norms and customs; culture; language and customer characteristics
Characteristics of a specific location	Availability of space for future expansion; attitude of local community to a location; physical conditions (e.g. weather, close to other businesses, parking, appearance, accessibility by customers etc.); proximity to raw materials/resources; quality of raw materials/resources and location of suppliers

Plainly, small retailers are expected to use less sophisticated methods since their location selection depends on a small number of key factors. Whereas, large projects are more complicated and should take more key factors into account (Cheng & Heng, 2004).

Shari Waters (2012) emphasized seven important factors in retail store location:

- Population and target customer - it is important to research the area thoroughly before making a final decision in terms of area's population, income and age, to make sure to find a location where customers live, work and shop;
- Accessibility, Visibility and Traffic - Retailers want to be located where there are many shoppers but only if that shopper meets the definition of their target market. Small retail stores may benefit from the traffic of nearby larger stores. Depending on the type of business, it would be wise to have somewhere between 5 to 8 parking spaces per 1,000 square feet of retail space. In many cases, the better visibility retail store has, the less advertising needed;
- Signage, Zoning and Planning – It is important to understand rules, policies and procedures related to your retail store location;
- Competition and Neighbours - Other area businesses in your prospective location can actually help or hurt your retail shop. Determine if the types of businesses nearby are compatible you're your store. For example, a high-end fashion boutique may not be successful next door to a discount variety store. Place it next to a nail or hair salon and it may do much more business;
- Location Costs - Besides the base rent, decision maker should consider all costs involved when choosing a retail store location (lawn care, building maintenance, utilities and security, how much additional marketing will it take for customers to find a store, property taxes etc.);
- Personal Factors – If decision maker work in the store, his personality is important, the distance from the shop to home and other personal considerations. Also, many restrictions placed on a tenant by a landlord, management company or community can hamper a retailer's independence;
- Special Considerations - Retail shop may require special considerations (special lighting, fixtures or other hardware installed, crime rate, parking lot and building exterior, etc.)

Table 2: Examples of the key factors for retail chain business in Hong Kong (Cheng & Heng, 2004)

Retail chain business	Common location	Key specific factors
Supermarkets	Mainly in residential areas	Easy to access; car-parks
Convenience stores	Everywhere	Easy to access
Department stores	Commercial areas	Busy areas, shopping malls
Fashion	Commercial areas	Busy areas, shopping malls
Fast food business	Everywhere	Easy to access, busy areas
Banks	Everywhere but not as many as fast food outlets or convenience stores	Safety areas, busy areas
Oil stations	Major roads	Heavy road demanding
Gift shops	Commercial areas	Busy areas, shopping malls
Groceries	Mainly residential areas	Busy areas, shopping malls
Cake shops	Everywhere	Busy areas
Restaurants	Commercial and residential areas	Fewer competitors in residential; form a restaurant zone with competitors in commercial areas
Service centers	Commercial areas	Minimum rental fees

Van Noort and Reijmer (1999) described the location factors which are characteristic for the various sectors use through classification of factors which corresponds with the three different environments in which a business has to operate (see figure 1):

- Market environment; the commercial relations which a business maintains with other parties in the market e.g. relations with customers, banks, suppliers etc.
- Physical environment; items such as infrastructure, buildings, (tele) communication provisions etc.
- Institutional environment; this is the governmental policy according to which a business has to tune its strategy. The relationship can be expressed in the form of legislation, regulations to stimulate business etc. relationships with trade organisations and employee and employers organisations.

The physical and institutional environment places restrictions on trading by an enterprise. Factors which are connected to these two dimensions are therefore called conditional location factors. These factors

affect the attractiveness of a location. They must not be seen separately from the market environment. After all, a poor location can lead to higher costs because, for example, customers are difficult to reach (Van Noort & Reijmer, 1999).

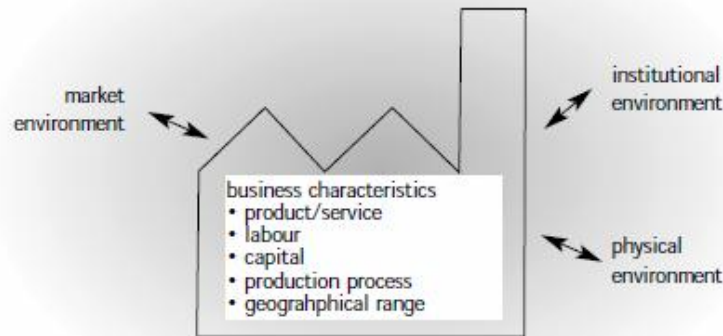


Figure 1: Business environment and business characteristic (Van Noort & Reijmer, 1999)

3. CONJOINT ANALYSIS

Conjoint analysis is a technique to find out how consumers trade off different attributes of a product or service. The method is also known as “trade-off analysis” or “utility analysis”. Two basic assumptions are made in conjoint analysis (Gil & Sanchez 1997). Firstly, a product/service can be described as a combination of levels of a set of attributes. Secondly, these attribute levels determines consumers’ overall evaluation of the product/service.

Gustafsson et al. (1999) proposed the following steps for conducting a conjoint analysis:

1. Determine the research problem and objectives and estimate the amount of available resources;
2. Decide on the sampling approach;
3. Select a survey format;
4. Determine the relevant attributes and the levels of each attribute;
5. Configure attributes and levels into individual concepts;
6. Design the data collection instrument;
7. Conduct the survey;
8. Analyze the data;
9. Validate the results, both internally and externally; and
10. Interpret the results and draw conclusions.

The attraction of using conjoint analysis is that it asks the respondents to make choices between products defined by a unique set of product attributes in a way resembling what they normally do - by trading off features, one against the other. When asked which attributes they would like, most customers will choose everything on the wish list. Conjoint analysis can establish the relative values of particular attributes and identifies the trade-offs the customers are likely to make in choosing a product and service and the price they are willing to pay for it.

Conjoint analysis produces two important results (Levy 1995):

- *Utility of attribute:* It is a numerical expression of the value consumers place in an attribute level. It represents the relative “worth” of the attribute. Low utility indicates less value; high utility indicates more value.
- *Importance of attribute:* It can be calculated by examining the difference between the lowest and highest utilities across the levels of attributes.

To determine the relative importance of different attributes to respondents, a relationship between the attributes’ utility and the rated responses must be specified. The simplest and most commonly used model

is the linear additive model. This model assumes that the overall utility derived from any combination of attributes of a given product or service is obtained from the sum of the separate utilities of the attributes. Thus, respondent i 's predicted utility for concept j can be specified as follows:

$$U_{ij} = \sum_{k=1}^K \sum_{l=1}^{L_k} \beta_{ikl} x_{jkl} + \varepsilon_{ij}, \quad i=1,\dots,I, \quad j=1,\dots,J, \quad (1)$$

where K is the number of attributes and L_k is the number of levels of attribute k . β_{ikl} is respondent i 's utility with respect to level l of attribute k . x_{jkl} is such a (0,1) variable that it equals 1 if profile j has attribute k at level l , otherwise it equals 0. ε_{ij} is a stochastic error term.

The parameters β_{ikl} , also known as part-worth utilities, are estimated by a regression analysis. The relative importance of each attribute are further calculated as the utility-range (i.e. difference between the highest and the lowest utility for that attribute) divided by the sum of utility ranges of all attributes:

$$FI_{ik} = \frac{\max\{\beta_{ik1}, \beta_{ik2}, \dots, \beta_{ikL_k}\} - \min\{\beta_{ik1}, \beta_{ik2}, \dots, \beta_{ikL_k}\}}{\sum_{k=1}^K (\max\{\beta_{ik1}, \beta_{ik2}, \dots, \beta_{ikL_k}\} - \min\{\beta_{ik1}, \beta_{ik2}, \dots, \beta_{ikL_k}\})}, \quad i=1,\dots,I, \quad k=1,\dots,K \quad (2)$$

The calculations are done separately for each respondent, and the results are then averaged to include all of the respondents.

Part-worth utilities can be also used to obtain overall utility values for all possible combination of attribute levels, i.e. for all possible profiles. It will be done by inserting the appropriate part-worths into equation 1. These utility scores can be further used to predict the market shares for each of the defined combinations. For that purpose, a model that uses exponential transformation, also known as the logit model, can be used: A logit model represents the probability that customer i will choose the j^{th} profile from a set of m existing profiles on the market (P_{ij}). The logit model is expressed as

$$P_{ij} = \frac{e^{bU_{ij}}}{\sum_{j=1}^m e^{bU_{ij}}}, \quad i=1,\dots,I, \quad j=1,\dots,J \quad (3)$$

The exponent b is used to fine-tune the results so that they reflect the current customer behaviour on the market more accurately. However, the real power of conjoint analysis is the ability to both predict preferences for profiles that weren't rated by the respondents, and to perform a what-if analysis. This can be done using market simulation models.

4. FRAMEWORK FOR LOCATION CHOICE IN RETAIL INDUSTRY

Here is presented framework proposed to help the decision maker to choose location for retail facility. Framework consists of three phases (figure 2):

- Identification of target customers (and stakeholders),
- Identifying of decision maker demands and customer preferences,
- Comprehensive analysis and selection of "best" location.

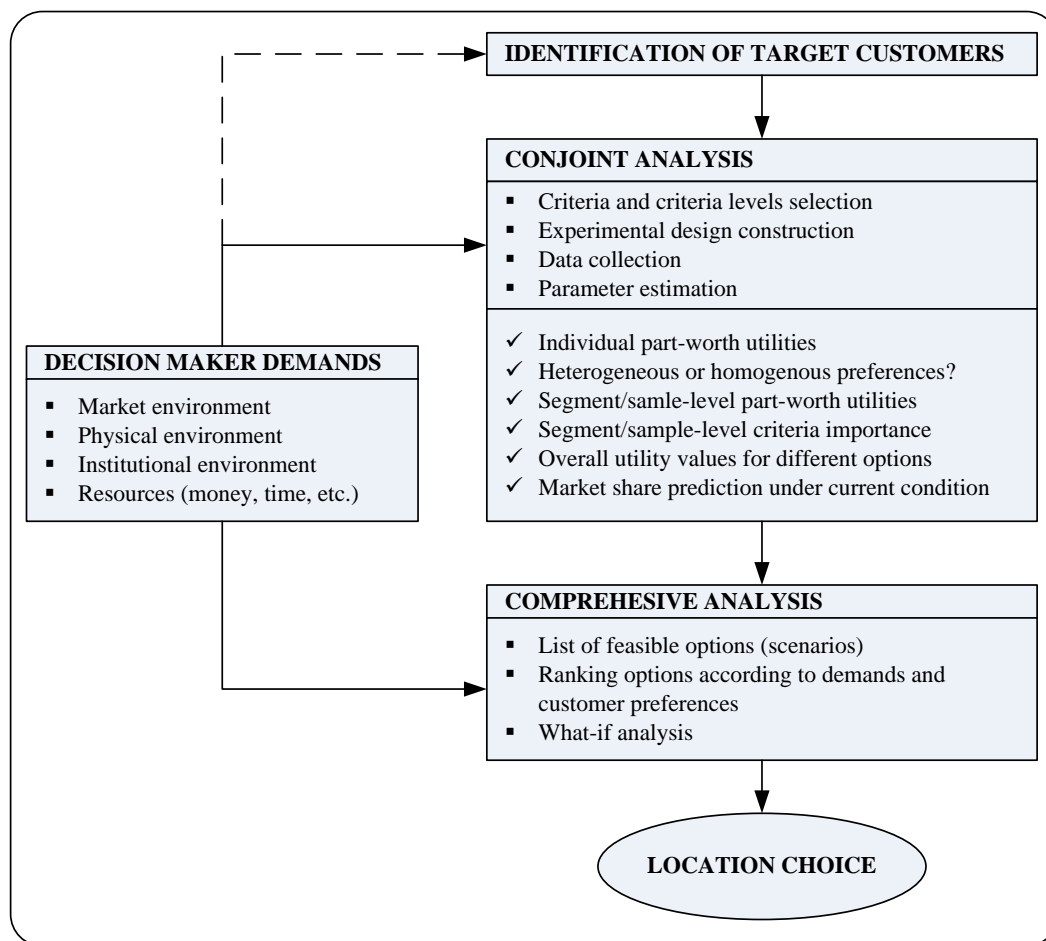


Figure 2: Framework for choosing location using conjoint analysis

The first phase of proposed framework is identification of target customers depending on specific retail sector. For example, target customers for car retailers are different from target customers for baby stores.

The second phase consists of identification of decision maker demands and customer preferences. Decision maker demands are related to market, physical, institutional environment and valuable resources. In this phase, conjoint analysis should be conducted. Based on the research objectives, literature review, expert opinions, selection of the key attributes and their levels are performed. After the data are collected, conjoint parameters estimation should be done, as described in Section 3. In the real-world applications, the parameters obtained from conjoint analysis shows respondents' preferences to the particular criteria.

Results from Conjoint analysis can be further used for creating different scenarios, then ranking options according to decision maker demands and customer preferences, and also what-if analysis can be done.

5. CONCLUSION

This paper has suggested framework for choosing location using conjoint analysis as supporting tool for more realistic criteria selection. The customer preferences obtained by conjoint analysis represents starting point for making the most suitable combination of criteria used in next phase of framework.

The represented steps in making retail location decisions may assists companies in conducting, analysing and evaluating location choices. The findings may be of benefit to companies by bringing more understanding and a broader view of what the important factors are in dealing with retail location choices. This framework may provide guidelines for companies to ensure that appropriate and relevant factors are taken into consideration in the early stages of the decision making process. Represented framework may also help policy makers in formulating retailing policies and may help relevant national and local government officers to improve their abilities and roles in assisting the location process and in attracting

and meeting the requirements of foreign investors. Further research is to conduct a survey and apply this framework in retail industry. Main steps of framework can be applied in any industry, only factor affecting location would be different.

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SPREADSHEET MODEL OF INVENTORY CONTROL BASED ON MODERN CONTROL THEORY

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Abstract: *This paper describes inventory control system modeling, based on the control theory. Models are developed in spreadsheets, for the purpose of planning and managing inventories in supply chains. The problem of inventory control is one of largely explored problems in modern business systems. In order to develop high qualitative models of inventory control, it is necessary to use different approaches and ways of modeling. One of the approaches uses methodology of the Modern Control Theory. The control theory deals with influences on the behavior of dynamic systems. That is an interdisciplinary subfield of science, which originated in engineering and mathematics, and evolved in usage by the social and management sciences, like psychology, sociology, criminology, financial system, operations management and supply chains. The external input of a system is called reference. When one or more output variables of a system have to follow a certain reference over time, a controller manipulates the inputs to a system with the goal of obtaining the desired effect on the output of the system. The most common objective of the control theory is to calculate solutions for a proper controller corrective action, which result in system stability. System stability implies that a system will hold the set point and not oscillate around it. The main contribution of this paper is the presentation of a concise and insightful view of using the knowledge of spreadsheets modeling in the control systems feedback for an inventory control model. In this paper, we present a spreadsheet “push” model of inventory control for five distribution centers and a spreadsheet tool for the control feedback in inventories. The intention of a spreadsheet model as a tool presented in the paper is its usability for diverse audiences of scientists, practitioners and engineers who are interested in understanding and utilizing the feedback in inventory control models. This paper is based on the author’s personal experience in the planning, controlling and organizing of inventories in coffee distribution.*

Key words: spreadsheets, inventory control, theory control, control systems, supply chain, model, modeling

1. INTRODUCTION

Modern Control Theory is an interdisciplinary area of research where many mathematical concepts and methods work together to produce an impressive body of important applied mathematics. The word control has two main meanings. First, it is understood as the activity of testing or checking that a physical or mathematical device has a satisfactory behavior. Secondly, to control is to act, to implement decisions that guarantee that device behaves as desired, (Andrei, 2005). Control idea trace back in times of Aristotle (384-322 BC). In his book “Politics”, one of the most influencing books ever written, in Chapter 3, Book 1, he has written: “... if every instrument could accomplish its own work, obeying or anticipating the will of others ... if the shuttle weaved and the pick touched the lyre without a hand to guide them, chief workmen would not need servants, nor masters slaves.”, (Bennet, 1979). Without control systems there could be no manufacturing, no vehicles, no computers, no regulated environment - in short, no technology. Control systems are what make machines, in the broadest sense of the term, function as intended. Control systems are most often based on the principle of feedback, whereby the signal to be controlled is compared to a desired reference signal and the discrepancy used to compute corrective control action, (Doyle & Francis & Tannenbaum, 1990).

The process of designing a control system generally involves many steps. A typical scenario can be presented as follows:

- Study the system to be controlled and decide what types of sensors and actuators will be used and where they will be placed.
- Model the resulting system to be controlled.
- Simplify the model if necessary so that it is tractable.
- Analyze the resulting model; determine its properties.
- Decide on performance specifications.
- Decide on the type of controller to be used.
- Design a controller to meet the specs, if possible; if not, modify the specs or generalize the type of controller sought.
- Simulate the resulting controlled system, either on a computer or in a pilot plant.
- Repeat from step 1 if necessary.
- Choose hardware and software and implement the controller.
- Tune the controller on-line if necessary.

The most elementary feedback control system has three components, presented in Figure 1. a system (the object to be controlled, no matter what it is, is always called the system or plant), a sensor to measure the output of the plant, and a controller to generate the plant's input.

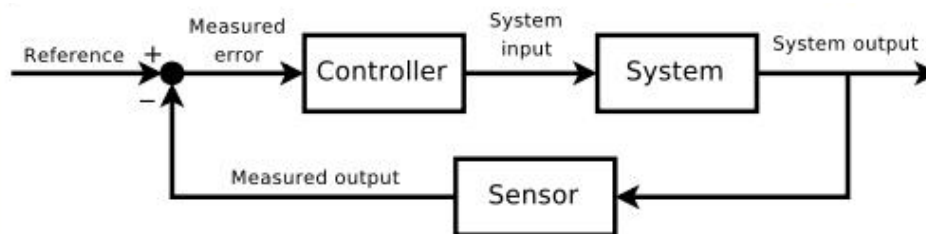


Figure 1: Concept of the feedback loop

The external input of a system is called the reference. When one or more output variables of a system need to follow a certain reference over time, a controller manipulates the inputs to a system to obtain the desired effect on the output of the system. The usual objective of control theory is to calculate solutions for the proper corrective action from the controller that result in system stability, that is, the system will hold the set point and not oscillate around it. The concept of the feedback loop to control the dynamic behavior of the system: this is negative feedback, because the sensed value by sensor is subtracted from the desired value to create the error signal, which is amplified by the controller, (Doyle & Francis & Tannenbaum, 1990).

Sensor can be define as device that converts a physical stimulus or input into a readable output, which today would preferably be electronic, but which can also be communicated via other means, such as visual and acoustic. As perhaps the simplest example, consider the sensor on keyboard switch actuator - which provides a signal when the associated key is pressed. The role of a sensor in a simple automation system is depicted in Figure 2. The detection and measurement of some physical effect provides information to the control system regarding a related property of the system under control, which we are interested in regulating to within some "set point" range. The controller outputs a command to an actuator (a valve, for example) to correct for measured deviations from the set point, and the control loop is thereby closed. Because of the simplicity of example in Figure 2 control system, it represents a fair number of practical control systems. In especially simple systems, a distinct controller may not be immediately evident (for example, Thermostat), (Zook & Bonne & Samad, 2008).

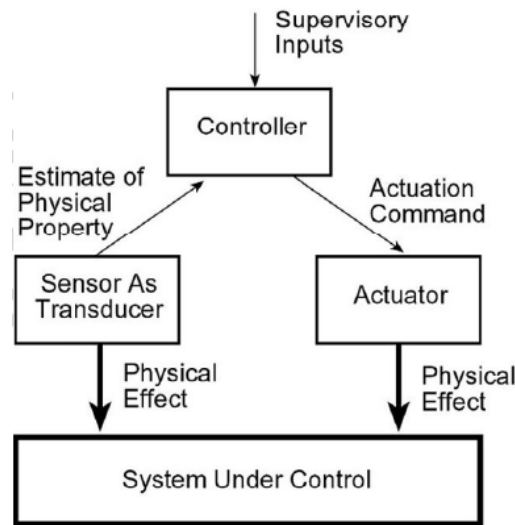


Figure 2: Example of a simple control system

A *dynamical system* is a system whose behavior changes over time, often in response to external stimulation or forcing. The term *feedback* refers to a situation in which two (or more) dynamical systems are connected together such that each system influences the other and their dynamics are thus strongly coupled. Simple causal reasoning about a feedback system is difficult because the first system influences the second and the second system influences the first, leading to a circular argument. This makes reasoning based on cause and effect tricky, and it is necessary to analyze whole systems. A consequence of this is that the behavior of feedback systems is often counter intuitive, and it is therefore necessary to resort to formal methods to understand them. In Figure 3 (a) the output of system 1 is used as the input of system 2, and the output of system 2 becomes the input of system 1, creating a closed loop system. In Figure 3 (b) the interconnection between system 2 and system 1 is removed, and the system is said to be open loop. A system is said to be a closed loop system if the systems are interconnected in a cycle, as shown in Figure 2., (Åström & Murray, 2009).

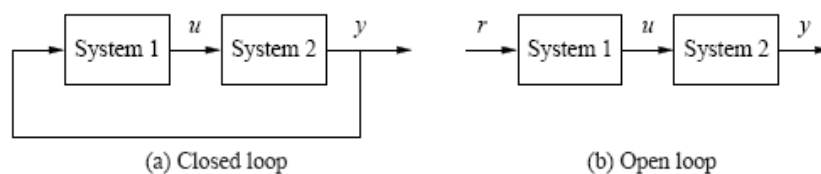


Figure 3: Open and closed loop systems

The cruise control system of a car, presented in Figure 4, is a common feedback system encountered in everyday life. The system attempts to maintain a constant velocity in the presence of disturbances primarily caused by changes in the slope of a road. The controller compensates for these unknowns by measuring the speed of the car and adjusting the throttle appropriately (Zook & Bonne & Samad, 2008).

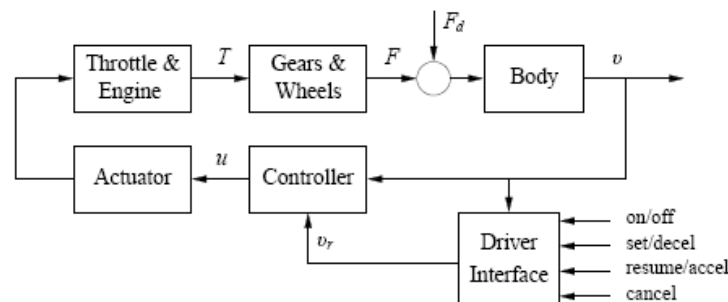


Figure 4: Block diagram of cruise control system for automobile

Feedback is one of the most important contribution of Charles Darwin (1805-1882). According to his theory feedback over long time periods is responsible for the evolution of species. Later, Vito Volterra (1860-1940) used this concept to explain the balance between two populations of fish in a closed pond. But, the most influencing was Norbert Wiener (1885-1964) who introduced the fruitful concepts of positive and negative feedback in biology. In engineering, this term has been early introduced by the engineers of the Bell Telephone Laboratory (Mayr, 1970). Now it is an active concept in practically all area of activity. A feedback process is one in which the state of the system, or its output, determines the way in which the control has to be computed at any time instant, (Andrei, 2005). Feedback has potential disadvantages as well. It can create dynamic instabilities in a system, causing oscillations or even runaway behavior. Another drawback, especially in engineering systems, is that feedback can introduce unwanted sensor noise into the system, requiring careful filtering of signals. It is for these reasons that a substantial portion of the study of feedback systems is devoted to developing an understanding of dynamics and a mastery of techniques in dynamical systems. Feedback systems are ubiquitous in both natural and engineered systems. Control systems maintain the environment, lighting and power in our buildings and factories; they regulate the operation of our cars, consumer electronics and manufacturing processes; they enable our transportation and communications systems; and they are critical elements in our military and space systems. For the most part, they are hidden from view, buried within the code of embedded microprocessors, executing their functions accurately and reliably. The term *control* has many meanings and often varies between communities. We define control to be the use of algorithms and feedback in engineered systems. For example, the thermostat, in particular, is a simple example of feedback control that everyone is familiar with. The device measures the temperature in a building, compares that temperature to a desired setpoint and uses the *feedback error* between the two to operate the heating plant, e.g., to turn heat on when the temperature is too low and to turn it off when the temperature is too high (Åström & Murray, 2009). Another representation of feedback loops is *optimal control* and *estimation* in feedback loops. Johann Bernoulli (1667-1748) was the first who articulated the principle of optimality. In 1957 Richard Bellman formulated the *dynamic programming* principle to the optimal control of discrete-time systems (Bellman, 1957), and in 1958, Lev Pontryagin developed the *maximum principle* for solving nonlinear optimal control problems (Pontryagin & al., 1962). Both these optimality principles characterize the optimal control by means of a feedback law. The main idea of Bellman was to introduce the *value function* (the Bellman function) as feedback law.

2. SYSTEM MODELING

A model is a precise representation of a system's dynamics used to answer questions via analysis and simulation. The model we choose depends on the questions we wish to answer, and so there may be multiple models for a single dynamical system, with different levels of fidelity depending on the phenomena of interest. There are two specific methods commonly used in feedback and control systems to represent the concept of modeling: differential equations and difference equations. A model is a mathematical representation of a physical, biological or information system. Models allow us to reason about a system and make predictions about how a system will behave. In this paper, we will mainly be interested in models of dynamical systems describing the input/output behavior of systems. Roughly speaking, a dynamical system is one in which the effects of actions do not occur immediately. For example, the velocity of a car does not change immediately when the gas pedal is pushed nor does the temperature in a room rise instantaneously when a heater is switched on. Similarly, a headache does not vanish right after an aspirin is taken, requiring time for it to take effect. In business systems, increased funding for a development project does not increase revenues in the short term, although it may do so in the long term (if it was a good investment). All of these are examples of dynamical systems, in which the behavior of the system evolves with time. The input/output framework is used in many engineering disciplines since it allows us to decompose a system into individual components connected through their inputs and outputs. Thus, we can take a complicated system such as a radio or a television and break it down into manageable pieces such as the receiver, demodulator, amplifier and speakers. Each of these pieces has a set of inputs and outputs. These components can be interconnected to form of the entire system through the proper design. To deal with large, complex systems, it is useful to have different representations of the system that capture the essential features and hide irrelevant details. In all branches of science and engineering, it is common practice to use some graphical description of systems, called *schematic diagrams*. They range from stylistic pictures to drastically simplified standard symbols. These pictures make it possible to get an overall view of the system and to identify the individual components. Schematic diagrams are useful because they give an overall picture of a system, showing different subprocesses and their interconnection and indicating variables that can be manipulated and signals that can be measured. A special graphical representation of model, called a *block diagram* has

been developed in control engineering. The purpose of a block diagrams is to emphasize the information flowed to hide details of the system. In a block diagram, different process elements are shown as boxes, and each box has inputs denoted by lines with arrows pointing toward the box and outputs denoted by lines with arrows going out of the box. The inputs denote the variables that influence a process, and the outputs denote the signals that we are interested in or signals that influence other subsystems. Block diagrams can also be organized in hierarchies, where individual blocks may themselves contain more detailed block diagrams, (Zook & Bonne & Samad, 2008). The economy is a large, dynamical system with many actors: governments, organizations, companies and individuals. Governments control the economy through laws and taxes, the central banks by setting interest rates and companies by setting prices and making investments. Individuals control the economy through purchases, savings and investments. Many efforts have been made to model the system both at the macro level and at the micro level, but this modeling is difficult because the system is strongly influenced by the behaviors of the different actors in the system. One of the reasons why it is difficult to model economic systems is that there are no conservation laws. A typical example is that the value of a company as expressed by its stock can change rapidly and erratically. However, there are some areas with conservation laws that permit accurate modeling. One example is the flow of products from a manufacturer to a retailer as illustrated in Figure 5. The products are physical quantities that obey a conservation law, and the system can be modeled by accounting for the number of products in the different inventories. There are considerable economic benefits in controlling supply chains so that products are available to customers, while minimizing products that are in storage. The real problems are more complicated than indicated in the figure because there may be many different products, there may be different factories that are geographically distributed and the factories may require raw material or subassemblies. Considerable economic benefits can be obtained by using models to minimize inventories. Their use accelerated dramatically when information technology was applied to predict sales, keep track of products and enable just-in-time manufacturing. Supply chain management has contributed significantly to the growing success of global distributors. Products flow from the producer to the customer through distributors and retailers as indicated by the solid lines. There are typically many factories and warehouses and even more distributors and retailers. Multiple feedback loops are present as each agent tries to maintain the proper inventory level, (Zook & Bonne & Samad, 2008).

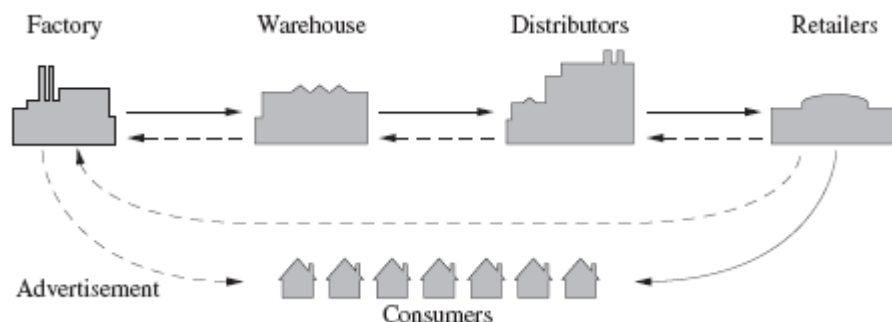


Figure 5: Supply chain dynamics

3. INVENTORY „PUSH“ MODEL FOR INVENTORY CONTROL

A significant growth of interest in supply chains inventory management can be noticed in the last few years. One thing has become certain, large companies tend to reduce costs through the more efficient supply chain management. Companies have realized importance of costs that arising from keeping large stock amounts in the distribution chain. Too much inventories in warehouses allow daily demand satisfaction and meeting of changes in products demand, but with very high distribution prices due to high costs of products shipment and transportation. GRAND PROM company was established in 1997. Main activity of this company is coffee production and sale. As a technologically modern, high quality and original product Grand coffee quickly became very popular and today is the leading brand among the coffees on the market of Serbia. The company is constantly expanding, thanks to constant investment in technology and monitoring of recent trends in the global coffee market. In late 2003, the company began to develop its own distribution network. Today, company has six distribution centers for direct supplying of more than 15.000 retails with its products. The development of distribution centers (hereinafter referred to as DC) is a necessity for supply chains management in the manufacturing systems business. Distribution centers are the simplest way of achieving direct links with customers, by the full control of the market. In

addition to the direct control of the market, DC contribute to the strengthening of the company's brands, market share increasing, billing control, customer service improvement, winning the leading position on the market, providing customer services, as well as faster and safer delivery.

Inventory management is an especially complex process for companies that producing articles which selling. This means that production must have data about the quantities of products required to produce for delivery, or in addition to the annual and monthly sales plans, continuously carrying out plans on a daily basis is necessary, in order to optimize the use of production and storage capacity. The parent company or main warehouse receiving daily information about quantities required for the delivery, from DC. According to these data, production section producing goods that will be received in the parent company's warehouse for finished goods. On behalf of logistics managers, finished goods are transported to DC or to key customers. It is important to note that the distribution centers supplying customers not only as direct distribution (small retail), but also key customers (key accounts), with demand that in most cases has a high degree of uncertainty. The unpredictability of the amount of product for delivery is often a big incentive for companies to create inventory planning and inventory management system as better as possible. In order of better planning of inventory management, companies often use information technology and various software solutions to address the problem of inventory management. The use of computers, internet, cross-links in the data transmission, i.e. modern IT infrastructure, is today an indispensable activity for each company. However, despite the well-developed IT infrastructure, companies are often wary of buying different material flows management software solutions, because the implementation of solutions requires some changes in work processes. In reality, most companies have major problems with company organization adapting to various software solutions and vice versa. Data transfer from geographically distant locations in real time can be extremely expensive and complex. If company needs 24h inventory tracking and the number of customer orders tracking, in geographically remote distribution center, it is necessary that during this period exist a constant transverse connection (GPRS) and database should be updated at the same time during the day with all queries sets of user in the parent company. This process of data exchange is limited and often ineffective because of cancellation possibility not only for the company's IT resources, then because of permeability of telephone networks also. Hence the update and data transfer is performed once per day (eg: in the afternoon, after work hours), the servers have enough time to process and store data in the database until the next business day. However, if the information about stock of one distribution center is available a day later, the question is how we can plan delivery for the next working day in the present moment, for the distribution center. Because of these reasons, companies employees using the internet, in order to obtain data from a geographically distant location, in a short time, and simple applications for data analysis, that enabling the use of a large number of tools for data processing. The application, which in most cases meets user needs for sharing and processing information is spreadsheet, with a large number worksheets. Spreadsheets can be a good choice for databases creation, because: databases creation is simple, better understanding, many users know how to use spreadsheets applications, data analysis tools are easier to use, receiving and sending data in various formats is simple and possible. Spreadsheet applications uses a powerful tool for working with databases and searching stored data by various criteria, sort their order of preference, statistical analysis and can be used in any Windows applications (Word, Power Point ..). At any time user can sort and search entered data by different keys. Moreover, it can use and powerful tools for the specific solutions simulation.

Organization of inventory management in supply chain distribution centers is often an inefficient. Lack of organization is reflected in the decentralized inventory ordering, where distribution centers make supplies ordering from the main logistics distribution center in excessive quantities, mostly because of the creation of additional reserves in order to avoid sudden peaks in sales. Often, this not well-defined activity is added by bed defined terms of ordering supplies, poor form of documents for inventory levels tracking and lack of well trained employees for supplies ordering. As a simple solution for these problems, companies started with using of the "push" principles for inventory management in distribution-logistics centers. This model was reflected in the automatic orders definition of stock replenishment for distribution centers, from the central logistics distribution centers. In that way distribution centers should only forward inventory level in time, and based on that information to get delivery of the necessary and sufficient amount of supplies. The system for inventory management was modeled in order of solving this problem. System was modeled by using of the methodology of feedback in control systems. During the model creation, all elements of a feedback loop were created. It was necessary for model to analyze a large number of numerical data, because of that model was developed as a spreadsheet application. Each of distribution centers should have to send a report - level of stocks status to central LDC, at the beginning of each working day. This

report was defined as prescribed form and format of the Excel spreadsheet (Figure 6). Employees in DC were responsible for DC stock reporting and submission of this report to a central logistics-distribution center.

A B C D E F G H I J K L M N O P															
PLANNED STOCK															
IN KILOGRAMS: 53.616,63 DAYS OF SELLING: 7															
DC NIŠ															
INPUT ELEMENT OF MODEL															
ARTICLES (PRODUCTS)	Average daily selling (kg)	Stock level (number of bags of coffee)	Stock level (kg)	STANDING INVENTORIES IN NUMBER OF SELLING DAYS	PLANNED STOCK LEVEL (kg)										
Aroma Light 100g /60 kes	73,8	4.080,0	408,0	5,5	516,7										
Aroma Light 100g/30 kes	213,4	16.710,0	1.671,0	7,8	1.493,9										
Aroma Light 200g/30 kes	6,7	270,0	54,0	8,0	47,1										
Aroma Light 200g/15 kes	30,5	1.575,0	315,0	10,3	213,7										
Aroma Light Vakuum 200	85,6	5.640,0	1.128,0	13,2	599,1										
Gold Double Set 400 gr	6,1	0,0	0,0	-	42,4										
Aroma Double Set 400 gr	6,1	0,0	0,0	-	42,8										
Rio 100g/60 kes	119,3	12.600,0	1.260,0	10,6	834,9										
Gold 100g/60 kes	3.122,2	333.060,0	33.306,0	10,7	21.855,3										
Gold 200g	484,7	43.916,0	8.783,2	18,1	3.393,1										
Gold 500g	77,3	1.008,0	504,0	6,5	541,2										
Gold Vakuum 200g	360,0	9.980,0	1.996,0	5,5	2.520,0										
Aroma 100g/60 kes	1.538,6	114.960,0	11.496,0	7,5	10.770,5										
Aroma 200g	210,8	9.240,0	1.848,0	8,8	1.475,6										
Aroma Vakuum 200g	679,9	23.520,0	4.704,0	6,9	4.759,2										
Aroma Vakuum 500g	59,1	1.408,0	704,0	11,9	413,7										
De luxe 200g - ZIP	287,8	13.395,0	2.679,0	9,3	2.014,7										
De luxe 200g - karton	112,1	3.930,0	786,0	7,0	784,4										
Espresso	0,1	75,0	75,0	825,0	0,6										
Topla čokolada	4,4	465,0	11,6	2,6	30,8										
Grand Gold Limenka 300g	21,0	936,0	280,8	13,4	147,0										
Bonito 100g	135,0	12.930,0	1.293,0	9,6	945,0										
Bonito 200g	25,0	4.560,0	912,0	36,5	175,0										
TOTAL	7.659,5	614.258	74.214,63		53.616,63										

Level of stock on date:
Date 30.01.2006
Time 18:50
Inventory coordinator:

LEGEND:

High level of inventories (over 14 days)


Optimal level of inventories (from 7 to 14 days)

Low level of inventories (from 2 to 7 days)

Critical level of inventories (below 2 days)

Figure 6: Level of stock report for one distribution center

At the same time, according to established pattern (days) for DC supplying, the DC sends order form for goods to LDC, in order to fill the inventory levels to planned level (see Figure 7). This report is the ordering form for a distribution center and the input element of model with feedback.

															
Preduzeće za proizvodnju, promet i usluge GRAND PROM d.o.o. Beograd Registrovano kod Trgovinskog Suda u Beogradu, broj reg. upisa: 1-79-448-00, PIB: 100001126, matični broj: 17173006 Direkcija: Milentija Popovića 9, Sava Centar, 11070 Novi Beograd; tel/fax: (+381 11) 311 2350, 311 3945; e-mail: direkcija@grandkafa.co.yu Komercijalna, marketing, proizvodnja: Surtinska 6a, 11070 Novi Beograd; tel/fax: (+381 11) 3187 986, 3187 988; e-mail: office@grandkafa.co.yu															
Order form date: <input type="text"/> Name of DC: <input type="text"/> NEW ORDER FORM INPUT ELEMENT OF MODEL															
ARTICLES (PRODUCTS)	Weight per box (kg)	Box per pallet	Total weight (kg)	Number of boxes	Number of pallets										
Aroma Light 100g /60 kes - ventil	6,00	49,00													
Aroma Light 100g/30 kes - ventil	3,00	84,00													
Aroma Light 200g/30 kes - ventil	6,00	72,00													
Aroma Light 200g/15 kes - ventil	3,00	84,00													
Aroma Light Vakuum 200g	4,00	80,00													
Gold Double Set 400 gr	1,60	44,00													
Aroma Double Set 400 gr	1,60	44,00													
Rio 100g/60 kes	6,00	49,00													
Gold 100g/60 kes	6,00	49,00													
Gold 200g	6,00	72,00													
Gold 500g	3,00	90,00													
Gold Vakuum 200g	4,00	80,00													
Aroma 100g/60 kes	6,00	49,00													
Aroma 200g	6,00	72,00													
Aroma Vakuum 200g	4,00	80,00													
Aroma Vakuum 500g	4,00	90,00													
De luxe 200g - ZIP	3,00	42,00													
De luxe 200g - karton	3,00	84,00													
Espresso	6,00	49,00													
Bonito 100 grama	3,00	84,00													
Bonito 200 grama	3,00	84,00													

TOTAL NUMBER OF PALLETTS OF COFFEE PRODUCTS: **TOTAL WEIGHT OF COFFEE PRODUCTS (kg):**
TOTAL NUMBER OF PALLETTS OF PAIE PRODUCTS: **TOTAL WEIGHT OF PAIE PRODUCTS (kg):**
TOTAL NUMBER OF PALLETTS OF TEE PRODUCTS: **TOTAL WEIGHT OF TEE PRODUCTS (kg):**
TOTAL NUMBER OF PALLETTS: **TOTAL WEIGHT OF PALLETTS (kg):**

NOTE: Only white fields of the table used for data entry.
 It is necessary to enter only whole numbers in the white fields of the table.
 Also, it is necessary to pay attention to the orders for HORECA.
 Reserve a empty place for HORECA goods in number of palletts in FTL shipments.

Figure 7: Order form for DCs in spreadsheet

In addition, an input element of model can be planned level of stock in selling days. According to that number, the actual state of inventories level comparison is done.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
2	PLANNED STOCK LEVEL IN SELLING DAYS					DAYS OF SELLING:		10	SECURITY STOCK:		0			
3														
4	ARTICLES (PRODUCTS)		DC Subotica	DC Novi Sad	DC Beograd	DC Požega	DC Niš	DC Kragujevac	INPUT ELEMENT OF MODEL					
5	Aroma Light 100g /60 kes - ventil		354,00	1.020,00	2.786,91	135,00	738,00	300,00						
6	Aroma Light 100g/30 kes - ventil		471,00	466,00	2.368,86	225,50	2.134,00	1.100,00						
7	Aroma Light 200g/30 kes - ventil		157,00	497,00	2.280,34	158,00	67,00	150,00						
8	Aroma Light 200g/15 kes - ventil		44,80	122,00	1.222,73	63,70	305,00	300,00						
9	Aroma Light Vakuum 200g		278,70	1.172,00	2.832,05	360,30	856,00	330,00						
10	Gold Double Set 400 gr		67,10	120,00	877,73	89,60	61,00	100,00						
11	Aroma Double Set 400 gr		55,80	112,00	611,27	101,60	61,00	100,91						
12	Rio 100g/60 kes		2.283,80	2.063,00	2.749,30	226,00	1.193,00	1.146,82						
13	Gold 100g/60 kes		10.820,60	15.500,00	83.566,51	2.656,00	32.000,00	11.800,00						
14	Gold 200g		3.741,40	9.000,00	90.945,48	3.357,60	4.847,00	5.400,00						
15	Gold 500g		1.100,00	2.000,00	15.543,41	443,00	850,00	2.000,00						
16	Gold Vakuum 200g		1.589,80	2.223,00	11.568,50	631,60	3.600,00	1.200,00						
17	Aroma 100g/60 kes		5.050,00	7.403,00	21.433,23	1.443,00	15.386,00	7.200,00						
18	Aroma 200g		1.660,00	2.733,00	15.556,89	1.123,80	2.108,00	1.700,00						
19	Aroma Vakuum 200g		3.238,10	6.614,00	20.759,18	2.298,30	6.799,00	3.476,82						
20	Aroma Vakuum 500g		574,60	1.570,00	4.866,76	346,00	591,00	500,00						
21	De luxe 200g - ZIP		1.074,30	2.000,00	8.859,20	752,50	2.500,00	992,05						
22	De luxe 200g - karton		560,50	874,00	3.321,32	310,00	1.100,00	400,00						
23	Espresso		50,00	40,00	105,00	16,60	1,00	4,77						
24	Topla čokolada													
25	TOTAL		33.171,5	55.529,0	292.254,7	14.738,1	75.197,0	38.201,4						

Figure 8. Planned stock level report in spreadsheet

When orders arrive from DC to the LDC, the same shall be entered in a separate spreadsheet file in order to be translated to the number of inventory selling days. Order forms from all five distribution centers are compiled into a separate spreadsheet worksheets by using macros. That spreadsheet represents all comparative orders of all distribution centers in one place. In this way, we define the sensor function of model, which should prepare data for comparison in the model comparator.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
2	STANDING INVENTORIES IN NUMBER OF SELLING DAYS							OVERVIEW DATE:		29.12.2006						
3	SENSOR							<div>COMPARATOR</div> <div>LEGEND:</div> <div><div></div>High level of inventories (over 14 days)</div> <div><div></div>Optimal level of inventories (from 7 to 14 days)</div> <div><div></div>Low level of inventories (from 2 to 7 days)</div> <div><div></div>Critical level of inventories (below 2 days)</div>								
4	ARTICLES (PRODUCTS)	DC Subotica	DC Novi Sad	DC Beograd	DC Požega	DC Niš	DC Kragujevac									
5	Aroma Light 100g/30 kes - ventil	9,2	12,0	10,7	18,1	7,2	7,5									
6	Aroma Light 200g/15 kes - ventil	36,8	71,3	29,5	74,4	9,0	5,9									
7	Aroma Light Vakuum 200g	1,4	6,7	16,9	14,5	5,3	12,6									
8	Gold Double Set 400 gr	4,0	0,2	2,3	2,0	-	0,1									
9	Aroma Double Set 400 gr	3,7	0,1	8,4	1,7	3,4	-									
10	Šoljice						-									
11	Gold 100g/60 kes	6,8	8,9	6,7	11,1	9,7	7,6									
12	Gold 200g	4,6	6,0	6,7	11,0	14,0	7,0									
13	Gold 500g	3,6	7,8	3,6	12,1	7,1	7,0									
14	Gold Vakuum 200g	2,2	11,7	5,1	7,1	9,2	10,8									
15	Aroma 100g/60 kes	5,6	6,2	3,3	11,4	8,2	5,4									
16	Aroma 200g	4,6	10,2	4,9	14,0	6,9	7,9									
17	Aroma Vakuum 200g	3,4	9,2	1,6	8,9	8,2	9,3									
18	Aroma 500g	4,7	7,5	9,2	11,6	2,2	9,7									
19	De luxe 200g - ZIP	1,7	6,0	4,8	7,7	6,4	4,2									
20	De luxe 200g - karton	1,2	5,2	1,6	12,8	14,3	12,6									
21	Barcaffe Classic 100g/30 kes.	6,7	7,8	2,6	13,4	1,6	11,9									
22	Barcaffe Classic 200g/15 kes.	5,0	11,9	16,6	13,1	4,6	19,2									
23	Bonito kafa 100g	4,5	4,2	1,9	12,5	10,4	7,9									
24	Bonito kafa 200g	7,3	5,8	8,0	13,5	11,2	11,3									

Figure 9. Sensor and comparator element of model in spreadsheet

Comparator is used to determine the difference between the planned inventory levels and the actual state of the stock. Defined differences in the output of comparator are used for making final decisions about quantities of items that will be delivered in each distribution center. Defined differences are shown as the number of days, with four different colors, which indicate the current stock level or result in a distribution center. Conditional Formatting command in Excel's toolbar is used to denote high, optimal, low and critical limits of inventories by different colors to define how many stocks we have in selling days number. According to the colors, current stock level is compared with planned level of inventories. These differences are switching to a new spreadsheet worksheet by especially made macros, which now realize functions of the model controller. Model controller function is realized in position of Coordinator of inventories. His control role is to confirm quantity of products for delivery of each item and if it is necessary to make a change of order, according to distribution center reedmen's. This report compares and control ordering forms from DCs, in compliance with level of stocks in the central warehouse. Immediately, after ordering forms from DCs are approved, orders control report is sent to production to create production

work orders. These actions as an effect has inventories planned level filling of the central warehouse. In addition, after approval, requisitions are converted to orders for delivery distribution centers.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	NEW ENTRY			CONTROLLER ELEMENT IN MODEL																					
2	ARTICLES (PRODUCTS)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16								
Weight per box (kg)		Box per pallet	Stock level LDC Belgrade (boxes)	DC Subotica (boxes pallets)	DC Novi Sad (boxes pallets)	DC Požega (boxes pallets)	DC Niš (boxes pallets)	DC Kragujevac (boxes pallets)	DC Beograd (boxes pallets)	Stock level after shipment	Boxex n production on day	(10+11)	Total delivery in boxes	Total delivery in weight (kg)	(3+11)	(15x1)									
Aroma Light 100g 60		6	49	6							6,00		8		8	36									
Aroma Light 100g 30		3	84	1.106		84	1,00				959		959	147	441	1.106	3318								
Aroma Light 200g 30		6	72																						
Aroma Light 200g 15		3	84	1.312					12	0,14	40	0,48	1260	1.260	52	166	1.312	3936							
Aroma Light Vakuum		4	80	1.216					11	0,14	30	0,38	1175	1.175	41	164	1.216	4864							
Gold Double Set 400		1,6	44	35				33,00	0,75	4,00	0,09	30	0,68	-32	67	107	35	56							
Aroma Double Set 40		1,6	44	291		44	1,00	7,00	0,16	5,00	0,11	30	0,68	205	86	138	291	485,6							
Rio 100g 60 kes		6	49																						
Gold 100g 60 kes	6	49	2.828	490	10,00	245	5,00	360,00	7,38	136,00	2,78	830	16,84	767	6.270	7.037	2.061	12.366	9.998	54588					
Cold 200g	6	72	2.565			144	2,00	400,00	6,66	196,00	2,72	950	19,19	875	5.303	6.178	1.690	10.140	7.888	47208					
Cold 500g	3	90	688			90	1,00	29,00	0,22	88,00	0,96	200	2,22	292	1.652	396	1.188	2.048	6144						
Gold Vakuum 200g	4	80	1.314			80	1,00	31,00	0,38	39,00	0,49	130	1,63	1034	1.034	280	1.120	1.314	5256						
Aroma 100g 60 kes	6	49	792	490	10,00	196	4,00	122,00	2,48	37,00	0,76	140	2,86	163	2.497	2.304	985	5.910	3.289	19734					
Aroma 200g	6	72	1.805			72	1,00	10,00	0,14	31,00	0,43	100	1,39	1592	1.592	213	1.278	1.805	10830						
Aroma Vakuum 200g	4	80	2.038	640	8,00	160	2,00	75,00	0,94	37,00	0,46	260	3,26	866	3.834	4.700	1.172	4.688	5.872	23488					
Aroma Stabilo 500g	3	90	979			90	1,00	25,00	0,28	39,00	0,43	35	0,39	790	790	189	567	979	2937						
De luxe 200g - ZIP	3	42	1.799	84	2,00	84	2,00	170,00	4,05	27,00	0,64	130	3,10	1304	1.304	495	1.485	1.799	5397						
De luxe 200g - karton	3	84	258			84	1,00	75,00	0,89	20,00	0,24	90	1,07	541	1.086	1.075	269	807	1.344	4032					
Espresso	6	49																							
Bonito 100 grama	3	84	1.000			336	4,00	10	0,12	51,00	0,61	330	3,93	273	2.129	2.402	727	2.181	3.129	9387					
Bonito 200 grama	3	84	969	252	3,00	168	2,00	95	1,13	59,00	0,70	270	3,21	125	2.129	2.264	844	2.532	3.098	8294					
Bareaffe Classic 100g	3	84	1.419			84	1,00	10,00	0,12	10,00	0,12	70	0,83	1245	1.245	174	522	1.419	4257						
Bareaffe Classic 200g	3	84	661					65,00	0,77	29,00	0,35	50	0,60	517	517	144	432	661	1983						
Bonito solja	2,4	30	49			15	0,50	30	1,00	2,00	0,07			2	47	113	48	117,6							
Bonito džerza	3,2	36						21	0,68	2,00	0,06			-23		23	74								
Topla čokolada	2,25	84	6											6						13,5					
Limenka gold 300 gr			295											295											
TOTAL:				2.381	34,79	1.975	29,50		1.559	26,93	836	12,32	3.775	67,63				46.408		217.342					

Figure 10: Controller element in spreadsheet model

Results of control are inventory supplies tailored to the needs of distribution centers and delivers adjusted to the maximum utilization of delivery vehicles (full-trucks-load shipments).

6. CONCLUSION

Finally we can say that the spreadsheets are an indispensable tool for simple, quick and easy processing and data analysis for activities of planning, modeling and control of inventories. Apart from logistics, spreadsheet models have great importance in many other disciplines and fields such as finance, quality management, human resources, quantitative methods and etc. Design of spreadsheet models is very simple if the modelar is familiar with methodology for developing and organization of data in control models.

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THE STATE OF BPM IN COMPANIES IN SERBIA

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Abstract: *The purpose of this study is to determine to what extent companies in Serbia had adopted process management practices, what is their process maturity level according to CMMI model, and what are the problems and challenges those companies in Serbia encounter while trying to implement process change initiatives. Survey method were used for research and it was mailed to general managers, CEOs, process analysts at a random sample of 300 manufacturing and service organizations in the Serbia. Results showed that most of the companies in Serbia are at Level 1 or 2, they do not have a formal group for process management and they are mostly focused on incremental improvement. This is the first research of this kind in Serbia which shows the state of the BPM in Serbia and this paper suggests steps for further efforts in process management practice.*

Keywords: *Business process management, process change, companies in Serbia*

1. INTRODUCTION

Availability of competing manufacturers and the ability to easily change supplier are reasons why companies think about improving their processes. Companies often think about process improvement through IT usage, and ignore the total set of changes that business system should undergo in order to improve its processes, to acquire and maintain long-term relationships with customers and sustain a competitive position in the market. These changes should permeate all levels of the company, and only comprehensive process improvement approach can bring the desired results.

The essence of maintaining the competitive position based on quality relationships with customers is in building a network of effective and efficient business processes. While Business Process Management (BPM) has been applied for decades now in developing countries, Serbia (as a transitional country) is relatively new to the entire concept. BPM presents a good opportunity for transitional countries, as its application can bring visible results in relatively small amount of time, and with little investments.

The aim of this paper is to evaluate the current state of BPM in Serbian industry. Companies' understanding about BPM will be analyzed, as well as general situation of process maturity in Serbian industry. The research was done through questionnaire which was sent to nearly 300 Serbian companies. The results show that, although Serbian companies are not unfamiliar with BPM concepts, BPM application is still rudimentary. The purpose of the paper is to highlight potential benefits that BPM can bring to Serbian companies, and to encourage other transitional countries to look for their development opportunities in BPM.

The paper is organized as follows: after a short introduction, a brief literature review will be given where basic concepts of business process management will be presented. Chapter four will shortly present research methodology that was used for the purpose of this paper. Results of the research will be given in chapter 5. These results will be discussed in chapter 6, and the conclusion will be given afterwards.

2. THEORETICAL BACKGROUND

Porter identified two ways for obtaining competitive advantage: to carry out activities differently from the competition; or to perform similar (or identical) activities as competitors, but in a better way (Porter, 1998). Companies operating in the same industry achieve different results by using different resources and having different capabilities (Peteraf, 1993). Processes are one of main resources of any company, and are difficult to imitate (Biazzo and Bernardi, 2003). Business process can be defined as a series of

activities carried out in order to produce a specified output, or to create a result that has value for the customer (Davenport, 1993; Hammer and Champy, 1993). Processes are vital for any organization, and they must be seen as resources that need to be managed. They are not only resources, they constitute a business system and things that it does, so it can be said that any business system can be managed by managing its processes.

Business Process Management (BPM) represents all of company's efforts to level its processes with strategic goals. It is a structured approach to analyzing, improving and controlling processes of a company (Elzinga et al., 1995). BPM is often identified with Business Process Management Systems (BPMS) or Enterprise Systems (ES, such as ERP or CRM systems). BPM should be viewed in a broader context, as a way for managers to organize and control processes (Harmon, 2007). A number of models have been developed for the purpose of managing processes. All of them suggest a series of stages or steps that should be applied in order to establish a BPM system (Elzinga et al., 1995, Sinclair and Zairi, 1995; Gardner, 2001). Most models emphasize certain aspects of process management (process measurement, process improvement), and do not give a complete picture of what is to be done in order to establish a system for process control. However, by analyzing these models, a conceptual model can be developed, that includes following aspects of process management (Biazzo and Bernardi, 2003): a) process architecture; b) process visibility; c) monitoring mechanisms; and d) improvement mechanisms.

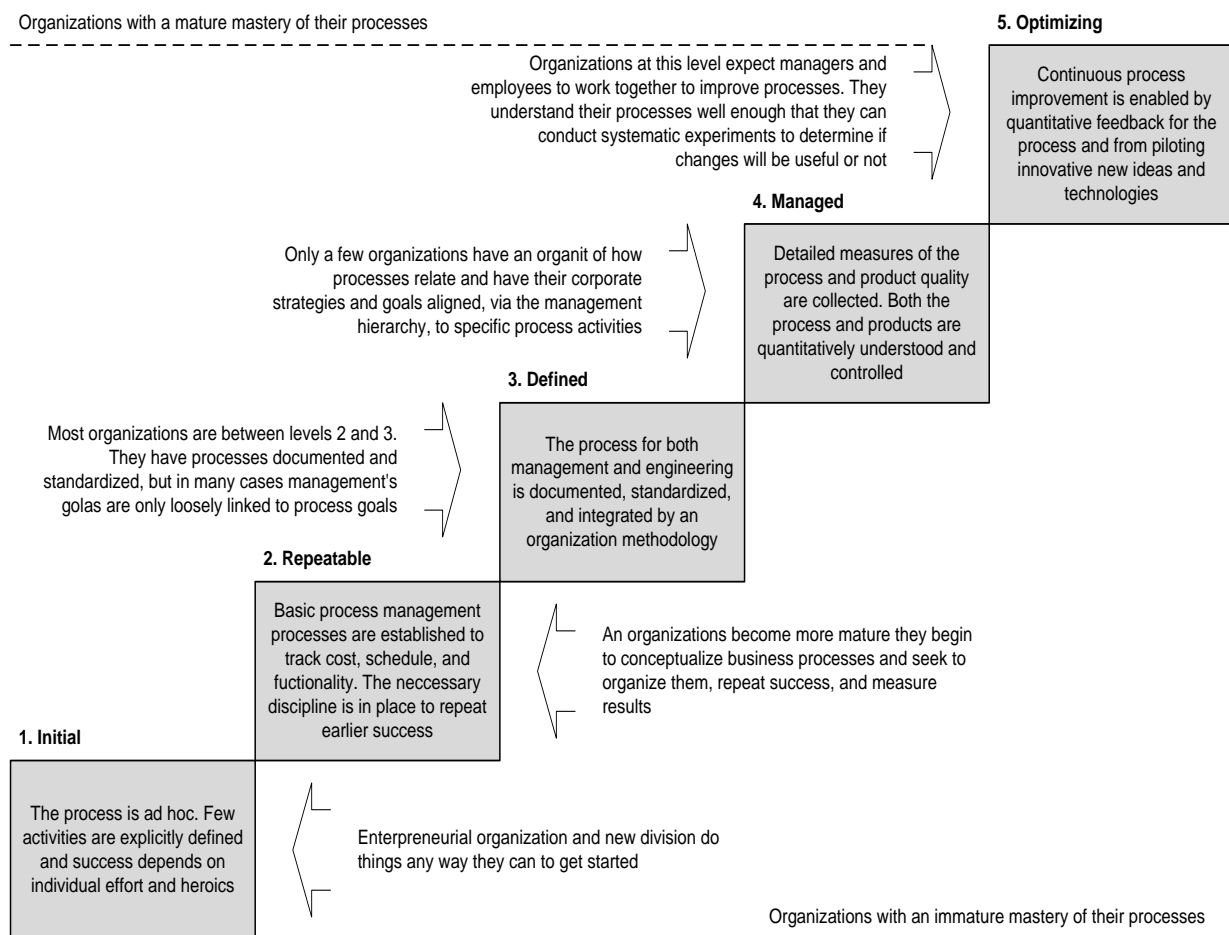


Figure 1: CMMI process maturity model

CMMI (Capability Maturity Model) is a model which follows the company's evolution from immature to very mature understanding of their own processes through five stages or levels (Paulk, 1995). It is originally developed for use in business systems dealing with software development, but it is equally applicable to any company (it is often applied in large companies, but it can be used in small and medium-sized organizations with the same success). The key point of the model is to understand where the organization is today and where it wants to get (the model provides basic guidelines on the road to maturity). A key assumption of the model is that immature companies cannot provide the consistency of their performance,

while mature companies make quality products at effective and consistent manner. Graphic display of the CMMI model is given in Figure 1. Continuous monitoring and improvement of business processes makes sense only if the business system achieved a certain level of maturity of its processes. Although the CMMI model suggests that organizations that are just starting up are at the first level of maturity, the fact is that many business systems, even after many years of doing business of the market, do not move away from the first level of maturity.

3. RESEARCH METHODOLOGY

The purpose of this study is to determine to what extent companies in Serbia had adopted process management practices, what is their process maturity level according to CMMI model, and what the problems are and challenges that companies in Serbia encounter while trying to implement process change initiatives.

The survey instrument used in this research was developed after an extensive literature review of business process management and process maturity level and problems associated with the use of process improvement practices. The instrument consisted of questions requiring single and multiple choices. Some questions included an open form in case when offered answers couldn't reflect the views of the respondents. A group of academicians examined the instrument for validity and clarity. After review a few changes were suggested which were later incorporated into the survey instrument.

As said before, one of the main objectives of this research was to determine the process maturity level of companies in Serbia according to CMMI model. Since this is the first research of this kind in Serbia (as far as authors know), the authors decided to design some of the questions as if there were three levels of process maturity instead of five, where respondents were asked if their organization "Never" did something (representing Level 1), "Frequently" did something (representing Levels 2 to 4), or "Always" did something (representing Level 5 of the model). The authors introduced this relaxation since there was a fear that the answers offered to the respondents will be too complicated for companies that have never been previously faced with such research, and that it may deter them from participating in research. One question had five answers offered, where participants were asked to explicitly position their company at one of the levels of the CMMI model.

The research instrument was mailed to general managers, CEOs, process analysts at a random sample of 300 manufacturing and service organizations in the Serbia. The cover letter accompanying the survey contained a note suggesting that respondents' confidentiality will be preserved. In addition, the letter addressed the nature of the study, and provided brief descriptions of the process approach and process management initiatives. Respondents were asked to either complete the survey or pass it on to the officer in the company that would have oversight of or responsibility for implementing BPM and business process improvement initiatives mentioned in the survey. A total of 41 usable responses were returned, resulting in a response rate of 13,66 percent. All of these responses were included in the results presented in this paper. Questionnaire included 23 questions divided into two groups: general information about companies and BPM understanding, practices and issues.

After the questioners were filled by the participants, the statistical package SPSS was used which automatically calculates frequencies and conducts χ^2 test (with significance set to 0.05).

4. RESULTS

Among 41 respondents in the research, 7,3% were general managers, 7,3% were executive officers, 43,9% were business function/department managers, 19,5% were business analyst, while 22% of respondents stated that their position was something else. Majority of the companies included in the research were large companies (61%) with more than 250 employees. When it comes to business field that the company is operating in, 46,3% were service oriented, 31,7% were manufacturing companies, while 22% were operating both in service and manufacturing industry. Most companies were domestically owned (53,7%), about a quarter of them have foreign owners (26,8%), and with the rest (17,1%) the ownership was shared between domestic and foreign owners.

To better understand how our respondents use the term Business process management, we asked respondents to choose among four options, or to suggest an alternative to the four options we presented. (see Figure 2).

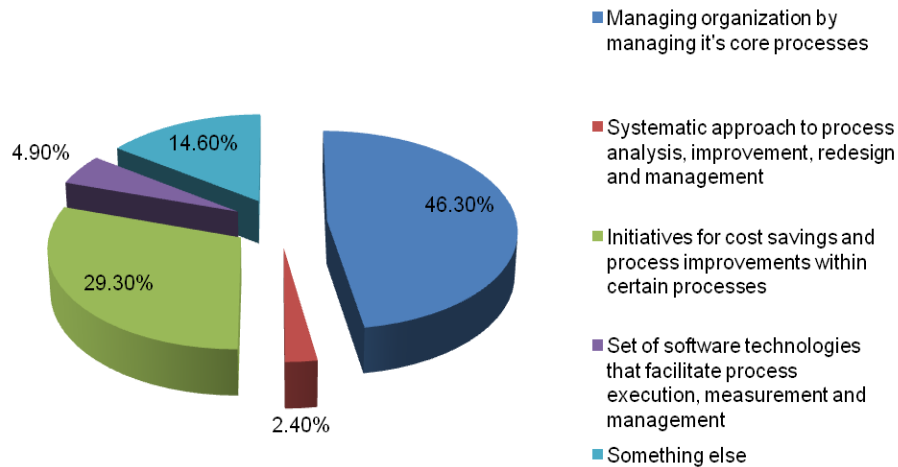


Figure 2: Companies' understanding of Business process management concepts

Figure shows that a significant percentage of respondents (46,30%) indicated that their organizations understand BPM to refer to a top-down methodology designed to organize, manage, and measure the organization, based on the organization's core processes. The view of BPM as a cost-saving initiative holds second place at 29,30%. It is also important to note that all of the participating companies have showed some form of interest in BPM, where most of the companies (41,50%) identified their interest as significant commitment to multiple process improvement project on the highest level.

The participants were asked to explicitly position the company they're working in at one of the levels offered by CCMI maturity model. The results are shown in Figure 3.

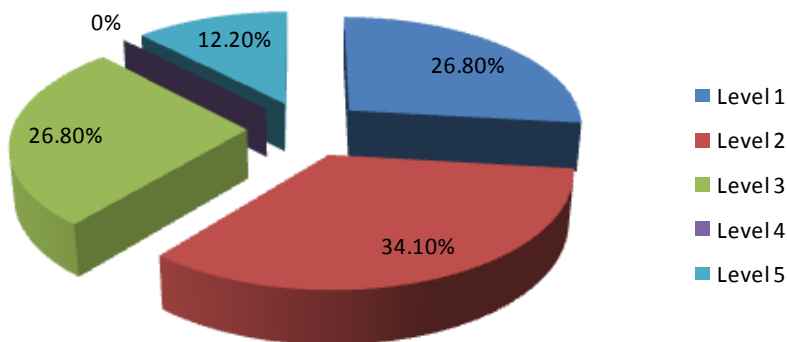


Figure 3: Levels of CMMI process maturity of companies in Serbia

It is interesting to note that most companies' processes are at Levels 1 to 3 of process maturity, where most of the respondents have placed their processes at Level 2 (34,1%). None of the respondents placed its company's processes on Level 4, and only 12,2% of the companies have their processes at the highest level of process maturity. Other answers to the questions concerning process maturity are in accordance to these results. The percentage of the respondents that said that processes in their company are frequently documented is 63,4%, while in 24,4% of cases processes are always documented. Processes are never monitored and measured in 14,6% of cases, frequently in 46,4%, and always in 39%. As much as 70,7% of respondents answered that the support provided by automated software applications is in accordance with company's processes. Only 2,4% of the respondents stated that process improvement initiatives are always being able to identify and remove problems and inconsistencies, while 82,9% stated that problems are frequently solved by process improvement initiatives. Most of the companies have spent up to 500000€ on process analysis, improvement and management in previous year (48,8% have spent 0-50000€, 41,5% have spent 50000-500000€), while only 9,8% of the companies have spent more than 500000€ in previous year. Most of the companies don't have formal group for process management (39%), or have formal process management group located within their executive management (24,4%).

Main drivers behind business process change initiatives identified among companies operating in Serbia are given in table 1.

Table 1: Main drivers behind business process change initiatives

Main drivers behind business process change initiatives	No. of companies
Business process architecture development	24
Onetime events (reorganization/mergers/acquisitions)	4
QMS certification	0
Risk management	6
Need for customer satisfaction improvement	24
Need for managing IT resources (ERP/CRM)	10
Business partner's requirements	8

When it comes to process initiatives that companies have undertaken so far, the results are given in table 2 (multiple answers were allowed)

Table 2: Process initiatives that companies have undertaken so far

Business process initiatives undertaken so far	No. of companies
Business process architecture development	17
Business process measurement system development	24
Process change coordination within company	16
Process management coordination within company	23
Process managers training for process analysis/redesign	11
Core processes redesign	7
Six Sigma improvement projects	2
Lean improvement projects	5
Continuous process improvement projects/KAIZEN	8
Process automation projects	14

When it comes to challenges and resistances encountered while trying to broaden business process initiatives, the results are given in table 3 (multiple answers were allowed)

Table 3: Challenges and resistances encountered while trying to broaden business process initiatives

Challenges encountered	No. of companies
Lack of interest within top management	8
Management requires ROI that is not achievable	2
Multiple process change projects require same resources	11
Previous process improvement projects were unsuccessful	0
Management doesn't want to invest in process change projects at this time	11
Something else	17

Chi-square test was used in order to test whether interdependence between the basic parameters of the company (business field, size, ownership structure, ...) and process management practice in companies in Serbia exists. It is interesting to note that ($X^2=6.889$, $df=2$, $p=0.032$) manufacturing companies are mostly focused on incremental process improvement initiatives. Companies that have spent less than 500000€ on process change initiatives in previous year are usually engaging external consultants for training their managers in process design and analyses. As far as the existence of formal process management goes, it can be concluded that companies that do not have formal group for process management often encounter problems with managing multiple process change project ($X^2=6.555$, $df=1$, $p=0.01$), which is the main reason why process change initiatives in these companies fail. The chi-square test did not reveal any significant differences between the size and ownership structure on one side, and process management practices conducted in companies in Serbia.

5. DISCUSSION

It is interesting to note that the majority of respondents are functional/department managers. This can be attributed to the fact that business process management related issues are relatively new to companies operating in Serbia, and business process awareness is not at the desirable level. That is why majority of companies assign functional/department managers to deal with process management issues. The understanding of term “Business process management” is similar to the one that leading world companies have (Harmon, 2007), as majority of them considers business process management to be a top-down methodology designed to organize, manage, and measure the organization, based on the organization’s core processes. Having in mind business conditions in Serbia as a transitioning country and world economy, it is understandable that all of the participating companies have showed some form of interest in business process management initiatives, since most companies are pressured to improve their competitive performance and customer satisfaction, and cut costs wherever possible. The analysis of process improvement initiative’s main drivers backs up this conclusion, since the need for improving existing/creating new products in order to maintain competitive advantage and the need to improve customer satisfaction are identified as main two drivers for process improvement.

Processes of over 60% of the companies operating in Serbia are at Levels 1 or 2 of CMMI process maturity model. Besides that, none of the participating companies have their processes at Level 4 of the model, and only 12,2% of the companies have their processes at Level 5 of the model. These results are not in accordance with the results of leading world companies (most of the world’s companies are at Level 3 of the model) (Harmon, 2007). This can also be attributed to the fact that business process management concepts are relatively new to Serbian companies.

Chi-square test has shown that manufacturing companies are mostly focused on incremental process improvement initiatives. This is not unusual since most of methodologies for continuous improvement (Kaizen, Lean, Six Sigma, etc.) were developed in manufacturing environments.

It can be concluded that companies that do not have formal group for process management often encounter problems with managing multiple process change project, which is the main reason why process change initiatives in these companies fail. This can be attributed to the fact that the absence of formal group for process management can lead to the lack of coordination between multiple process change projects, because responsibility is not clearly defined.

6. CONCLUSION

Business conditions in Serbia (the transition, low employment and productivity) dictate the need for companies to constantly improve ways of doing business. One approach that offers significant opportunities for business improvement is Business Process Management. Considering the results obtained from research, it can be concluded that BPM is a relatively new concept for enterprises in Serbia. Although it is a new concept, it can be seen that there is interest by companies to improve business processes, and that there is plenty of room to improve the understanding and application of business process management concepts, as the business process maturity of companies operating in Serbia is lower the process maturity of leading global companies. It is encouraging that Serbian companies understand the need to promote concurrent market position, as seen from analysis of main drivers for improving business processes. Functional organization is still the dominant form of organization of business systems in Serbia and it is necessary to make additional efforts in order to successfully make their transformation into process oriented company. The first step in this path could be the formation of formal group to manage processes, whose main task would be to coordinate the various business process improvement projects. It would also be good to strengthen business – academia connections, as the research shows that companies don’t have a clear picture of Business Process Management.

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MANAGING RISKS IN SUPPLY CHAINS OF PRODUCTION SYSTEMS

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Abstract: Supply Chain Risk Management (SCRM) has a dominant place in active and successful management of business processes. Trends such as globalization, lean processes and the geographical concentration of production have made supply chain networks more efficient, but have also changed their risk profile. Supply chain management is exposed to various risks like earthquakes, economic crises, SARS, strikes, terrorist attacks etc., which can repeatedly disrupt the supply chain operations. Integration of risk management is crucial for the success of the process and it should be incorporated in the functioning of the organization. The goal of this paper is to present risks which are present within a supply chain, as well as different approaches in SCRM, steps to be taken and application in practice.

Keywords: supply chain, risk management, turbulence, disruption, risk

1. INTRODUCTION

Because of the competition in global markets, manufacturing companies are under increasing pressure to define supply chain management as key priority in order to reduce costs and risks. In the eighties of last century a more intensive approach in studying supply chain management had begun. Many companies now organize their supply chains in compliance with previously established settings in which they are trying to work closely with their suppliers and customers. The definition of SCM given by The Global Supply Chain Forum (2012) is the following: "Supply chain management is the integration of key business processes from end-user through original suppliers that provides products, services, and information that add value for customers and other stakeholders".

In supply chain functioning companies are exposed to risks individually as well as the whole supply process with its participants. Over the last ten years, earthquakes, economic crises, SARS, strikes, terrorist attacks have disrupted supply chain operations repeatedly. Supply chain disruptions can have significant impact on a firm's short-term performance. For example, Ericsson lost 400 million Euros after their supplier's semiconductor plant caught on fire in 2000, and Apple lost many customer orders during a supply shortage of DRAM chips after an earthquake hit Taiwan in 1999 (Tang, 2006). From fluctuations in fuel costs to the uncertain politics and economies of countries from which raw materials and component products are sourced, disruptions and delays of supply chain flows threaten the profitability of every firm competing in today's global business environment (Ueltschy et al., 2009).

Disruptions in the supply chain can have long term negative effects on performance of companies as special on its financial aspects. Many researchers have developed different models and strategies for SCRM in order to overcome the disruptions within the supply chain and their consequences. Risk Management is a management style based on assessing the potential likelihood and impact that could be caused to a business if key (strategic) risks are not controlled and mitigated.

The main objective of this paper is to present fields of supply chain risk management processes with emphasis on reasons of their importance of the company and all included companies of supply chain. The aim is to depict the types and effects of risks that affect the functioning of the supply chain, as well as their increased influence in the last decade that have led the company to deal with them, evaluate them and bring added value to shareholders.

2. SUPPLY CHAIN RISK

Risk management is a rapidly developing discipline and there are many and varied views and descriptions of what risk management involves, how it should be conducted and what it is for. Risk management is a central part of any organisation's strategic management. It is the process whereby organisations methodically address the risks attaching to their activities with the goal of achieving sustained benefit within each activity and across the portfolio of all activities (THEIRM, 2002).

Strengthening the supply chain in new market conditions on national as well as global level caused changes in the risk portfolio of the majority of companies. Next to "traditional" risks which every company is facing, new risks often emerge as a result of close cooperation between companies. Understanding supply risk requires much more than evaluating suppliers' financial conditions. Risk factors come in many shapes - operational, managerial, geographic and more (Lawton, 2009).

The majority of firms in this study do not currently have formal definitions for supply risk. However, each of the respondents from those firms had strong conceptions of what supply risk means to their organizations and they provided definitions of supply risk by their sources and outcomes. The sources of supply risk were described in terms of individual supplier failures and supplier market characteristics. Respondents conceptualized the outcomes of supply risk by the inability to meet customer requirements and threats to customer life and safety (Zsidisin, 2003).

Supply chain risk is exacerbated by the never-ending push to improve operating efficiency and reduce costs. Although trends such as lean manufacturing, just-in-time inventory, outsourcing and supplier consolidation have yielded compelling business benefits, they have also introduced new kinds of supply chain risk and reduced the margin for error without providing appropriate counter-balancing to help mitigate risk (Marchese et al., 2012).

The sources of supply risk tend to arise from individual supplier failures and from market factors. The individual supplier failures that define the scope of supply risk were the inability to handle demand fluctuations, quality problems at supplier plants, and the inability to stay in pace with technological changes. In addition, supply risk was understood in terms of supplier market characteristics. Market characteristics include sole sources (such as suppliers having a patent) and market capacity constraints (Zsidisin, 2003).

Before companies can devise effective means of reducing supply-chain risks, managers must first understand the universe of risk categories as well as the events and conditions that drive them (see Table 1). Then, armed with clear, specific knowledge about these crucial risks, companies can proceed to select and tailor mitigation strategies, which are likely to be most effective.

Table 1: Supply chain risk and their Drivers

Category of risk	Drivers of risk
Disruptions	<ul style="list-style-type: none"> • <i>Natural disaster</i> • <i>Labor dispute</i> • <i>Supplier bankruptcy</i> • <i>War and terrorism</i> • <i>Dependency on a single source of supply as well as the capacity and responsiveness of alternative suppliers</i>
Delays	<ul style="list-style-type: none"> • <i>High capacity utilization at supply source</i> • <i>Inflexibility of supply source</i> • <i>Poor quality or yield at supply source</i> • <i>Excessive handling due to border crossings or to change in transportation modes</i>
Systems	<ul style="list-style-type: none"> • <i>Information infrastructure breakdown</i> • <i>System integration or extensive systems networking</i> • <i>E-commerce</i>

Forecast	<ul style="list-style-type: none"> • <i>Inaccurate forecasts due to long lead times, seasonality, product variety, short life cycles, small customer base</i> • <i>"Bullwhip effect" or information distortion due to sales promotions, incentives, lack of supply-chain visibility and exaggeration of demand in times of product shortage</i>
Intellectual Property	<ul style="list-style-type: none"> • <i>Vertical integration of supply chain</i> • <i>Global outsourcing and markets</i>
Procurement	<ul style="list-style-type: none"> • <i>Exchange rate risk</i> • <i>Percentage of a key component or raw material procured from a single source</i> • <i>Industry wide capacity utilization</i> • <i>Long-term versus short-term contracts</i>
Receivables	<ul style="list-style-type: none"> • <i>Number of customers</i> • <i>Financial strength of customers</i>
Inventory	<ul style="list-style-type: none"> • <i>Rate of product obsolescence</i> • <i>Inventory holding cost</i> • <i>Product value</i> • <i>Demand and supply uncertainty</i>
Capacity	<ul style="list-style-type: none"> • <i>Cost of capacity</i> • <i>Capacity flexibility</i>

Source: Chopra, S. & Sodhi, M. S., (2004)

The combinations of various drivers presented in Table 1 may lead to jeopardizing the functioning of supply chain. Moreover, it may also lead to increasing the risk portfolio of every company in the supply chain. If certain internal risks of one company are not noticed or do not hold importance for it, the possibility of influencing other partners in the chain is open leading to increase the risk portfolio of every company in the chain. However, companies are often not aware of risk of other companies' risks within the chain since they are out of their reach and in many cases not visible.

According to the World Economic Forum (2012) research it is determined that risks which have proven to be more significant for the supply chain are natural disasters (59%), conflict and political unrests (46%) and sudden demand shocks (44%) which are hard and almost impossible to control. After the Deloitte Consulting LLP research a conclusion was drawn that despite the tsunami's widespread impact on global supply chains, most companies are not fundamentally changing how they manage supply chain risks. Meanwhile, supply chain risks appear to be rising, driven by a variety of internal and external forces – especially globalization, which is increasing supply chain complexity and amplifying the impact of disruptions (Marchese et al., 2012).

3. SUPPLY CHAIN RISK MANAGEMENT

According to Wildemann (2006) the majority of the investigated companies expected an increased importance of risk management in the future for all areas considered. In this context Supply Chain Risk Management (SCRM) is defined as a concept of Supply Chain Management, which contains all strategies and measures, all knowledge, all institutions, all processes and all technologies, which can be used on the technical, personal and organisational level to reduce supply chain risk (Kersten et al., 2006). SCRM is very important given the new economic and industrial environment in which firms currently work (Lavastre et al., 2011). SCRM is the management discipline which combines risk management with SCM. According to Paulson (2004) supply chain risk management (SCRM) is the intersection of supply chain management and risk management (RM) and has the intention to help organizations handle the uncertainties and risks in the supply chain as it can be seen on Figure 1.

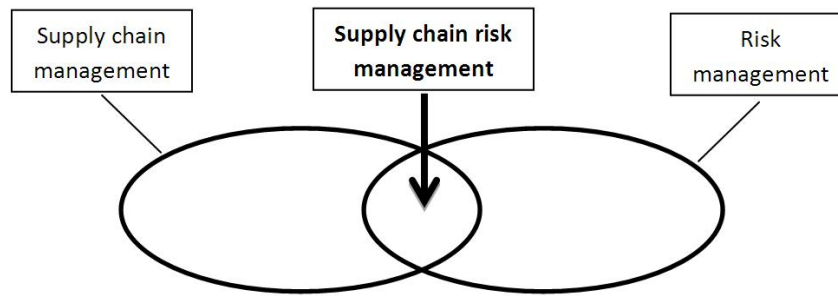


Figure 1: The intersection of supply chain management and risk management

The main connection between SCRM and RM is the overall objective with the task to help organizations understand and assess risks and take certain measures in order to decrease errors and keep business successful. The difference is that SCRM focuses on risks within the supply chain, i.e. successes and failures of the whole chain while RM is dealing with individual risks of a company. It is of utmost importance that the whole organisation is familiar with the significance of SCRM. Senior management should approve SCRM and it is necessary that organisational structures are prepared for risk management.

According to Aberdeen group (2006) survey 82% of companies are concerned about supply chain resiliency, just 11% are actively managing this risk. This action gap is one of the greatest weaknesses of current corporate global supply chain strategies. It threatens the continuity of a company's business and sets the stage for gross margin erosion due to under-managed supply chain uncertainty and risk. An emerging set of technologies and solution providers are helping companies better assess risk and create contingency plans.

Supply chain risk management has follows the same principals as risk management on the company level. The steps to be taken are presented in Figure 2.

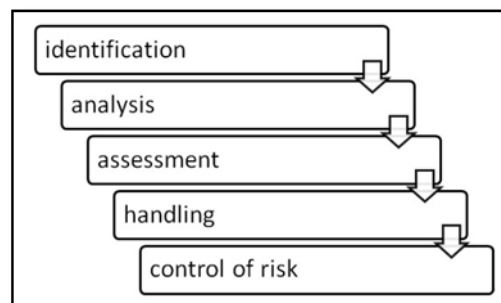


Figure 2: Risk management steps

Every process in the company needs a separate approach regarding risk management. In addition, before the next step in risk management is taken the company needs to harmonize its activities on every level because many risks can be transferred through the supply chain and it is not possible to include every risk if we are focused on one level of the chain. The previously mentioned steps are simple and logical and they support clear decision making in order to keep risk at an acceptable level. In practice, following these basic steps can cause many difficulties in risk management. Some risks are caused due to lack of understanding the business environment and the actors in organisations who may be unpredictable, complicated or not visible enough. Most risk management systems are designated to fail because the process is implemented according to these steps without taking into account the reality. Once risks have been identified, the necessary next step is to analyse each risk individually and to determine its potential consequences (Blome & Schoenherr, 2011).

A successful supply chain risk management program requires characteristics of a newly structured approach:

- A comprehensive supply chain risk profile,
- Established risk tolerances by type of risk, supplier, commodity, etc.,
- A clear understanding of the true cost (direct plus indirect) of supply chain risk events,
- Leading key risk indicators (KRIs) along with risk scoring models that give “early warning” to potential trouble,
- Pre-defined management responses corresponding to increased levels of supplier risk,
- Risk-based pricing and performance analysis to support improved risk response development,
- Alignment of individual incentives to risk-based decisions,
- A focus on early intervention rather than crisis management (www.pwc.com, 2009)

The McKinsey Quarterly (2006) found that the actions company currently use to minimize the potential effect or detrimental events of supply chain risks include performance contracts with suppliers or service providers (54%); alerting customers well ahead of time to potential concerns (38%); redundant suppliers/product design (37%); transferring price increases to customers (35%); vertical integration (29%); currency hedges, e.g., foreign exchange (25%); insurance (20%); commodity hedges, e.g., options, collars, forward buys (15%); and other (9%). In addition, according to the Aberdeen Group (2006) survey similar results were obtained. Increase in the flexibility of the supply chain, introduction of alternative supply chains and better analyses of suppliers’ activities have proven to be most important.

To improve supply chain risk management, companies are focusing on different strategies

- increasing logistics and supply agility by ensuring alternate suppliers, carriers, route,
- improving visibility and automation of supply chain activity (Aberdeen Group, 2006),
- increase responsiveness (Sunil Chopra and ManMohan S. Sodhi, 2004)

Assessment of supply chain risk may lead to destabilization of supply chain performances and may trigger domino effects such as ballooning inventory levels, longer customer lead times that threaten sales competitiveness, or even unjustified spending of resources which go over budget due to shorter transportation time and usage of more expensive secondary transporters. By decreasing the number of catastrophic events and daily risk of the supply chain, a company may achieve greater speed and reliable supply chain on a daily basis as well as creating more stable and effective business environment.

4. CONCLUSION

Today risk management is one of the most important activities within the supply chain which has become significant due to an increasingly complex and connected business environment. Risk management should be a continuous and developing process which runs throughout the organisation’s strategy and the implementation of that strategy (THEIRM, 2002).

Companies which were lucky not to be hit by different catastrophes which took place in the last ten years must not be silent observers but they should use experiences of others for planning answers and activities in the supply chains and be prepared for new catastrophes.

Since more companies have outsourced production on distant locations the number of subjects in the supply chain has increased so did the complexity of the system and risks. A few years back managers were mostly dealing with reducing costs, price deviations and inventory management. Today, supply continuity is the main business driver. Organisations now acknowledge that disruptions in the supply chain have great impact over performance of companies and they are necessary tools and measure to for overcoming negative effects. It is necessary to exchange experiences between different subjects of the supply chain which also have a high level of awareness of SCRM. In this paper some useful methods for SCRM were presented which in practice have to be adjusted to circumstances, i.e. the company itself, subjects in the supply chain and business environment.

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ORGANIZATIONAL LEVEL AND SERVICE PERFORMANCE ANALYSIS OF PUBLIC TRANSPORT IN BELGRADE

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Abstract: *The main purpose of the paper is to analyze the organizational level and quality of the services of public transport in Belgrade, shown through the identified quality indicators and their trends. For the third consecutive year, first-year students from the Faculty of Organizational Sciences in Belgrade are conducting scientific research, as practical implementation of the subject Production Systems. The main objective of the project is to train students for practical work in the field of engineering management business approach. The method used in this research for gathering data is the method of current observations. Our findings show that certain trends of quality indicators have been present over the past 3 years. Those that are good should be further improved, and those that are not good should be changed in order to improve the current situation in the public transport system. For that reason, a proposal of measures that could improve the quality of these services is given in the discussion part. The aim of this research was to see the actual state of public transport in Belgrade from an objective standpoint and suggest actions for its future improvement. This project shows how valuable students' research can be, and also how data gathered in this kind of research could prove to be beneficial for numerous organizations, and in this particular case, for the organizations that provide public transportation services in Belgrade.*

Key words: *Quality indicators, trend of indicators, proposals for improvement*

1. INTRODUCTION

Quality of the service involves a comparison of expectations and performance, and it is an indicator of how well a delivered service matches the customer expectations (Lewis and Booms, 1983.). Furthermore, since the Public Transportation company in Belgrade (in further text: PT) provides the service of public transportation, the organizational level is directly derived from the quality of its services. In this case, quality of the services was measured using the method of current observation. The method as well as the complete research is explained further in the next chapter.

The main task was to find and present possible trends of the identified indicators of the quality of services during three years of this research. Intersection and further analysis of noted trends are made based on that. Additionally, specific measures that could improve the quality of service, and by that the organizational level of PT, are proposed.

One of the main objectives of this project is to train the students for practical work in the field of engineering management business approach through identifying and data gathering, calculating and analyzing the indicators of PT's quality of service. For that reason, this paper also represents the synthesis of the work and study of all 1650 students who participated in the project. On the other hand, the cooperation between the Belgrade University and the domestic economy is at a very low level. Taking this into account as well as benefits which successful cooperation could bring to both sides, it is not difficult to conclude that this area has great potential. Therefore, another aim of this paper is to emphasize this potential of the communication and possible cooperation (in this case specifically, between FOS and PT).

The next chapter explains the research methodology and subsequently the findings of the research through appropriate charts. A discussion chapter is based on the findings and it represents the most

important part of this paper, since it gives an analytical overview of the gathered data. Finally, a short resume of this paper is given at the end as a conclusion.

2. RESEARCH METHODOLOGY

First-year students of the Faculty of Organizational Sciences in Belgrade are conducting a scientific research for the third consecutive year as a practical implementation of the subject Production Systems.

The method used in this research for data gathering is the method of current observations. A modified method of current observations in this paper will be based on the monitoring of specific indicators (Radojković, 2010). The method itself will be similar to the original method, since it will be based on observing time and noting certain characteristics which indicate the quality PT's services. Each characteristic will be included in the paper, i.e. on the monitoring list. The monitoring list is defined precisely and it measures and evaluates the following indicators of the quality of the services: labeling of the vehicle, punctuality of departure, the waiting time of vehicles, ride comfort, driver behavior towards passengers, hygiene of the vehicles and possible failures; these indicators are explained further in the following text.

Good labeling of the vehicle means that at least the number and the appropriate direction of the public transportation vehicle are posted on the front window as well as near every door. The punctuality of departure is measured by comparing the planned (given by the official driving schedule) and the actual time of the departure of a vehicle. This is measured only on the initial stations, where the driving schedule is explicit. The waiting time of the vehicles is the time measured with an accurate clock, from the moment when the observer arrives at a stop to the moment when he or she enters the vehicle. Ride comfort is evaluated at the moment of entering the vehicle and it has three levels: everyone has a seat, there is room for standing or the vehicle is crowded. Drivers' attitude towards passengers is evaluated through two parameters. One is the driver's will to wait for the passengers who are running for the bus (waits or does not wait), and the other is how driver is closing the door (carefully or not carefully). Hygiene of the vehicles is evaluated by looking for dust or other kind of dirt inside the vehicles or on its windows (clean or unclean). Possible failures are the vehicle's failures that occurred during the regular public transportation usage. The findings of these indicators are shown in the next chapter.

The subject of the research is measuring the organizational level and the services quality of the public transportation in Belgrade, and by that, the work of an organization – PT which brings together all the companies that provide services of public transportation in Belgrade. In the first phase, data for further analysis is collected and students form teams of three to six people, where every team member is required to use the services of PT. When using the public transportation, the student (researcher) is obliged to enter the correct and appropriate information in his/her monitor list for the public transportation line currently being used. This phase is the data gathering phase.

In the second phase, every team writes a research paper with an analytical overview based on the data collected in first phase. Later, all monitor lists are gathered and merged, and based on the complete data for the selected year a final research paper is written, which is the synthesis of every team's research papers.

The statistics of the data gathering phase is shown in the following table:

Table 1: Statistics of the data gathering phase

Year and period	Monitor lists entries	Number of covered lines	Number of students	Number of teams
2009; 09.03-22.03.	16707	158	473	113
2010; 22.03-11.04.	22537	139	636	159
2011; 14.03-03.04.	28584	142	551	146

3. FINDINGS

Diagrams showing the trend of indicators through the last three years of our research are listed below, followed by a brief analysis.

In the period between 2009 and 2011, **labeling** indicators varied between 12,42% of bad-marked vehicles, to almost 30% in 2010. Modern trolleybuses of PT improved percentage of well-marked vehicles during the year of 2011 only 8.85% vehicles from Dorcol garage were inappropriately marked.

Table 2: Labelling

	LABELLING	
	Good	Bad
2009.	87.58%	12.42%
2010.	70.90%	29.10%
2011.	77.86%	22.14%

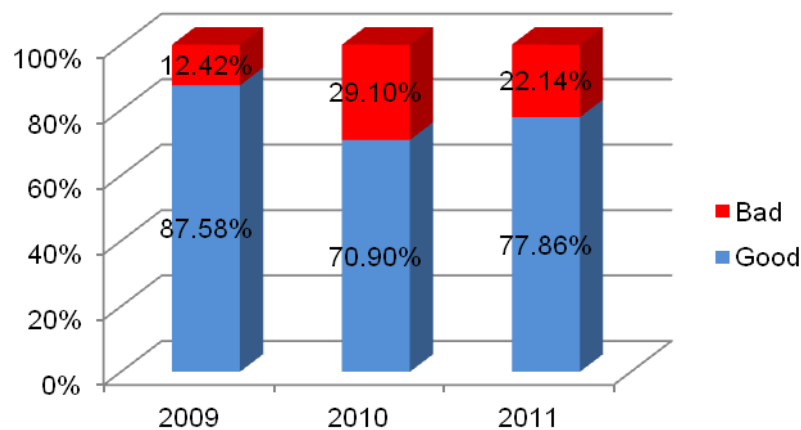


Figure 1: Labelling

The average **waiting time** during the three years of our research is around three minutes, which is acceptable and in line with some European capitals such as Budapest or Bratislava.

When talking about the **punctuality of departure**, it is noted the highest number of vehicles departing on time was measured in 2010, more precisely 78.59% of them. Data from the year 2011 indicate that the ratio between timely departures and those that were late is 2:1. This aspect needs to be changed, since records show that during the previous years there was almost 10% more departures which were on time.

Table 2: Punctuality of departure

	PUNCTUALITY OF DEPARTURE	
	Late	On time
2009.	23.98%	76.02%
2010.	21.41%	78.59%
2011.	30.19%	69.81%

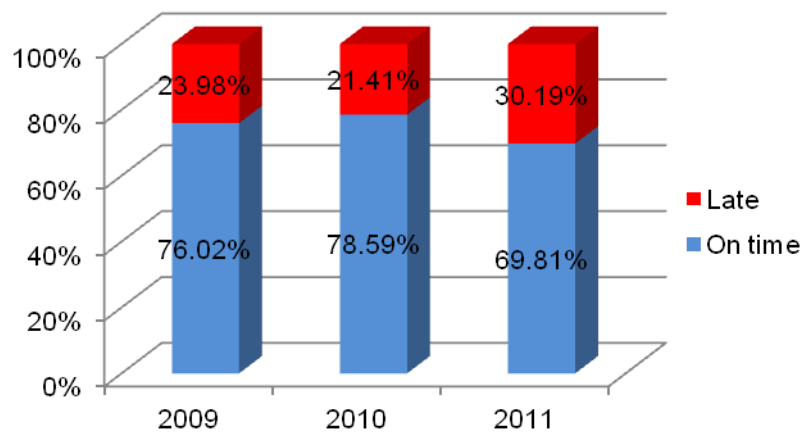


Figure 2: Punctuality of departure

Results obtained by measuring this indicator show that **hygiene of the vehicles** needs to be improved. An interesting fact is that in 2010 the trolleybuses had the highest percentage of unclean vehicles - 51.50%, while in 2011 they were the cleanest of all vehicles with only 17.59% of unclean vehicles. This progress shows that PT in Belgrade is constantly trying to raise the level of its services. Nota bene is that users of the public transport are partially responsible for this state and that adequate measures need to be taken in order to educate and influence them.

Table 3: Hygiene of the vehicles

	HYGIENE OF THE VEHICLES	
	Clean	Unclean
2009	61.60%	38.40%
2010	57.43%	42.57%
2011	60.89%	39.11%

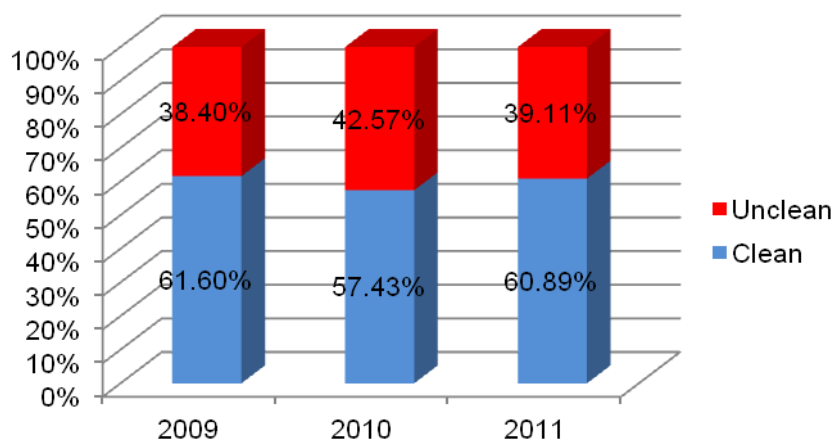
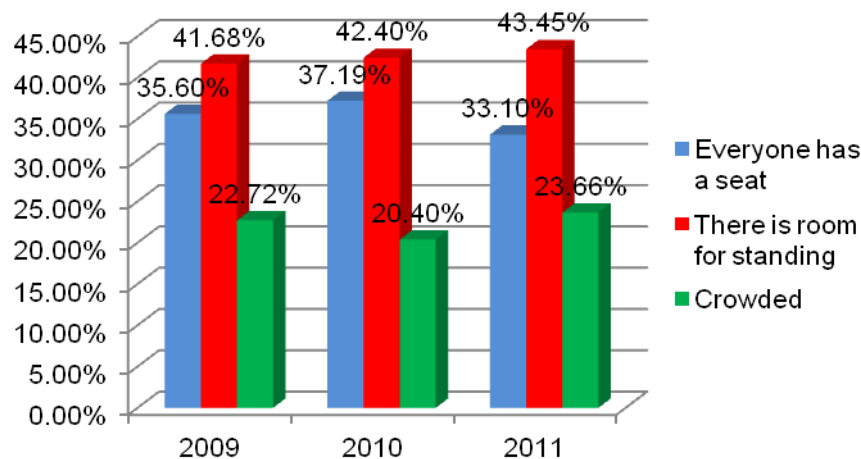


Figure 3: Hygiene of the vehicles

Throughout the research period, data regarding **the ride comfort** have not drastically changed. In 2011, the buses were the most crowded, 26.53%. During the same year, the best situation was in trolleybuses where everyone had a seat in 53.13% of the cases

Table 4: Ride comfort

	RIDE COMFORT		
	Everyone has a seat	There is room for standing	Crowded
2009	35.60%	41.68%	22.72%
2010	37.19%	42.40%	20.40%
2011	33.10%	43.45%	23.66%


Figure 4: Ride comfort

During our research, we came to the conclusion that the **drivers' attitude towards passengers** is quite good. Many of them are willing to wait for the passengers who have missed the bus. When talking about the percentage of drivers who carefully close the door, the situation is quite similar. It is important to note that the number of drivers who pay attention to passengers is constantly decreasing. This could particularly cause problems to disabled persons, the elderly and parents with children. For these reasons, some measures should be taken in order to stop this trend, since the safety of the passengers should come first.

Table 5: Drivers' attitude towards passengers

	DRIVERS' ATTITUDE TOWARDS PASSENGERS			
	Waiting for the passengers that are running		Carefully closes the door	
	Yes	No	Yes	No
2009	89.60%	10.40%	92.76%	7.24%
2010	85.99%	14.01%	92.68%	7.32%
2011	83.34%	16.66%	90.03%	9.97%

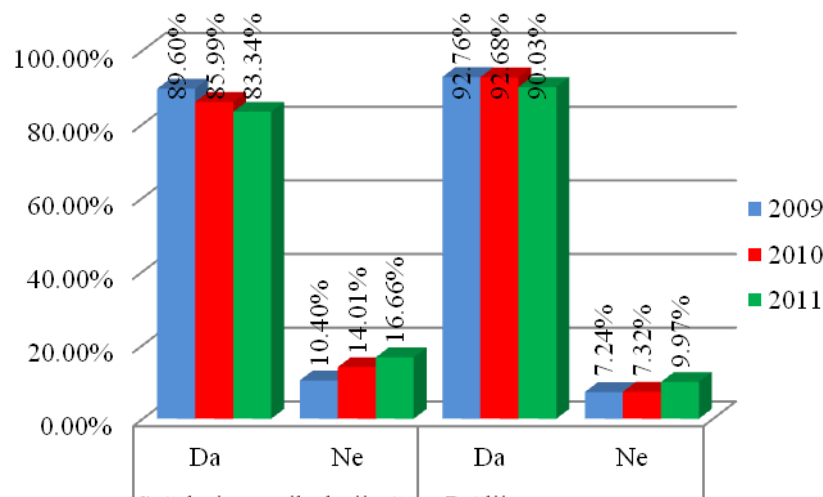


Figure 5: Drivers' attitude towards passengers

4. DISCUSSION

This list of the proposed measures represents a synthesis of a three-year research. Implementation of the BusPlus system resulted in some significant changes. Smart cards, digital boards with the exact time of departure etc. are some of the changes proposed by previous generations that participated in the research. This is just another indicator which proves that students of the Faculty of Organizational Sciences and the employees of the PT in Belgrade think in the same direction. This fact can form a basis for future cooperation between these two institutions.

The results stated in the previous section show that certain trends of indicators exist. Those that are good should be further improved, and those that are not should be changed in order to improve the current situation in public transport system.

Number of well-marked vehicles declined in the period between 2009 and 2010, but marked a growth afterwards, in 2011. This came as a result of introducing new vehicles into the public transport system, i.e. new trolleybuses. This trend can be continued with much smaller investments. Bearing in mind that labeling of the vehicles is very important, especially to foreigners using the transport system, it is necessary for it to be on the highest level. Despite the fact that some vehicles already have **digital boards**, some drivers do not update them on regular bases, so this must be appealed to. On the other hand, problem with older vehicles can be solved by printing directions and the line number on cardboard. This is a very cheap and simple solution and we think that it should be introduced since, according to the last measures, 22.14% of vehicles were inappropriately marked or completely unmarked.

Control of hygiene is one of the most important issues when talking about measures that need to be taken, since the health of thousands of citizens depends on it. Hygiene of the vehicles is an indicator with a trend of growth in the last three years and it need to be continued. Our proposal is to employ of persons who would be in charge of controlling the hygiene of the vehicles before they leave the garage. We are well aware that this may be expensive, but the same issue could be dealt with by expanding the work duties of the drivers.

As it is mentioned earlier, the number of courteous drivers is constantly decreasing. **Education of drivers** about possible problems which could occur due to their carelessness should partially solve this problem.

Information about the consequences of the activities of the PT could easily be obtained through necessary feedback from the clients/customers. **Introducing a special phone line for customer complaints** would make problems more transparent and solved faster.

Regarding our previous suggestion, we believe that **sanctions for badly behaved drivers** would be the next logical step, and that this would give a good example that bad and unmannered behaviour will not be tolerated. Progressive punishment should be considered and taking actions that range from pointing to

bad behaviour, warning the driver, to suspending them and even firing in extreme circumstances in order to maintain the image and the high quality of service in the Public Transport Company.

Another extremely important indicator showing a decline in the past 3 years is punctuality of departure from starting stations. Considering the fact that Belgrade is one of the larger business centres of the Eastern Europe, this is unacceptable because time and time management play an important role in lives of the majority of the people in Belgrade. The big problems are that the vehicles are stuck in traffic or delayed due to construction works on roads and they cannot be on time on their starting stations and are therefore unable to admit passengers at a specified time. Another problem is drivers who not consistent with the given driving plan, and those drivers should be treated as the drivers mentioned in the previous passage. A measure that needs to be taken in order to make this work is introducing a monitoring system, a system of tracking the location of vehicles via GPS and updating the **digital boards on initial stations** (something that is being introduced right now and we welcome the change).

It is no secret that the PT has issues with charging their customers – making people buy tickets. Everyday purchases of tickets from all of the customers of the Company would significantly reduce the need for subventions (if not completely eliminate it). We hope that the sales will increase with the introduction of the new BusPlus system and new ways of controlling the tickets (not wearing fluorescent vests is a step in the right direction). Before the results are visible, our suggestion is to provide a **ticket that would last a full day**, and cost approximately 3 Euro for the employed and 2 Euro for citizens with privileged status (university students, high school students, the unemployed etc.). This could also be a good way of encouraging tourists and people that are not staying in Belgrade a long time to buy tickets and contribute to the quality of services of the Company by increasing its budget.

Another important facet to note is that the passengers also influence the quality of service; therefore our proposition is to organize different **events and projects** in order to create a stronger bond between the PT and the people who use its services. Through such actions, we hope to encourage people to treat the PT and its vehicles with more respect and to raise the quality of this service significantly if they try.

4. CONCLUSION

The project which lies in the core of this research (assessing the organizational level and the quality of services of the PT in Belgrade) is designed as an opportunity for the youngest students of the Faculty of organizational sciences to apply theory in practice during the semester of attending the classes in Production Systems. Three years since its start – it has become a very serious project.

By participating in the project, the PT would have the benefit of influencing the way research is conducted and give suggestions for new parameters that could be marked in the future. Students-researches would gather the required data that could help the company complete its own reports and in return they would get precious experience of working in a team, gain practical skills in the field of engineering management of business systems, and they could feel that their work is making an impact which is very important for their motivation in future ventures. If this cooperation does occur, every citizen of Belgrade would greatly benefit from it through the upgraded quality of services of the public transport.

The aim of this research was not to point to the flaws of the PT or to criticize their work, but to see the actual state of the public transport in Belgrade from an objective standpoint and suggest actions for improvement in the future.

The data put forward is a clear indicator that the PT has worked over the past three years on maintaining the quality of its services. Considering the planned changes that are currently underway (e.g. introducing the new line of trams or the new ticket system) and the innovations that have been announced, we expect improvement in the markers for the following years and continual growth and impact of the company.

Another important note is that through events and certain actions, the Company could cooperate with the citizens of Belgrade on increasing the awareness of importance and the impact of their actions when using the services of this company. This company is important for many people living in Belgrade (and the vicinity) therefore better behaviour and a more understanding from the everyday traveler would significantly help the company, that will most certainly know how to repay it.

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PUBLIC TRANSPORT KEY PERFORMANCE ANALYSIS IN RUSH HOURS

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Abstract: *The paper is aimed at presenting and analysing ride comfort of public transportation in Belgrade with a focus on ride comfort during the morning and the afternoon rush hours. First-year students of the Faculty of Organizational Sciences have been gathering data for three years, from 2009 to 2011, and the paper is designed to show trends of the ride comfort indicator during these three years, to propose measures that can be taken to improve it, and to show the potential that this kind of research has. The method of current observations was used for gathering data in the first phase of our research, which were later analysed through the remaining 2 phases. The data and the conclusions made could be of use to the Public Transport of Belgrade, with one of the key conclusions being that the afternoon rush hour is a period of day when ride comfort is at its lowest and the majority of efforts should be focused on improving it.*

Key words: *ride comfort, afternoon rush hour, morning rush hour, proposals for improvement, trend*

1. INTRODUCTION

Students of the first year of Faculty of Organizational Sciences in Belgrade, for the third consecutive year, are performing a scientific research, as a practical application of the subject "Production Systems". The subject of the research is measuring the level of organization and quality of the services of public transportation in Belgrade, and by that, a work of an organization called Public Transport "Belgrade" that brings together all the companies that provide services of public transportation in Belgrade.

Quality of the service involves a comparison of expectations with performance and it is a measure of how well a delivered service matches the customers' expectations. Furthermore, since the PT "Belgrade" provides the service of public transportation, the level of organization, is directly derived from the quality of its services. In this case, quality of the services was measured using the method of current observation and more about that method and the complete research as well, is explained in the next chapter.

In this paper, focus is on the one aspect of the quality of the services - ride comfort. This identified indicator is probably the most important, from the customers' aspect, in these case passengers of PT. In addition to other indicators that are measured and analyzed, the largest number of users at the peak, ride comfort has been selected as the key performance of public transport services.

One of the main objectives of this project is the training of the students for practical work in the field of engineering management business approach, through the identification and data gathering, calculation and analysis of the service quality's indicators of PT. On the other hand, the cooperation between the Belgrade University and the domestic economy is at a very low level. Taking into account that, as well as benefits, that successful cooperation could bring to both sides, it is not difficult to conclude that great potential lies in this area. For this reason, another goal of this paper is to point out that potential of the communication and eventual cooperation (in this case specifically, between FOS and PT).

The next chapter research methodology will be explained and after that, findings of the research will be presented, through appropriate charts. Based on the findings, a discussion chapter is made and it represents the most important part of this paper, because it gives the analytical review of the gathered data. As a conclusion, short resume of this paper is given in the end.

2. RESEARCH METHODOLOGY

The actual research is conducted since 2009 and it should be noted that participation in the research is not required, but due to certain awards and benefits that it brings, many students decide to take that step. In the first phase, data for further analysis is collected and in it, students form teams from three to six people, where every team member is required to use the services of PT. When using the public transportation, student (researcher) is obliged to enter the correct and appropriate information in his monitor list, for the public transportation line currently being used. Method used in this case is the method of current observations. This phase is called data gathering phase.

Modified method of current observations in this paper will be based on the monitoring of specific indicators (Radojković, 2010). Method by itself will be similar to the basic method, because it will be based on time observing and notifying certain appearances and characteristics that represents the quality of the services of PT. Each appearance will be put on the paper, i.e. on the recording list. Recording list is defined precisely and it measures and evaluates the following indicators of the quality of the services: representation of the vehicle, the accuracy of vehicle starting with the initial station, the waiting time of vehicles, ride comfort, driver behavior towards passengers, cleanliness of vehicles and possible failures.

Focusing on ride comfort during the morning rush hour from 07h to 09h and afternoon rush hour from 13h to 17h; findings, along with the detailed analysis, followed by appropriate charts, are given. The quality of the ride comfort, is measured as concentration of passengers in the public transportation's vehicles and it is embodied in three levels:

1. Everyone can sit- the highest level of the ride comfort
2. There is a room for standing - intermediate level of the ride comfort
3. It is crowded- the lowest level of the ride comfort

It should be pointed out that ride comfort is evaluated by the students (researchers) in the moment of entering the vehicle.

However it should be noted that data for this indicator is very sensitive in the case of major traffic jams and should be taken with a grain of salt. This is because in the monitoring period, especially in 2009 and 2010, there were major construction works on roads and unexpected situations (such as strikes, visits of foreign officials...) that would create traffic collapses, which distort the real picture of the ride comfort indicator.

Statistics of the appropriate data gathered for the need of this paper is given in the next table:

Year and period	Number of monitor list's entries			Lines covered	Number of teams
	Morning rush hour	Afternoon rush hour	Total		
2009; 09.03 - 22.03.	1786	5289	7075	114	113
2010; 22.03 - 11.04.	2606	9138	11744	139	159
2011; 14.03 - 03.04.	2343	10195	12538	135	146

3. FINDINGS

We wanted to analyze each segment (Everyone can sit, there is room for standing and its crowded) of our marker - Ride comfort, and compare how they changed through the three years of research that we conducted. The next three graphs that are created with a purpose to compare the values of morning rush hour with the afternoon rush hour, and to compare them individually to the average values we have calculated from the entire research – overall comfort.

The Figure 1 below is showing data for the "Everyone can sit" marker from all three years of research, comparing the morning rush hour, afternoon rush hour and overall comfort side by side. This marker is referring to a case of ride comfort when the vehicle is the least crowded and every person can sit.

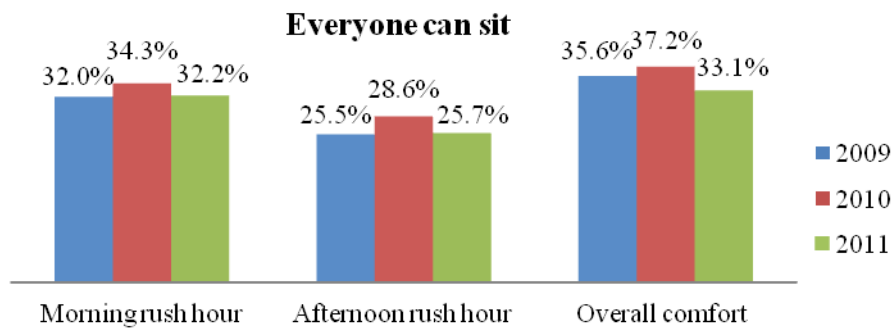


Figure 1

The Figure 2 on the next page is showing data for the “There is room for standing” marker from all three years of research, comparing the morning rush hour, afternoon rush hour and overall comfort side by side. This marker is referring to a case of ride comfort when the vehicle is moderately crowded, not everyone can sit, but people don’t feel uncomfortable standing.

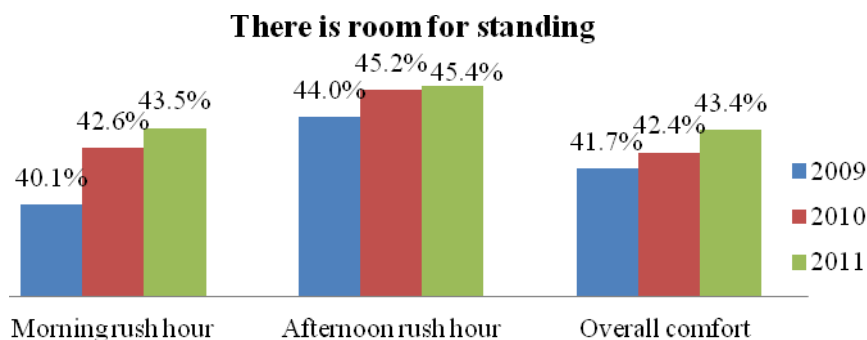


Figure 2

The Figure 3 below is showing data for the marker – “It’s crowded” from all three years of research, comparing the morning rush hour, afternoon rush hour and overall comfort side by side. This marker is referring to a case of ride comfort when the vehicle is the most crowded, people aren’t comfortable during the ride because of the number of people that are around them, and it is also difficult to get in and out of the vehicle.

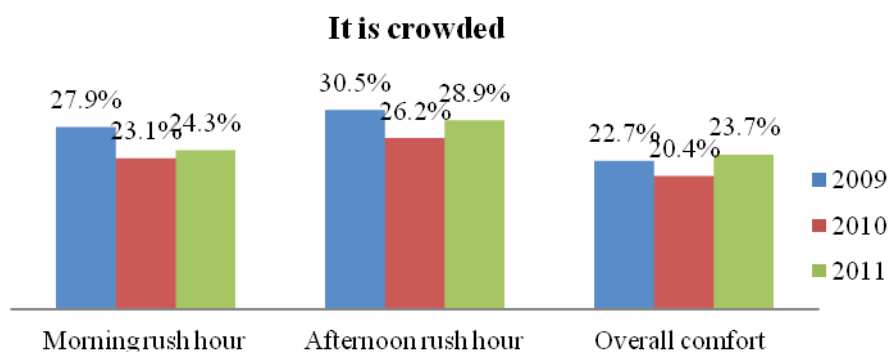


Figure 3

The Figure 4 below is showing data for the morning rush hour ride comfort with all three years included side by side listing the average percentage for each of the markers – everyone can sit; there is room for standing; it’s crowded.

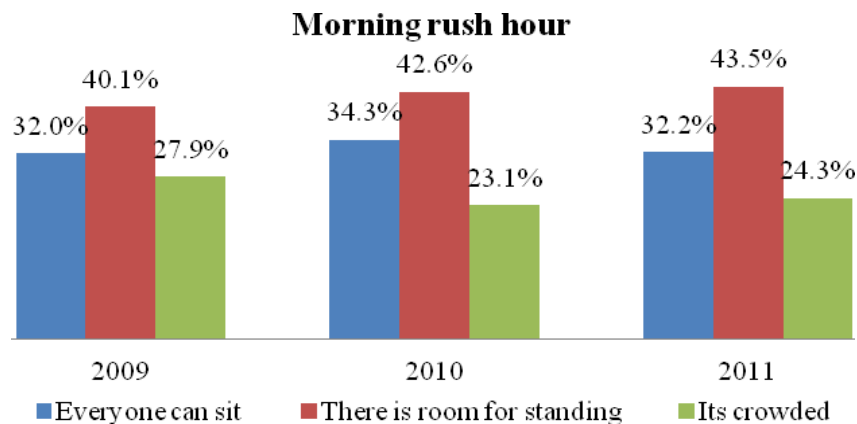


Figure 4

The Figure 5 below is showing data for the afternoon rush hour ride comfort with all three years included side by side listing the average percentage for each of the markers – everyone can sit; there is room for standing; it's crowded.

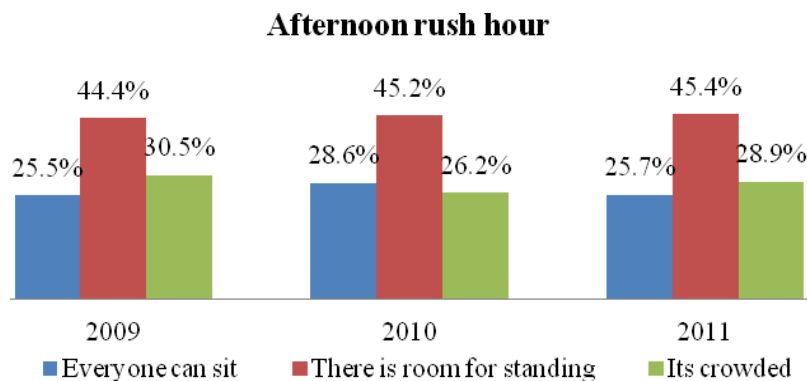


Figure 5

4. DISCUSSION

This section shows the research results and their analysis. Also, it contains a section with proposed set of measures for solving problems of crowded vehicles and comfort in rush hour, as well as examples of European cities where these measures are successfully implemented.

Looking at the Figure 1 for the first segment some trends was noticed:

- Average difference in percentages- 6,43% in favor of the morning rush hour over afternoon rush hour comfort, when looking at this marker which is representing the desired way to travel in PT
- Year when the Everyone can sit marker was at its peak is 2010, and the service was the best considering ride comfort.
- Average difference between the values of comfort in the morning rush hour and overall comfort is 2.45% - the values of morning rush hour are affecting the average comfort in a negative way but, the difference is showing a decreasing / positive trend over the years (3.6% was the difference in 2009, 2.9% in 2010 and most recently in 2011 the difference was only 0.9%).
- Average difference between the values of comfort in the afternoon rush hour and overall comfort is 9.03% – the values of afternoon rush hour are affecting the average comfort in an extremely negative way but, the difference is showing a decreasing / positive trend over the years (10.1% was the difference in 2009, 9.1% in 2010 and most recently in 2011 the difference was 7.4%).

Looking at the segment of Everyone can sit, the morning rush hour values do impact the overall values of comfort, but not in as much as the values during the afternoon rush hour (this is not just about

percentages which ratio is almost 1 to 4, but also about the number of observations – there are a lot more observations in the afternoon period, roughly about 3 times more over the three years).

The marker “There is room for standing” is shown in Figure 2 and is related to the state where not everyone can sit in a vehicle, but people feel comfortable even while standing, and the reasons for invading other people personal space are few and this occurrence is rare.

Trends that are noticed while analyzing this data:

- Average difference between comfort in the morning and the afternoon rush hour is 2.8%, considering this marker, with the morning rush hour being the better of the two – again.
- In the 2011 - the year with the highest percentage for this marker (with a rising trend), but it is not considered as a “winner” simply because the nature of this marker is to be between the desirable and the undesirable marker, hence its increase must be interpreted in correlation with the changes that happen to the other two markers - no clear conclusion.
- Comparing the morning rush hour comfort and the overall comfort it can be seen that there is very little difference between them, and until we analyze the third marker – It’s crowded we can only suspect that the ride comfort isn’t impacted by the morning rush hour as much as it would be expected.
- Average difference in percentages between the afternoon rush hour and overall comfort is 2.37%.

This marker is a mediator between two extremes – “Everyone can sit” and “It’s crowded”. Making this marker a part of research was needed as another possibility / choice, when the students are undecided, and it shows that in more than 40% of cases people even thought they can’t all sit, they don’t have to think about hurting someone if they try to move, or feel claustrophobic.

The Figure 3 is showing the percent of vehicles that were crowded, and even though its subjective it usually refers to situations in which a man doesn’t have freedom of movement inside of a vehicle and only the lucky few have the chance to sit down.

Taking a look at this graph here is a draw of several conclusions:

- Average difference between comfort in the morning and the afternoon rush hour is 3.43%, considering this marker, with the morning rush hour once again being the better of the two.
- It was implied that the year 2010 might have been the year in which the comfort was at its highest level of the three while analyzing the first graph, and this assumption is confirmed.
- Looking only at the overall comfort and the comfort during the morning rush hour it can be seen that there is a peak in 2009, but the values are getting closer in the last two years, further raising suspicion that the comfort in the morning rush hour is striving for the overall values, and as such being less different (less worse) than any other time of day (excluding the afternoon rush hour). This is hinting that the increase of number of vehicles in the morning rush hour isn’t as needed as in the afternoon.
- Another big difference between the overall comfort and the comfort during the afternoon rush hour - 6.6%, and again a negative impact of the afternoon rush hour time interval on the rest of the day.

Differences between rush hour and overall data were expected however there has been an odd trend that we noticed. The morning rush hour is offering very similar ride comfort to the ride comfort overall – it is showing few deviations. On the other hand ride comfort in the afternoon rush hour is evidently worse than overall ride comfort and we feel that it should be the main focus of measures that we are suggesting.

Based on the analyses of daily use of services of PT, a set of measures has been given that should improve efficiency, driving comfort during the afternoon rush hour.

Also it should be noted that earlier this year Bus Plus system was introduced, with a numerous innovations such as smart cards, monitoring systems, digital panel for the exact time of arrival and more that have contributed to improving the overall quality of the services of PTC. The introduction of these innovations is not covered by this paper, but some of our ideas (proposed measures for improving service quality) are coincide with the introduced Bus Plus benefits. This is the clear sign, that the students who have participated in this project think in the same direction as the management of PTC, which could prove to be the good basis for future cooperation.

In addition to these measures implemented, it is important to point out that vehicle hygiene should be improved to a higher level. Therefore, controllers of cleanliness should be appointed. As for the jams and the need to increase the number of vehicles, based on statistical data on the level of use of certain lines, PT started increasing the number of vehicles. Recently announced was the increase of number of vehicles on 9 lines, one of them being 33 which was observed as a crowded line in 44% of cases during the afternoon rush hour in 2011, and 31% during the morning rush hour. The PT added vehicles to this line based on data they received from the Bus Plus system. This line was problematic and it deserved more buses on it, however from our data we can see that there is one line that has been neglected – line 50 with around 50% of cases during rush hours being noted down as crowded in the year 2011. This an example that shows the potential for practical use of the data the students gathered.

The following set of measures have been proposed:

Considering that the metro transports a large number of passengers in a relatively short time, building one in Belgrade would reduce the number of vehicles on the streets during morning and afternoon rush hours and achieve the desired traffic relief. It is very important to establish an integrated system of metro-tram-bus in order to reduce time used for transport. As for the passengers, they would reach their destination faster and a lot cheaper considering the price of fuel today. The ecological component of electricity is very important – the use of electricity as fuel instead of the exhaust of the harmful ozone from vehicles. An excellent example is Paris with 12 million inhabitants, where the daily subway transports 4.5 million passengers.

Transportation across the rivers Sava and Danube was briefly present in year 2008. This form of transport should continue to be used by building the stations that are close to more important places in the city and activating the regular lines with an acceptable transport price. This type of transport links Zemun, Borča, Čukarica and Novi Beograd. The main aim of this transport is partial reduction of traffic jams on the streets and reviving the rivers that attract tourism. This kind of transport is very common worldwide. Cities like Amsterdam, Bangkok, Cape Town, Chicago, Dubai, Copenhagen, Hamburg, Istanbul, and especially London all boast with this kind of transportation. In London, this system is particularly developed and there has been an increase from the year 2000 until year 2009, from 2 to 5 million passengers on board. Further promotional campaign would help bring this form of transport into focus as a better alternative.

Increasing public awareness of the utility of BGVOZ, and as a major boost to usage of this kind of transport should be a higher frequency of departures, this way lessening the time of travelling compared to trams and buses.

BGBIKE is an idea that has been around for some time now and it would be structured as an organized network of bike rent. Bicycle rental stations would be placed on all frequent places in the city, covering the entire city. It is necessary to build and mark cycling routes and provide parking space. The goal is to reduce the number of vehicles on the streets, maintain the health of citizens and environment protection. Payment could be organized on a daily or monthly basis or per hour. In many cities around the world this type of transportation is applied and widely used: Barcelona, Amsterdam, Vienna, London, and Paris. We can take Copenhagen as an example, where 35% of the population rides bicycles to work or school, and when it comes to the citizens of Copenhagen the percentage goes up to 50%. People opt for this form of transportation mostly because it is healthier and cheaper.

To improve the vehicle fleet of PT- First of all, it is necessary to remove old buses, trolley buses and trams from service because they are slow and uncomfortable, and their breakdowns can often create traffic jams.

It is proposed that during traffic jams, PT supplies additional buses from the garage in order to accelerate the transport of individuals who are excluded from the traffic. It would be desirable that apart from the line 15, some other lines be supplied with popular double deck buses, primarily lengthy lines and crowded ones.

Building of a large capacity garage with parking spaces for cars. A significant number of drivers in jams is seeking for a parking place, a number of which exists particularly in the old part of Belgrade.

In Europe. Some other measures in addition to those above we would like to see introduced by the PT: CMS (COMFORT MEASURING SYSTEM). A Comfort Measuring System for Public Transportation Systems exploits the GPS and G-sensor of modern smart phones to measure the comfort level of vehicle rides. Then, it mashes up the sensed data (e.g. locations, acceleration, and time) with the authorized data (e.g. bus trajectories, and vehicle properties) of the public transportation system, and provides a detailed comfort statistics as a value added service. A CMS, called TPE-CMS is used to evaluate the public bus transportation service in Taipei City and it is applied in 4.028 buses and 287 routes. The CMS system can be deployed in any city, as long as there are participants volunteering and there are authorized transportation data available.

BRT (Bus Rapid Transit). BRT is a term applied to a variety of public transportation systems using buses to provide faster, more efficient service than an ordinary bus line. The goal of these systems is to approach the service quality of rail transit, while still enjoying the cost savings and flexibility of Bus Transit. The BRT is used in America, Europe, and Australia.

Implementation of the ISO 2631 standard which regulates vibration and comfort during the ride and the European standards EN 13 816, whose aim is to promote the approach to the improvement of quality of transport, focusing on customer needs, since driving comfort is one of the most important determinants of quality.

Different regulatory strategies to limit the movement of cars in a given time and space and using public transport in order to reduce traffic jams.

Investments in safety and security of passengers.

The most important thing to note is the fact that an improved city public transport is a prerequisite of achieving greater energy efficiency and provide better accessibility, as well as systematic monitoring of the behavior and needs of travelers for greater traveler satisfaction.

The key goal of the proposed measures is for PT to become fast, frequent and reliable and to achieve ride comfort for passengers at affordable prices with some reference to the environment. Implementation of these measures would achieve the desired relief in rush hours and uniform distribution of transport. This would increase the ride comfort of passengers, as well as raise the protection of the environment to a higher level.

CONCLUSION

Many of the measures that were proposed during the three period of research have so far been implemented thanks to the officials of public transport who showed great understanding for the needs and complaints of their users. Those measures were: replacement of outdated vehicles with new vehicles, improvement of bus stations and the introduction of monitoring systems in vehicles that includes a system for monitoring vehicles which compared to international standards is one of the most important for solving traffic jam and electronic payment system cards.

Three years of data for ride comfort have been analyzed from two rush hours and compared between them and the overall data. One of the most important conclusions is that actually the afternoon rush hour is a considerably bigger problem than its morning counterpart. Therefore new measures should be targeted to decrease the number of crowded vehicles in the afternoon rush hour by encouraging people to use alternative means of transportation such as trains - BGVOZ, reinstating the river bus, or investing in metro or bicycle-rent stations considering we have a developed bicycle track infrastructure in some parts of the city. Another suggestion is to increase the percentage of vehicles that operate in the afternoon rush hour if the percentage isn't already a hundred. An obvious solution that is being gradually implemented - increasing the number of vehicles that PT has at its disposal. Cooperation with students of Faculty of organizational sciences with PT would be of great benefit to both sides considering the data that this kind of research can provide, the money it can save for PT, and the feedback that PT can offer to the faculty, not to forget the experience the students acquire working on a project of this scale.

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SYNERGY EFFECTS OF STRATEGIC PARTNERSHIPS IN PROVIDING A UNIVERSAL POSTAL SERVICE¹

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Abstract: *This paper is focused on measuring the process and development of synergistic effects of joint networks on the provision of postal services and other public services, state and local governments. Individual contribution of each participant in a synergistic chain, in terms of quality, time, network costs (i.e. efficiency and effectiveness of the network) were measured. The aim of this paper is to indicate a new approach in determining possibilities of achieving synergistic effects of partnerships between the public postal operators, state and other dominant economic entities in the RS in order to improve overall business performance and contribute to the progress of a wider social community. In the preparation of this paper, as well as in our previous studies, we used concepts of marketing management in businesses which bring focus of all key business activities on users and successfully manage relationships with them, Key Account Management (KAM), the modern concepts of the Theory of solving inventive tasks (TRIZ) and methods of fuzzy logic. The results are clearly presented and indicate the need to achieve long term synergistic effects of the activity of various participants in order to meet the need and demand for a universal postal service (hereinafter UPS) and other services of wider social and economic importance.*

Keywords: Synergy, network, post office, local government, key customers, UPS, business performance

1. INTRODUCTION

The Post of Serbia, as the oldest and only public postal operator (hereinafter referred to as PPO), provider of UPS² in the postal services market in the Republic of Serbia (RS), successfully responds to new business challenges and the need for the traditional company to develop into a successful business system, which, integrated into/with worldwide postal flows, contributes to the overall national development. Under conditions of rapid changes in business environment, deregulation and liberalization of the postal market, the postal services are required to adjust urgently to the market, redefine their own mission, vision, goals and develop modern strategies contributing to the provision of fast and efficient response to customers' request - both through enforcement of existing innovative services and new services based on informational technologies. Having chosen the marketing business orientation which puts their customers in the center of all key business activities, that is, providing their customers with customized services, the postal system opts to commercialize the postal service, committing themselves to the long term business success, stability and development of the system and personnel, while creating joint value for customers, the postal system and society as a whole (Ožegovic, 2005). Business network of Post of Serbia is the largest infrastructure and logistic network in RS. Postal network consists of postal network units (post offices) and other resources used by UPS provider in the performance of postal services. Post offices provide their access services of great significance to citizens and economy, especially in rural and underdeveloped areas. The post offices provide over 400 different types of services which contribute to development of businesses and gives service and support to vulnerable strata of the population (retired people, socially endangered). Post offices contribute greatly to the development of local communities, particularly their role in conducting postal operations and financial transactions³ (Kujacic, Sarac: 2011). Results of the research represent that postal units' managers and the Post's brand identity enjoy an exceptional level of public confidence. With the purpose of complex understanding of the development level of postal market in the RS and neighboring countries, the tables set forth represent the following: Table 1. Size of national market of postal services in the RS; Table 2. Comparative data/Comparison of PPO with other neighboring countries.

¹ This paper resulted from research project funded by the Ministry of Education and Science of the Republic of Serbia, under the name of "Reengineering the operator network of the universal postal service, with the organizational synergy of governmental and economic resources" (TR36040).

² According to Law on Postal Services (2005, 2011), UPS is a service of public interest, and represents a group of postal services which are constantly conducted on the RS territory under equal conditions for all customers, within the prescribed quality and under reasonable prices.

³ Results of the 2011 survey, on the sample of a thousand examinees, represent that postal-financial services have a key role in answering the citizen needs throughout the RS.

Table 1. Size of national market of postal services in the RS (year 2008)

Market segment	Volume (millions of items)	Volume represented in % (per services)	Income (mil. EUR)	Gross income represented in %
Basic(postal) services	302,374	63,06	86,83	42,58
Financial services	134,67	28,15	60,87	29,85
Other services	42,167	8,79	56,21	27,57
Total	479,508	100,00	203,91	100

Table 2. Comparison of the postal market development in the RS and neighboring countries

Country	km ²	Population (millions)	Item per citizen	Letters/km ²	Number of PPO's	Area in km ² / PPO	Average number of citizens /IPO
Austria	83.858	8.361	577	57,544	1.912	43.86	4.388,73
Bosnia and Herzegovina	51.197	3.926	13,72	1,052	246	208.12	15.961,00
Bulgaria	110.912	7.693	17,78	1,233	2.981	37.21	5.244,01
Croatia	56.538	4.556	75,78	6,106	1.147	49.29	3.967,11
Hungary	93.032	10.058	170,22	18,403	2.741	33.94	3.648,36
Serbia	77.474	7.345	40,44	3,833	1.503	51.54	4.886,89

Source: www.posta.rs

Key parameters and goals in the standards of quality of postal services, in both domestic and international postal traffic which a provider of the UPS in the RS has to execute are represented in the table 3. The results of measuring the quality of transfer deadlines in the Post of Serbia in the year 2010, according to J+3 and J+4 indicators are: J+3(63,5% OUTGOING, 71,2 % INCOMING); J+5 (95,5% OUTGOING, 94,3% INCOMING). The following represents the aforementioned.

Table 3. The aim of quality – time of transfer in the RS

Domestic traffic		International traffic	
Letter	Package	Aeroplane i high priority registered items - Europe	UPU
90% - 2 days	85% - 2 days	85% - 3 days(J+3 speed indicator)	65% - D+5
98,5% - 4 days	95% - 4 days	97 % - 5 days (J+5 reliability indicator)	
99,5% - 7 days	99% - 7 days		

The deadlines don't include the day of the receipt, days when the PPO's not working or delivering, and state holidays.

Source: www.rapus.rs

The criteria for opening postal network units and setting up mailboxes are regulated by Te Republic Agency for Postal Services. Provider of the UPS in the RS is obliged to follow these criteria, i.e. table 4 and 5.

Table 4. The Criteria for opening a postal unit in the RS

Number of households	Distance
> 1300	> 2 km to administrative border to the nearest PO
> 1300	> 5 km of group of settlements to the nearest PO
3000-12000	> 2 km to the new PO, per 3000 households
12000-36000	> 1,5 km to the new PO, per 4000 households
36000-100000	> 1,25 km to the new PO, per 6000 households
> 100000	> 1 km to the new PO, per 7500 households

Source:www.rapus.rs

Table 5. Criteria for setting up of mailboxes

Population	Remark/comment
> 1000	rural area
< 1000	more than average unregistered items a day
< 200000	one per 5000 inhabitants
> 200000	one per 10000 inhabitants

Source: www.rapus.rs

In rural areas and in some less developed urban areas, post offices play a key role in maintaining and contribution to improving of local communities. They regularly provide support and advice to endangered social groups. This socially important role of post offices - in addition to their responsibilities for the execution of services in the field of the UPS, and commercial functions outside the scope of services of the UPS – is highlighted by many local communities throughout the RS.

2. MODERN MANAGEMENT CONCEPTS AND INNOVATION OF THE POSTAL NETWORK AND SERVICES

Postal network, like the other distributive logistics industry is trying to adapt to business environment which is changing rapidly, but to also encourage the developmental processes (Ozegović, 2010). Customers expect a

high standard in the quality of service, highly professional staff and modern facilities in which those services are provided. Technology and communications and other modern trends in the market bring completely new ways of doing business and lead to further transformation of lifestyles and user preferences.

The network came to increasingly rely on a relatively small number of courses of business that bring the highest revenue. The results of previous studies show that the Post has to optimize the potential of the network, creating opportunities for new business directions and cooperation with local government and industry, as well as through the development of: joint cooperation in the exploitation of the postal network; information society and electronic commerce, postal and local infrastructure as the basis of other economic activities (Kujacic et al,2011). Many post offices in rural areas face a decline in traditional lines of business and show signs of unsatisfactory business performance and investments which last for years. The situation is similar with other public enterprises and institutions which operate their activities in rural areas. The consequences of decline in traditional lines of business will be more serious in the future due to the inevitable intertwining of urban and rural network, while new business lines could replace most, if not all of the lost revenue. Generally speaking, there is no discrepancy between the commercial objectives of the Post and the social role of the postal unit in urban areas. The modernization of the network will be of use to the local communities by creating a modernized post office with redefined services, i.e. with better services to fit with the customers' needs and expectations. Restrictions in postal commercial freedom in urban areas, could pose an obstacle to a substantial modernization and development of modern business strategies that are more than necessary for the postal network and the postal system as a whole (e.g. relationship with strategically important customers).

2.1. Resources and network accessibility

Providing spatial, personal, financial and temporal availability of PPO network (Serbian Post Office), does not allow the Post its full economic independence. It was noted that the postal network does not provide equal access to all areas of the RS. In some administrative districts more than 7,000 people come to one unit of the postal network. Delivery to a large number of households is not performed daily. Delivery to a wider delivery area is done 2-3 times a week, while to an even broader area only once a week (Table 6).

Table 6. PPO delivery area in the RS (2011)

Type of delivery area	Population coverage by type of delivery	Estimated distribution of items on delivery areas (from - to)	
NARROW	68%	80%	92%
WIDE	21%	15%	6%
WIDEST	11%	5%	2%

Source: Statistical data of the Post of Serbia, www.posta.rs

In Vojvodina, on average, every town has a post office, while in some regions of the RS one post office covers 10 towns or villages. It has to be emphasized that along with the work of postal mail delivery services, other instances, such as municipal governments, local governments, businesses and public companies engage their employees for the same purpose. Table 7 represents data for 16 municipalities (268 populated areas) from different regions of the RS, which were part of a survey in year 2011. In these municipalities 143 couriers are permanently employed. The average monthly number of items which are delivered solely by local communities and offices in these areas, compared to the number of items delivered by post, range from 10 % to 20%.Exception to this average happens during the months when delivery of large quantities of items takes place. Such items are: voting invitation, utility bills (periodically in small towns), etc. In period of increase in volume of shipments generated by local communities, local administration,public enterprises and other economic entities,additional manpower is hired for delivery of their shipments (usually through youth services cooperations).

Table 7. Information about delivery services in 16 municipalities in the RS

Towns /area	Local Community – LC				Local Community Offices - LCO			
	Number of deliverymen in LC	Number of employees in LC	Number of items delivered through the Post of Serbia (monthly)	Number of self delivered items (monthly)	Number of deliverymen in LCO	Number of employees in LCO	Number of items delivered through the Post of Serbia (monthly)	Number of self delivered items (monthly)
268 /16	89	205	26713	2421	54	162	13515	2085

Based on statistical data of the Post of Serbia (www.posta.rs) we were able to partially determine present efficiency of the postal network. Some relevant data is missing to determine efficiency (operating income and expenditures). Conclusions drawn from the results of the study are based on the recording conducted in the period from 01.01.2011. to 31.12.2011. Large number of delivery post offices is located in rural areas. The results of these studies have shown that a large number of mail delivery has several times more items in the final stages of delivery than in the receiving phase, indicating the need for allocation of income, based on the application of cost accounting systems.

2.2. Evaluation of the effectiveness and the possibility of innovation of PPO network and services

In the absence of available data, we have conducted a comprehensive research survey related to measuring and forecasting the efficiency and effectiveness of the PPO network and other networks of general interest, as well as their synergy effects which made the research much more complex. In order to make this research more efficient and effective, its presentation needs to be simplified. In order to select optimal solutions for the synergy of resources and services of the post office with the state, local governments as well as the businesses (which were set up by the state and others), public companies and other major participants, we have chosen to apply modern concepts and methodology that includes: fuzzy logic, TRIZ and the modern concept KAM. Input values set for the set model are: cost effectiveness, availability and productivity of the observed mode of organization of postal activity, network and services in a defined area. The term of cost effectiveness entails the relationship between achieved output and total expenses incurred in its realization. In order to determine cost effectiveness of postal network units providing services to its customers, it is important to accurately define the income which is generated in the observed unit, based on the performed activities during the phases of transfer of items. **Availability** as an input entry is very important parameter in our studies⁴. The term availability implies that the PPO connects all populated areas in the country as to provide its services to all customers, both in domestic and international postal traffic. **Productivity** as a parameter has been introduced to determine the "real value" of output produced per unit of time. This method, which has enabled the inventive approach in creating alternative solutions in synergy of resources, networks and services, is known as **TRIZ**. Application of TRIZ made a major break through in the selection of alternative solutions for the delegation of resources of state governments, local governments, the Post and other participants in the synergetic chain (Sarac, et.al, 2011). Using the principles of the TRIZ, system characteristics and the matrix of contradiction we have come to the new, innovative solutions, which have not been exploited yet.

2.2.1. Forecasting the need and demand for the UPS

Forecasting the demand for postal services – especially letter post, has always been one of the major preoccupations of postal administrations around the world. Given that it is an essential element of strategic planning, it is essential to evaluate the factors that have a decisive impact on the operations of postal operators. According to research conducted at the Universal Postal Union - UPU, the greatest impact on the volume of postal services impose economic factors (45%), followed by postal (24%), social (21%) and technology (10%). According to the UPU, by using certain econometric models, an increase of 1% BDP can influence the increase in the volume of letter post services between 0.8% and 1%. Observing the period of the past 6 years, even in the market of the postal services in the RS, this rule was confirmed where the ratio is even higher in favor of postal services growth (1.06%).

2.2.2. Expected development of competitive relations in the market of postal services in the RS

In the market of postal services in the RS, the competition which is becoming more and more intense has been noticed, especially in the most profitable parts of this market. Competition in the market consists of more than 200 businesses that annually perform more than 320 million of services. In line with the current trends in the global market primarily related to the process of deregulation, controlled and gradual liberalization of the postal market, the changing needs of users of postal services, as well as the need to stimulate the competition, growth in number of participants in the market of postal services is expected in the RS. Under new market conditions which include a precise definition of the status of each of the participants in the market of postal services, the Post of Serbia is positioned as the PPO which includes universal access to basic services for the entire country. On the other hand, as the market situation is becoming more intense and uncertain, the Post has to take its position through intense innovation of existing and by introducing new

⁴In addition to territorial availability, in subsequent research we will include a personal availability as an input.

commercial services in accordance with the need and demand. Thus, become both a national leader and regional leader in the contemporary market of postal services. Some of the results of market research and the analysis of competition indicate that an intense development of competition on one hand, and the size of market segment covered by select group of business users on the other, impose the need for key activities planned directly at strategically important business users with the possibility to achieve synergetic effect through development and maintenance of long-term profitable business relationships. *The development of modern strategic multi-phase business concept and strategy for key account management in the postal services companies, governmental bodies and local government can provide the opportunity for the long-term business prosperity while simultaneously contributing to the development of the society as a whole.*

2.2.3. Marketing business orientation and business performance as a framework for realization of synergistic effects of partnership

Traditional business concepts give way to modern concepts which are focused on customers and managing the relationships with them, which directly contribute to the improvement of company's business performance. Marketing business orientation is one of the major research topics in the field of marketing management in the past ten years. In order to stay on dynamic market, modern companies have to develop strategies that can ensure the survival, growth and development. In that sense, the companies are developing business relations with suppliers and distributors, investors, customers and other key players in the market. Studies conducted in recent years point out the factors which favour the efficiency of certain approaches to relationship marketing. Studies conducted in recent years indicate factors that favour the efficiency of relationship marketing approach. This shift towards relationship marketing brings new management philosophy – **KAM**, as one of the most important strategic marketing management trends in the last few decades (Conlon, Napolitano, Pusateri, 1997). This modern business concept represents strategy, philosophy, discipline and commitment of modern companies. It can be said that the strategy of key accounts management represents a way for successful development and maintenance of long term profitable relations with key customers. Philosophy focuses on achieving a satisfactory growth level of profitability of key customers and company. Discipline is largely focused on differentiated advantage over the competition, while the requirement for the modern companies involving management of the key users comes down to devotion to this management by the company which represents one of the key factors to its success. (Ožegović, 2010).

2.2.4. Key Account management and processes of identification, selection and categorization of key customers in specified areas

Moving the focus from individual transactions to relationships and Relationship Marketing (RM) and acceptance of customer heterogeneity with respect of the values given to the company, it resulted in emphasizing joint importance of marketing theory and practice. The two key changes have contributed to the rapid development of relationship marketing (RM) importance which is based on modern business concept of KAM. In contemporary business concept of key account management, studies have verified existence of a seller's need for greater investment in key customers and delivering values that meet and exceed their needs and expectations, while having the mutual benefit. In order to implement the project TR 36040, survey has been conducted from April 1st to May 31st 2011. Research in attitudes of business users (primarily municipalities, local communities and legal persons which are the founders- communal organizations) in terms of quality, competitiveness of the postal services used, cost of service and delivered value ratio and the overall satisfaction level in doing business with the Post, has been conducted in the selected area covered by 8 municipalities in Vojvodina. Nevertheless, our goal was to answer the underlying question whether they would recommend the Post to its clients, as the expression of highest level of trust and commitment to the relationship where the customer becomes an advocate of the service providing company. The results of the research and analyzed factors that have a significant impact on the key account management are given in the following review, Figures 1a, 1b, 1c, 1d, 1e.

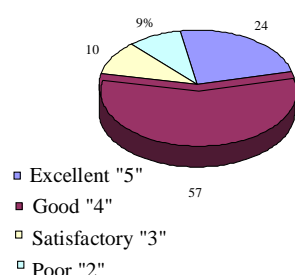


Figure 1a. Quality assessment of postal services

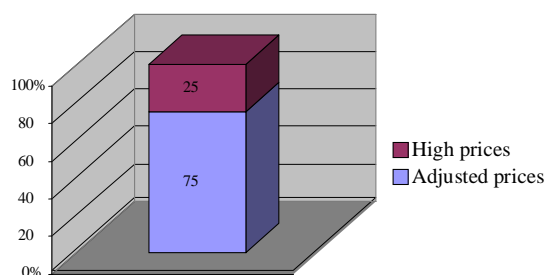


Figure 1b. Postal services price to quality ratio

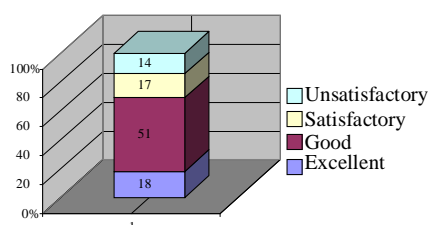


Figure 1c. Level of customers being informed

Figure 1b. Quality assessment of postal services

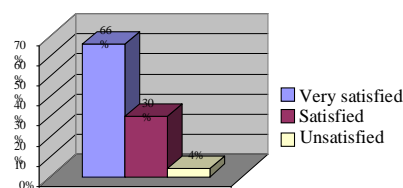


Figure 1d. Presentation of a research of customer satisfaction in cooperating with the Post

According to research conducted for needs of this paper it can be concluded that about 30% of the total volume of postal services is conducted in underdeveloped areas, mostly rural areas where enforcement of Postal Services requires higher costs. For such reasons, organizational types of postal network and the postal services itself are generally unprofitable in rural areas (Ozegovic, 2010), indicating the need for applying modern organizational models of association of related business areas, establishing and developing long term business partnerships that generate synergistic effects both for companies involved in the process of exchange and the community as a whole. As a method for this type of analysis, we have developed a model of customer value. The development of this model reflects the clear intention of managers of modern enterprises to build, maintain and promote good and lasting relations with their most important customers. The emphasis is on profitability of long term business relationship, but not on the optimal revenue, i.e. profit per individual transaction. For these reasons it is very important that in the postal traffic, KAM is treated as a process of building long term strategic partnership relations that result in synergetic effects, rather than the responsibility for sales. The proposal of strategic multi-phase model of KAM in the postal traffic, also known as "PostAIM" (Ozegovic, 2010) will be presented through a simulation of one of its parts related to the segmentation and categorization of customers and the possibility of its practical application in the selected company, the Post of Serbia. In terms of purposeful use of postal services, three basic segments of consumers can be extracted: State, social and other public institutions; Legal person; Individuals (citizens).

A preliminary categorization of customers in the selected area could be carried out by customer classification into A, B and C category by using the known Pareto 80/20 rule. In determination of criteria of identification, selection and categorization of strategically important customers, key customers, that is customer value for

the selected company, we have used the following criteria: profitability of key customer, share in revenue from sales, attractiveness. In formulating the model for segmentation and categorization of customers, we started from the fact that the value delivered to key customer is critical for the KAM (Pardo et al., 2006). The proposed model "PostPPA" – a basic model for calculating the value of customer (V_k) as a basis for segmentation of customers in postal services companies, can be represented with the following (Ozegovic, 2010)5:

$$V_k = \sum_{i=1}^n t_i \cdot p_i \quad (1)$$

where the following stand for:

t_i – weight of i th element;

p_i – coefficient (calculated, estimated value).

$$V_k = t_{up} \cdot pup + t_{pfk} \cdot ppfk + t_{pak} \cdot ppak \quad (2)$$

where the following stand for:

V_k – coefficient of the customer value;

t_{up} – weight coefficient of customer participation in total income;

pup – share % in total income;

t_{pfk} – weight coefficient of customer profitability;

$ppfk$ – customer profitability %;

t_{pak} – weight coefficient of the estimated customer attractiveness;

$ppak$ – % of estimated customer attractiveness;

$$\text{Vector of weight coefficients for } t \text{ is: } t = (0,3 \quad 0,5 \quad 0,2) \quad (3)$$

$$V_k = 0,3 \cdot pup + 0,5 \cdot ppfk + 0,2 \cdot ppak \quad (4).$$

The entire segmentation process and customer selection has to be repeated at least once a year and more often if necessary.

2.2.5. Portfolio and analysis of key customers

The goal of business segmentation involves identifying homogeneous market segments with similar needs, desires and characteristics, which indicated an increase in the importance of analysis of the customer's dynamic portfolio. On the basis of performed segmentation of business customers according to the value from the PPO perspective and strategically important customers of postal services, the following key segments to which identified key customers belong can be observed: state institutions, Telecommunications and information technologies, Financial organizations and banks, Communal organizations, Organizations for traffic and trade, Publishers and book distributors.

Value of key customer	High	1 2 4 20	18 10 3 14	8 13
	Medium	5 15 7 9	11 6 16	24 18
	Low	12 17 19 21	3 23	22 25
		High	Medium	Low

PPO synergistic business opportunities with key customers

Figure 2. Display of key customer portfolio matrix of Serbian Post6

On the basis of the results of this research, we can conclude that the successful implementation of key account management represents a strategy of long term profit that requires adding of value to relationships with potential key customers in order to create mutual long term interest, synergistic effects. Also, that that segment of the state administration7, local government and legal entities, become significantly involved in realized number of services and the PPO income (out of 25 identified potential key customers that used the "PostPPA" model, through the mentioned research it has been found that they generate about 79 % of income from the sale of the PPO; 7 potential key customers belong to the given segment). Information obtained in this analysis allow management to focus more on

5Testing of the application of the general model of customer value, PostPPA was conducted at the Post Office of Serbia, but the same is applicable further and beyond, especially in the service sector.

6Basic data of the 25 identified potential key customers in the Post of Serbia are represented numerically in the form of ordinal numbers previously generated from the table

7Bold in quadrants in matrix portfolio

achieving accumulated value of the portfolio, rather than the values derived from individual relationships (Ožegović, 2010).

The present imbalance in operating results and investments in these strategically important customers suggests the need to allocate available resources and divert investment on buyers, who have decisive impact on overall business effectiveness, developing long term partnerships with them, as well as the realization of synergistic effects of partnership, which represents the basis of modern strategic key account management concept. With such balanced inter-organizational relation of values, key customers should not be identified with "the larger buyer", who can over time be transferred into a group of key customer through planned management activities. Potential key customers in the Post of Serbia are strategic partners with whom long term synergy effects are achieved and the success is mutually shared.

3. SYNERGY EFFECT OF STRATEGIC PARTNERSHIP

Review and analysis of opportunities to achieve synergetic effects, in accordance with objectives of this paper, between the bodies of state and local government and the PPO will focus on local, less developed and rural areas of our country. Synergistic effects between the PPO and bodies of local governments can primarily be achieved in the form of creating a joint offer to citizens and potential users, as well as joint appearance. This new form of cooperation does not only entail the specified joint appearance, but also regular exchange of business information on potential joint customers. Prescribing the form, manner and form of exchange of business information is not available in advance because this way of establishing cooperation is a dynamic process and requires mutual respect and trust (the so called "open book" operating system), as well as prescribing the organizational forms of positioning a multifunctional team consisting of participants of both organizations. Realization of new forms of business cooperation through partnerships of the PPO with bodies of state and local authorities contributes to the success of achieving long-lasting forms of partnerships and the benefits in many areas. In establishing these new forms of business cooperation on the local and other markets, the focus of synergetic effects can primarily be seen in the following mutual long term interests, moreover benefits: a) creating high value of joint bids, b) ensuring a higher degree of utilization of available potential and resources of participants in the exchange, c) by sharing the brand (in a way that is of mutual interest), d) creating common products and/or services - integrated solutions in the service of citizens and businesses, e) strategic partnership to introduce new technologies, f) temporarily using postal/public administration bodies and local government at the onset of a particular market segment or at a meeting of general interest, g) joint use of sales and distribution network, h) savings achieved by using shared corporate office or by renting them, j) savings in hiring of employees (during the substitute of the temporarily absent employee of one or the other). Government authorities, local government and local communal organizations by occasionally hiring postman who according to the results of the research enjoys high reputation and trust, being easily recognized due to the uniform, can raise the level of achieved efficiency and effectiveness through mutual exchange of knowledge and experience regarding the usage of available resources and customer attitudes, etc. It can be concluded that the synergistic effects of partnerships in a selected area of business activity can be achieved efficiently and effectively and contribute to the stimulation and advancement of both state and local government and the PPO, as well as other legal persons founded by those state and local governments.

Synergy, as the effect of collective action exists⁸ if the condition is met:

$$NSV(A+B) > NSV(A) + NSV(B) \quad (5)$$

Where:

NSV(A+B) – current net worth of combined corporate asset of enterprise A and enterprise B

NSV(A) – current net worth of corporate asset of enterprise A

NSV(B) - current net worth of corporate asset of enterprise B

Sources of synergy are economies of scale, learning, risk management and cost-sharing, joint action against third parties, reduced costs of entering into new markets. Strategic analysis, selection and categorization of customers based on their value, that is, users of services, contributes to the successful management of their portfolio.

4. CONCLUSION

The aim of this paper is to indicate to one new approach in determining the possibilities of achieving synergistic effects of partnerships between the operators of the UPS, PPO, state and other dominant economic entities in the RS in order to improve overall business performance and contribution to the

⁸ According to: www.ekof.bg.ac.rs/SM_Glava_17

advancement the wider of social community. Based on the results of the conducted research, it can be concluded that profitable establishment of the aforementioned long term profitable business relations and partnerships in surveyed aspects primarily in connection with rationalization and optimal utilization of available resources, can produce synergistic effects. In addition to the significant and positive relationship in business cooperation between the PPO and the state and other major entities in the RS, for it to be improved after the development of models of strategic segmentation, classification and categorization of both the market of postal services and users of the UPS its implementation and monitoring, that is, complex model of management of long-term profitable partnerships, it is necessary to develop modern multifunctional models for segmentation, categorization and relationship management even with other medium and small state and business entities in this area of business. By doing this, systematic solutions could be improved and encouraged so as to contribute to continuous improvement of business performances and synergy effects between businesses entities involved in the chain of value as well as to give rise to the development and improvement of the society as a whole. The results of this paper represent interesting and useful theoretical, managerial and practical implications which can contribute greatly to the creation of effects of synergetic partnerships in developing countries, such as our own, the RS.

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REMUNERATION SYSTEMS AS AN ELEMENT OF CORPORATE GOVERNANCE IN FINANCIAL CRISIS

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Abstract: *This paper discusses the problem of creating proper remuneration systems in order to improve corporate governance and business performances. To meet the challenges of the financial crisis, boards must change the way they work. Four aspects of corporate governance require attention: remuneration systems, risk management, boards performance and the exercise of shareholder rights. The main reason for writing this paper is an incentive to solve the long standing issue of remuneration systems. Pay for performance is a difficult concept in practice. Incentives at lower levels increased risk taking partly due to their failure to adjust bonuses for risks incurred. The OECD Principles hold boards directly responsible for managers' remuneration and advocate full transparency, so it must be emphasized that boards should have direct responsibility for remuneration systems. The systems must be in line with long-term objectives of the company, but it is easy to say, and hard to do. This paper represents a theoretical approach to the steps that a company must take to ensure that remuneration is established through as explicit governance process in which the roles and responsibilities of those involved are clearly defined and separated. Additionally, the importance of shareholders' role is emphasized in order to raise their awareness. In the modern era this paper can be an incentive for paying attention to intangible assets, motivation and improving business performances.*

Keywords: *remuneration systems, incentive packages, corporate governance, crisis, business performances, compensation*

1. INTRODUCTION

In modern times, when knowledge management has an undisputable role in every single area of doing and being, proper organization management, with the minimal volume of errors, is expected from everyone who lead the company and who are engaged to manage it. It is obvious that this is possible if the link between the ones who manage (managers) and the ones who own (owners) the company is direct, functional and unbreakable.

Corporate governance can be defined as a process in which managers professionally manage equity and owners tend to control them in order to ensure that managers take actions which lead to maximizing owners' wealth. Proper corporate governance means the respect of interests of all parties in the company which opens up other issues that exist in the relation manager-owner.

Remuneration systems represent an important element of corporate governance and one way for increasing the efficiency of corporate governance and business performance improving. Incentive mechanisms designing must ensure linking interests of managers and owners, decrease agency costs and increase benefits for owners. In that way, these mechanisms improve total quality management of the company. Linking owners' and managers' interests is a sensitive problem on which the company's strategy success frequently depends on and which raises serious issues on adequate compensation schemes choice and on measuring performances.

Corporate governance weaknesses are found in remuneration systems, risk management, board practices and the exercise of shareholder rights. These issues had played an important role in the development of the financial crisis. OECD Principles of Corporate Governance provided a good basis to adequately address the key concerns that have been raised and that there was no urgent need for them to be revised. It is extremely important to encourage and support the implementation of already agreed to international and national standards, including the OECD Principles of Corporate Governance.

In order to examine the issues of compensation systems in detail, this paper will firstly discuss the role of corporate governance in a modern company, compensation packages, their structure and their influence on corporate governance. Afterwards, in the second part of the paper, the role of proper corporate governance will be discussed as well as the choice of a proper compensation system in crisis.

2. REMUNERATION SYSTEMS – AN IMPORTANT ELEMENT OF CORPORATE GOVERNANCE

In order to define the place and the significance of remuneration systems in the frame of corporate governance, it is necessary to define the term of corporate governance. Corporate governance is a mechanism for aligning principals' and agents' interests and incentives. Corporate governance seeks to reconcile the relationships among the directors, board members, managers, stockholders and the outside financial community of analysts, bondholders, and other creditors by clearly assigning responsibilities, measuring performance and rewarding or penalizing managers in line with their impact on the company's long-term value creation.

Understanding the executive compensation package and its role in the modern company requires a basic understanding of corporate governance. Nowadays, the ownership and management functions are separated. This separation can arise from two situations. Firstly, there are individuals with pre-existing businesses who either do not have the desire or skills required to manage the business. In the second, there are individuals with good ideas or products that may not have the funds necessary to bring those products to market or sustain themselves through the start-up period and thus must seek outside investors. Effective coordination of executive compensation with the corporate governance function: rules, monitoring, and other incentives promoting effective relationships among important constituencies, has an important role in the company. Managers' compensation and corporate governance are linked and substantial effort and costs are required to better align incentives and reduce opportunism of all corporate stakeholders – top executives, board chairs and members, stockholders, debt holders and the financial community.

In the modern company, ownership and management are separated. This separation of the ownership and management functions can lead to conflicts. For example, although the owners are concerned with the maximization of the value of their stake in the company, the executives are concerned with the maximization of their own wealth and minimizing their effort. The mechanisms for controlling the conflicts that arise from the separation of the ownership and control of the company include monitoring by large shareholders and the board of directors, equity ownership by managers, market for corporate control, managerial labour market and compensation contracts that provide incentives to increase shareholder value. Monitoring by the board of directors has its limitations. Most directors have limited investment in the companies on whose board they sit and director's incentives also may not be aligned with those of shareholders. One reason the board cannot review every decision is the limited amount of time they have to spend on corporate matters, especially if the company is not their primary employer.

2.1. Designing remuneration schemes

Designing the remuneration schemes has the goal to minimize agency costs towards improving business performances. An important segment of corporate governance is the alignment among the managers' and owners' interests in order to decrease the possibility of high quality managers leaving when sector is in the decreasing phase or the possibility of managers at the pressure passing to other organizations (Đuričin, Janošević & Kaličanin, 2010).

As principals (owners, shareholders) have the major impact on value creating, it is crucially important to design such a remuneration system which will motivate managers to act in order to increase the company value. Hence, beside the short-term effects, it is really important to take into account also the long-term effects and objectives, because only in that way the gap between short-term and long-term can be bridged. Short-term goals are necessary, but not enough for total improving of business performances.

Remuneration systems have been varying through time. The system which has been in practise for years was based on managers being paid for their position, and not for their performance. Before 1980 managers and directors had been paid for a position, and their earnings represented the fixed cost for company. In period 1980-1990 compensations were linked to performances and earnings of managers and directors were considered as a variable cost. After 2000 the major part of manager earnings had an investment character.

Designing proper systems of remuneration considers defining the measures of performances and their relation with the company objectives (Đuričin et al., 2010). During the act of compensation schemes designing, some issues must be considered (Balsam, 2001):

- The package offer must be attractive;
- The manager must be encouraged to act according to company goals and objectives, which means increasing shareholder value and minimizing the costs to shareholders;
- By receiving proper compensations managers must be provided with the incentives to remain with the company.

Properly designed remuneration system represents a powerful tool of corporate governance. This tool directs managers and other employees behaving in the direction of continuous business performances improving and value creating. If we take into account that creating value is the basis for efficient corporate organization and high agency costs seriously endanger organization goals, it becomes clear that developing different remuneration systems, which link managers' and shareholder' interests, represent the strategically important issue.

It is extremely important to offer managers something that will be the reason for aligning their interests with the interests of owners. With this in mind, it will be rational to create such a governance system which would equalise managers' and owners' goals. In this respect, upon proper incentive system designing the care must be taken about potential users and costs. Using a particular plan requires considering of all outcomes in advance. Despite serious challenges in setting proper compensation systems, almost all greater organizations developed different compensation systems in order to minimize the consequences of the agency problem.

Four key objectives of incentive system implementation are usually emphasized (Malinić, 2008):

- Linking managers' and shareholders' interests which means giving compensation which will motivate managers to make strategic and operative decisions, as well as maximizing the shareholders' wealth;
- Achieving the proper wealth level, in the terms of setting manager awards to link the changes in managers' and owners' wealth;
- Minimising risk of quality managers leaving, even when they receive better offer when the industry is in the phase of lower productivity and recession;
- Maintaining shareholder costs at reasonable level.

Compensation system designing can be observed from different perspectives, from the aspect of setting the relationship between the compensation and performances, from the aspect of paying awards (in cash, stocks, options), from the aspect of the compensation system role in achieving the short-term and long-term objectives, etc.

The pay of chief executive officers has been rising rapidly since the early 1990s. In the early 1990s performance-related pay became more widespread. It is not only in the US that the problem is seen as politically if not economically acute. Executive compensation has become a major issue in Australia, Sweden, Germany, Switzerland, the Netherlands and France. In the EU, median CEO total remuneration (salary plus bonus) has risen at an average annual rate of around 14 per cent in the period 2004-2007 with particularly high rates in the UK, France, Germany and Switzerland.

2.2. Structure of remuneration packages

The structure of remuneration packages can differentiate in various situations, sectors, conditions and businesses, but packages usually consist of several main elements. It is important to emphasize that remuneration packages should be created in order to enable and motivate managers to focus on long-term performances. Incentive packages are one way to motivate managers.

The major components of the compensation package are the following:

- Main salary,
- Bonus,
- Stock options and grants,
- Pensions and benefits.

It must be emphasized that every component of the compensation package impacts the company's cash flows, both directly via the actual payment and indirectly via the company tax returns, so it must be taken into

account (Balsam, 2001). The compensation structure has evolved (Figure 1) during the twenty year period 1989-2009. Also, we can see the data from 2009 about chief executive officer's compensation (salary, bonus, stock gains and other compensation), average age, tenure and ownership. Remuneration packages structure varies across the companies and sectors, but increasing significance of long-term incentives has become evident.

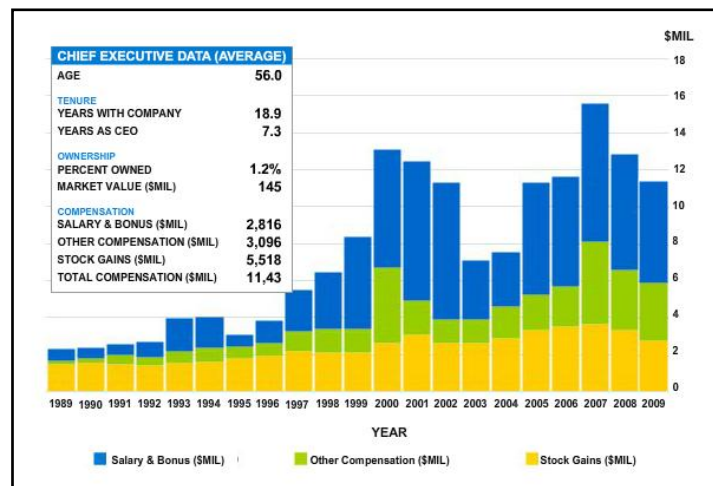


Figure 5: Historical CEO compensation (Forbes, 2009)

Salaries are observed in the compensation packages across time, industry and corporate size, whereas other components of the compensation package have become more prevalent over the time and vary by industry and with the size of the company. Salary is the most basic part of the compensation package. It is fixed in amount, although it is variable in the sense that it can be renegotiated. An individual can get raises for good performance or get a pay cut for poor performance. Although salary needs to be competitive, because it is only one component of the compensation package, it need not always be greater than the salaries offered by competitors.

Bonuses are considered to be a variable component of the compensation package. The payment can be subjective or based upon objective criteria. It can be based upon one or more of the following performance measures: earnings, stock price, market share or customer satisfaction.

Stock-based components of compensation have two categories: stock options and stock grants. Although the value of both is based upon stock price performance after the date of grant, the payoffs and risks are different. Stock options allow their holder to purchase one or more shares of stock at a fixed price over a fixed period of time. Stock grants differ from stock options in that they have no exercise price.

The compensation can be deferred when an employee performs services in one period and receives payment in a subsequent period. The future payment can be in cash, stock, or benefits. Pension is deferred compensation in cash. Stock-based compensation granted in the current period can be considered deferred, as while the options or shares are granted in the current period, the executive does not have full rights to them until they vest in some future period. Furthermore with options, if the exercise price is greater than or equal to the market price at the date of grant, executives will not be taxed at least until the options are exercised.

As it was said earlier, remuneration structures vary in complexity. For example, in Finland, Sweden, Austria and the United Kingdom the fixed basic fee represents over 75% of the total fee. Companies in other countries added other layers of fees: the most common are attendance fees, variable fees based on company performance, basic fees for committee membership and chairmanship, and committee attendance fees. The proportion of the fixed remuneration (fixed basic and fixed committee fees) is on average 83% of the total remuneration. In Denmark, Sweden, Switzerland, Italy, Netherlands and the United Kingdom, fixed remuneration represents over 90% of the total. Remuneration is over 40% variable in France (based on attendance fees) and Germany (based on company performance). The remuneration of the chairmen and members of the audit, remuneration and nomination committees has remained stable since 2007 (Heidrick & Struggles, 2009).

3. THE CRISIS

Almost everyone is familiar with the causes of the global financial crisis which struck the whole world in 2008. Its consequences are present till today.

The financial crisis has raised a new order that has to be understood fully and accepted widely. The changes happening today are structural, truly transformative and will affect every company in every sector across the world. The financial crisis represents a challenge to policy makers that can be compared with the challenges that followed the collapse of Enron, WorldCom, Parmalat and by the Asian financial crisis of 1997 (OECD, 2009).

Corporate governance policy makers cannot stay beside the debate which raises questions about the relative role of legally binding, corporate governance requirements and their enforcement as opposed to principles-based, flexible instruments. These turbulent times demand greater focus on board effectiveness. While adherence to strong rules on corporate governance remains essential, the world economic crisis has introduced a need for discipline rarely seen over the last decade. The OECD Principles hold boards directly responsible for executive remuneration and advocate full transparency.

3.1. Remuneration systems are linked with the crisis

The governance of remuneration systems is the postulate of business performances improving. The financial crisis has raised new aspects of the compensation issue. Executives have had quite large equity share in their companies. They faced significant potential downside risks which should have restricted their risk appetite. The remuneration structure as a whole led to risk taking strategies since the executives faced expected losses on the downside and their basic cash compensation was high. It should be noted that in the face of public anger, a number of executives have voluntarily renounced their bonuses.

According to previous, there are four areas of corporate governance linked to recent failures of financial crisis:

- Remuneration systems;
- Risk management;
- The performance of boards;
- The exercise of shareholder rights.

These four areas are also closely related: if remuneration has been excessive and not structured properly, it can be considered that the boards have allowed this state of affairs to occur. The test of whether companies have effective corporate governance has, rightly or wrongly, become increasingly related to judgements about remuneration issues.

According to the problems that the crisis has raised, the awareness about the importance of compensation systems was revealed through the formation of remuneration committees. When we talk about committees in Europe, the average number has stabilized to three per company according to results from 2009 (Figure 2).

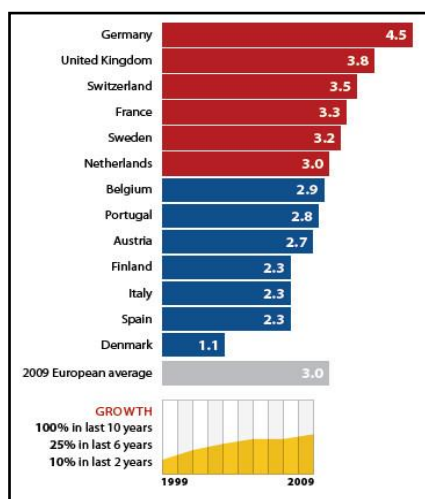


Figure 6: Average number of board committees (Heidrick & Struggles, 2009)

The remuneration committee is the second most common committee, found in 89% of companies. There has been little change in this over the years, but audit committees still continue to be more independent than remuneration committees.

The ratio of chief executive officer to average worker pay has widened rapidly. The issue had arisen even before the financial crisis, which has only served to make it more acute. The manifestation of the issue is not the same everywhere and at all times. In a number of countries, golden handshakes, even when a failed manager leaves a company, have been a source of concern.

Pay for performance as a concept has generally been supported by shareholders, but cases where the performance criteria have been extremely weak or subject to frequent revision are well documented. Most common has been the tendency to link bonuses and pay to targets that really have little to do with managers' performance such as the level of company's share price, and not the relative position of the company. Generally speaking, compensation is upwardly flexible, but there is little downside risk. This habit led to turbulences.

3.2. Remuneration system governance in crisis

The OECD Principles of corporate governance state doubtless that responsibility for remuneration systems is with the board. The importance of the Principles must be emphasized because they call for transparency, board responsibility and shareholder engagement.

The practical challenge is how to improve their position related with management. Just stating that remuneration systems should align incentives with the long-term interests of the company may not be enough and additional guidance is useful. In effort to align remuneration with the long-term interests of the company and its shareholders, it is important for the board to disclose specific mechanisms that link compensation to the long run interests of the company. The company must take steps to ensure that remuneration is established through the explicit governance process in which the roles and responsibilities of those who are involved, including consultants and risk managers, are clearly defined and separated. In a number of jurisdictions, it is considered good practice to give a significant role to non-executive independent board members in the process. Their remuneration should be decided through a transparent process that is disclosed in the remuneration report to shareholders. Depending on the characteristics of the company, remuneration systems that should be a focus of the board oversight need to be considered broadly and not just focused on the chief executive officer and board members.

The governance of compensation systems has very often failed because managers had too much influence over the level and conditions for performance based remuneration with boards which was unable or incapable of exercising objective judgement. In many cases it is striking how the link between performance and remuneration is very weak or difficult to establish. The use of company stock price as a single measure, for example, does not allow to benchmark company specific performance against an industry or market average (OECD, 2009). Also, the remuneration schemes are often overly complicated. They tend to be

asymmetric with limited downside risk thereby encouraging excessive risk taking. The goal needs to be remuneration systems that encourage long-term performance improving and this will require instruments to reward managers once the performance has been realised.

Defining the structure of remuneration schemes is a key aspect of corporate governance and companies need flexibility to adjust systems to their own circumstances. The balance between the fixed and variable components of remuneration packages should be carefully considered at company level, and the regulatory framework should not induce a shift towards excessive fixed remuneration components. Theories about the determinants of managers' and directors' remuneration differ widely, but the two major approaches are both relevant. One approach is to view remuneration as the result of efficient contracts. In this view, regulatory and other policy measures should focus on transparency so that shareholders and boards strike an efficient contract. The other approach which is more of a positive rather than a normative theory takes the view that management is able to exercise bargaining power and asymmetrical information to negotiate remuneration systems that are sub-optimal from the view point of corporate governance.

Performance measures should be related to the strategic objectives of the company and the time frame used to measure performance specified. The set of measures must be created to monitor accounting and other reporting practices that suggest weaknesses in corporate governance, not providing multi-period compensation packages, monitoring managers and financial analyst relationships, establishing an independent compensation committee composed of board members without managers participation, analysis of compensation packages with alternative scenarios and expected outcomes, limiting to certain top executives the grant of options and deferred stock, and with these, make every effort to establish true estimates of costs to the company and their impact on the managers and company value.

It is important for boards to first set the strategic goals of the company and its associated risk appetite. They are then in a position to establish compensation structure that meets a small number of performance metrics based on these goals. An explicit governance process needs to be established that will also define the role and duties of compensation consultants who are increasingly important. Good practice is for the process, remuneration structure and performance to be made transparent through some form of remuneration report. There also needs to be a possibility for shareholders to express their views about remuneration policy.

Where remuneration consultants are hired to advice on remuneration contracts and conditions, it is good practice for them to be engaged by the board with a key role for independent board members who are thus independent of management. Their role, including other work for the company, should be disclosed in a remuneration report. Boards need to ensure their continued independence by prohibiting or limiting the contemporaneous provision of other remuneration services and by requiring them to adhere to a code of conduct.

The boards have to decide and disclose, in their efforts to align remuneration with the long-term interests of the company and its shareholders, specific mechanisms that link compensation to the long run interests of the company such as multi-year performance based vesting conditions, deferred compensation, claw-backs and adjustment for risk. Performance measures should be related to the strategic objectives of the company and the time frame used to measure performance specified (OECD, 2010).

Boards and shareholders often look at a chief executive's annual compensation plan to determine whether the company is offering the right incentives to increase shareholder value. But few consider how does the compensation that the chief executive officer received over the years in the form of stock and stock options influence managerial decision making. In order to avoid unintended consequences, the authorities could find it important to review and understand how the tax system might constrain or influence the development by companies of remuneration systems based on long-term company performance.

It is useful for the board to understand the dollar amount that the managers can earn for the company. Boards are sometimes faced with the problem of what to say to shareholders when the managers receive very large pay-outs. Many boards will likely find that the pay-out amounts for various levels of stock price targets are much different than they expected, often encouraging too much or too little risk.

It must be highlighted that few boards look at how the chief executive's total wealth invested in the company changes as stock prices fluctuate, but they could and they should. The attention must be paid to evaluating how risk structures and incentives of managers' pay packages are aligned with the company's strategy. Ensuring effective measurement and monitoring of the value added by management is complex and costly

but it is essential for protecting stakeholders and increasing long-term total enterprise value of the company. It means that remuneration systems are the essential issue for performance management of the company.

4. CONCLUSION

Turbulent times have revealed new issues that emerged under circumstances that the crisis has brought. There is a growing awareness that the remuneration system designing is the major challenge which requires the commitment of a dedicated and expert group of directors.

Building a structure of responsibility and accountability is essential to address issues around managers' compensation. Greater transparency is necessary to broader stakeholder trust. Companies should also put in place a system that identifies potential conflicts of interests and implements countervailing measures.

As a critical component of corporate governance, compensation systems must constantly strive to align the incentives of managers with shareholders. As the value added by management is difficult and costly to measure, monitor and verify, this is a complex and critical challenge.

Finally, for main issues must be repeated: setting adequate measures, improving transparency, shareholders' role and boards' responsibilities. Companies should be able to set proper measures and to explain the main characteristics of their performance related remuneration systems in concise, transparent and non-technical terms. This should include the total cost of the systems, performance criteria and how the remuneration is adjusted for related risks. The role of shareholders is also very important so it should be considered good practice that remuneration policies are submitted to the annual meeting to shareholder approval in order to increase awareness and attention. Boards have been struggling for centuries to represent their shareholders effectively. There is no doubt that the crises lead to further evolution in the corporate governance practices of boards. In the meantime, boards must work hard in order to find mechanisms that link managers' compensation with the long-term interests of the company.

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IMPORTANCE OF ORGANISATIONAL CHANGES AND LEADERSHIP IN CONTEMPORARY ENVIRONMENT

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Abstract: *This document presents the importance of organising business activities in companies and making business more efficient and effective. This paper also aims to show how important it is to create and lead changes and be innovative in leading. This research will show the necessity of changes in organizational structures of modern companies according to complex and fast changes on the market with strong links to leadership-oriented management.*

Keywords: *leadership, changes, business activities, management, leader*

1. INTRODUCTION

In the era of globalisation and multinational companies, where market competition is large and aggressive, in order to survive and ensure a good placement of its products or services on a market, a company, be it large or small, has to follow and adjust to changes on the market. Today, companies need people, leaders and managers, capable of ensuring the company's survival on the market, as well as its progress with proactive exchange with the surroundings, external and internal alike.

Leadership creates a strategic vision, provides direction and orientation to activities, initiates and manages changes and motivates employees to follow it, because changes also imply changes in the enterprise structure, but also modifications in the employees' behaviour.

The basic hypotheses from which this research proceeds as follows:

- In order to subsist on a market and ensure good marketing of its products, a modern enterprise has to follow changes in the external environment.
- For maintaining an organisation's vitality, an enterprise requires top management with leadership capabilities, which observes changes in the external environment on time and follows them with constant, innovative changes in the enterprise.
- Good enterprise organisation implies leadership at different levels of enterprise structure.
- Enterprise transformation process, which implies changes in the organisation and functioning of an enterprise, requires leadership, which creates, initiates and manages such changes, whether major or minor; successful transformations are often insufficiently clear and demand sacrifices, creativity and innovations, and cannot happen without a convincing leadership.

2. ENTERPRISE AND MODERN ENVIRONMENT

"A company is a living organism. We can compare it to a tree that grows, develops and bears fruit. Fruits are products and services, and the aim is to have them as many as possible. Visible on every tree are its trunk, branches and fruits (or company's material and financial resources), which are nurtured and promoted, talked about and reported on. All we can see comes from roots, which are actually, the intellectual capital. There can be no healthy fruit without healthy and strong roots, which draw their strength from the soil, i.e. knowledge of the human resource potentials, in the first place." (1)

An enterprise is a social being – a group of people who carry out different activities in order to achieve a goal, i.e. make profit. An enterprise is at the same time a state (enterprise structure) and process (set of all activities). In the age of market economy globalisation, where competition is intensive and quick, in order to successfully carry out its business activities, an enterprise has to adjust to the market changes and not just follow them, but also to anticipate and adequately react to them. Adjustment of an enterprise's business operations to market changes has to be done through an adequate combination of strategic (major) and incremental (modest) changes. An analysis of the environment (which consists of all the individuals, organisations and institutions, as well as of all economic, political, legal, technological, socio-cultural and other factors which have an actual or potential impact on an enterprise's business results) is extremely

important for the business of an enterprise, adoption of strategic decisions and direction of its business activities. An analysis of the environment provides insight into its present state and, at the same time, anticipates its potential changes. (2)

In today's world the pace of these changes is rather fast and the competition strong and aggressive. Today's enterprises are faced daily with great risks on the one side, and great possibilities, on the other. It is necessary to strike a balance between risks and possibilities, which is only possible if enterprises follow technological trends and the global economy demands.

Survival of an enterprise and its progress under modern conditions, exclusively depend on the enterprise's capacity to adapt its production programme, technology and product quality to demands of the modern market. Competitively oriented enterprise is the one capable of offering on the market a good-quality product under more favourable conditions than its competition. A product is not produced just to be sold, but also to meet the consumers' expectations and wishes. Today, that is very hard to achieve, because competition is getting larger by the day. Enterprises have to transform into leadership enterprises that will achieve differential advantage on the global market. Such enterprise orientation imposes greater requests for itself, raising new challenges along the way. Accepting the risk will undoubtedly lead to greater success and better performance. (3)

In order to make profit, it is necessary to follow modern trends in science and technology development, IT achievements and modern management information system. Better knowledge of all IT categories enables better communications on the world market and favourable results in the international economy. Political surroundings are very important, especially as regards the adoption of important strategic decisions. State regulations and the country's political system condition synergic effect of all environment's factors on the development of business systems and successful survival of enterprises in turbulent surroundings. A successful and modern enterprise has to adapt to modern business trends. These modern trends imply:

- maximum profits and minimum costs,
- compromise (successful cooperation between employers and employees),
- information technologies (management information systems),
- good and stable state regulations and political system.

The most successful enterprises in global economy become those which initiate activities based on knowledge created in the enterprise. That's the know – how, expertise, as well as the organisation's development concept which learns by securing its survival and improvement of overall business results.

The major weakness of an enterprise as an economic organisation is its inability to change. Each organisation must have sufficient stability to continue to function well and, at the same time, prevent it from becoming static.

By satisfying the basic economic principles an enterprise can achieve positive business results. However, that's not sufficient for further future of enterprises in turbulent surroundings. World globalisation and dynamic environment force many enterprises to learn so as to adapt to unstable world market. Competency of an enterprise is its trade mark in the business world. Incompetent enterprises very soon go under because they did not manage to carry out transformation on time and adapt their organisational structure and strategy to market developments. Knowing its competition is exceptionally important for an enterprise. Therefore, it is necessary to follow what the competition is doing and always be one step ahead of it. No.1 enterprise in the business world is the one that accepted on time modern concepts of doing business and adapted its business operations to current developments in the environment. (4)

3. GLOBALISATION AND THE NECESSITY OF ORGANISATIONAL CHANGE

The globalisation process, a 21st century phenomenon, essentially relates to the growth of trade and investments in international business and to the integrated world economy. According to Punnett (2004) the globalisation concept is based on a number of relatively simple premises.

- Technological developments have increased to high levels and thus enabled the ease and speed of international communications and travel.
- Increased and easy communications and trade have made the world smaller.

- A smaller world means that people are more aware of events outside of their home country, and travel more to other countries.
- Increased awareness and travel result in a better understanding of foreign opportunities.
- A better understanding of foreign opportunities leads to increased international trade and investment.
- The increased international trade and investments lead to greater integration of the world economy.

Today, managers must be conscious that markets, supplies, investors, partners, and competitors are everywhere in the world. Successful businesses will take the risks and use opportunities wherever they are and will be prepared for downfalls. Successful managers, in their environments, need to understand the similarities and differences across national boundaries, in order to utilize the opportunities and be aware of potential business downfalls.

Business globalisation is easily recognised through a network of many brands and services all over the world. For example, Japanese electronics and car industries are distributed everywhere – in Asia, Europe, North America, while on the other side, the American cars, entertainment, financial services are present in Asia, Europe and North America. Most companies became multinational and transnational, practically meaning that they have their base in their home countries, but do business all over the world. For example, the French Michelin is based in France, and its factories – production plants are in many countries (Serbia, Rumania, China, Thailand,...), American Coca – Cola also (factories in France, Belgium,...), the highest percentage of Japanese Honda cars are produced in the USA, and such are many more examples of world known manufacturers. (5)

In order to achieve its objectives an enterprise has to clearly define its mission and vision, to define its objectives and adopt such organisational structure that will facilitate the implementation of set goals. Leadership is also necessary at all levels.

Organisational structure of enterprises is mostly a hierarchy concept of coordinating entities which cooperate and contribute to the achievement of the set objective. Organisational structure allows division of responsibilities to functions and entities, within branches, sectors, groups and individuals. In an organisational structure individuals can be employed for a definite and indefinite time period, which is defined under a contract. An efficient organisational structure should facilitate the operational relationship between different entities in the organisation and can improve work efficiency of organisational units. The organisational structure of an enterprise should be such so as to enable process control and monitoring, up to product delivery. It should be such so as to harmonise all requests and optimise the process itself. The organisations should enable application of individual capabilities with a view to achieving high flexibility and creativity. With the expansion of business, the chain of requests is increasing and the control expanding. If the organisation doesn't change, after a longer period of time its flexibility and creativity will decrease. Therefore, it is necessary to change the organisational structure from time to time, so as to make recovery possible. (6)

Problems with which the enterprises are faced lately can hardly be successfully resolved without successful organisations, and organisations cannot be successful without efficient leadership. The enterprise can obtain all other resources it lacks (technology, capital, etc.) through larger or smaller efforts. However, enterprises lacking leadership have limited chance to face the problems brought about by globalisation of the world market. Lacking leadership, enterprises continue to do what they have been doing for years in the way they have been doing it. They continue to improve the existing routines and existing business orientation.

In the business world, leadership is undoubtedly the most important activity and function in the collective work. The right man in the right position and at the right time can make miracles. Leaders, who are generally also managers, can be easily recognised in a business environment. Every leader's style implies a style of conduct and methods of performing the job. Some styles may be accepted by his associates, whereas others might be considered inappropriate. The style is a result of leader's philosophy, personality and experience.

It should be emphasised here that capability of an enterprise to face the changes basically depends on two leadership qualities. The first is the ability to timely spot and understand the changes in the external environment and the second is the capacity to procure and use the resources, and expertise, and to adequately react to changes. Leadership is a process which includes the movement of the organisation's members from the present state to the future, new state. (7)

Cooperation of the top management and mid-level management in an enterprise represents an essential factor in initiating and implementing strategic changes, especially major, transformational changes. "The less a strategy can be imitated, the more durable the source of competitive advantage." (8)

4. IMPLEMENTING ORGANISATIONAL CHANGES AND LEADERSHIP (A CASE STUDY)

Apart from the usual changes on the market, enterprises today are faced with the crisis, which is assessed as the largest global crisis since the world economic crash in 1929. From our country's perspective, the international crisis has only intensified the effects of national and regional crisis we have been facing for over one decade. The crisis always makes business significantly harder. Proactive response to it, while the negative effects are still on, can only be great work on system maintenance and intensive preparations, through development processes, modernisation and reconstruction, for that which comes after.

This crisis too has shown, in its crudest form, through the collapse of world business and financial empires, that what companies once were is no longer a guarantee of their survival and further development. Only those prepared to adequately change survive.

Company Tigar AD (shareholding company)

Under the conditions of a crisis many different business decisions have been made in Tigar so as not to bring the implementation of strategic objectives at risk. In the previous period a complex restructuring process was carried out in Tigar, which was considered the right one to enable sustainable development of the business system over the long-term. That implied being equipped with capacities, technologies, as well as higher productivity and better product quality compared to the competition. All these are greater and smaller innovative changes which a corporation made or is making so as to subsist and develop.

Tigar made a plan of successive investments for the 2007-2011 period. A year after the investment programme follows a period of development and industrialisation, and only then starts the period of commercialisation in which the return of investments will be ensured.

Experts point out that in the current crisis, the threatened liquidity is a test of sorts of the strength of the economy in general and of the company individually. And in order to ensure a reliable inflow of money from the market it has to provide products and services that meet the market requirements. However, it is first necessary to invest, commit money, whereafter it will successively return into the system. During the restructuring period, business results are always lower, needs for cash higher and investors and banks more cautious in making decisions, because they should finance some future results. In the case of Tigar the situation is particularly complex, because the entire system has been under restructuring for a couple of years now.

Tigar is a brand recognised on the national and international plane, and analysing the practice of large companies, Tigar's management came to a conclusion that in addition to corporate brand, the company needs to own other brands too, which it would develop on its own or take over, buying brands that have already proven themselves and are recognised on the market. Applying this practice, Tigar introduced brands Maniera (fashion shoes), Brolly (children's shoes), Bottega (rubber and Italian shoe shops), Stop & Drive (service network), and it bought famous foreign brands Hunter (rubber footwear) and Bilgutex (recycled rubber products).

Intensive development of new products for new markets and buyers, as well as the expansion of the product mix for the existing customers was the first priority after investments in capacities, good-quality equipment and continuous employee training and education were completed. In one year Tigar Americas managed to win a good position on the market of Canada. Partnership was made with STC firm in the most expensive part of production – protective footwear for extensive purposes. Miner and forest boots have already been commercialised, through a number of deliveries. Several new prototypes have been mastered, which are to be commercialised soon.

By acquiring the Century brand, which is present and known all over Europe, Tigar has secured an even better position in further winning this demanding market. It is very important that together with the brand, the unique dipping technology was also obtained. It ensures the absolute impermeability of footwear to any type of external fluids, liquids and other aggressive substances.

The company also carried out the modernisation of its retail network. When Tigar started marketing fashion footwear from the Maniera programme, a question of the sales channels arose. By opening Bottega shops, with the full programme of footwear for all seasons, Tigar opened its doors to a loyal customer. Since shoes from collections Maniera and Brolly are of seasonal character, an adequate programme had to be found, which would be a counterpart to these brands by its quality and, at the same time, interesting for the desired target group of potential customers. With the opening of Bottega shops conditions have been created for clear differentiation of Tigar's points of sale from others and the retails network was improved.

In 2009 Tigar continued the development of the largest national service network Stop & Drive, which fully follows the modern trends. Apart from opening new service centres in towns all over Serbia, great importance was attached to the modernisation of the existing facilities, as well as good-quality training of employees.

With the aim of expanding further the production and its market share on the national and international markets, Tigar Technical Tyres acquired a production programme of the Danish firm Bilgutex. This purchase included transfer of equipment, production technology, technical certifications and certificates for Bilgusafe products – children playgrounds tiles, Bilguland – sand pool fences, Bilgubollards – road margin poles, Bilgubuffers – buffers and Bilgulane – rubber mats. The transfer included taking over of commercial contracts, which enable not only the production, but also the marketing of these brands, which are already well positioned on the North European market.

Tigar Technical Tyres mastered the production of sport floorings from recycled rubber, which have long-life cycle in exploitation and do not require special maintenance. Products from recycled rubber for traffic and road signalisation have also been mastered.

The Footwear Factory was modernised with the acquisition of new technologies and product lines, as well as automatisisation of the existing process lines. Apart from introducing the mentioned innovative changes, Tigar also reconstructed some of the existing production lines, and also carried out the regular annual overhaul of factories.

Production costs and prices of final product have been reduced with the introduction of cheaper materials and alternative suppliers. Increasing energy efficiency, which includes numerous economic, ecological, social and other social responsibility components, including environmental protection, represents the key to business success and important competitive edge of companies committed to sustainable development. Experiences from European Union member countries show that ecologically aware companies can reduce energy costs up to 20%, without major investment, whereas thus achieved savings directly increase profits.

Within the activities aimed at promoting energy efficiency and reducing business costs, the Corporation Tigar adopted Energy and Water Saving Programme. Monitoring the consumption of resources is an on-going process in Tigar, with careful recording and analysing of gathered information on the water and energy use. Based on set consumption targets, further measures and actions are being taken so as to permanently promote the energy efficiency. Tigar regularly records the consumption of fuel gas and coal, energy and water consumption, as well as share of energy in the cost of finished products. Follow-up of these parameters and implementation of specific corrective measures contribute to the reduced wasting of raw materials, better product quality and preventive maintenance, improved financial planning of production and control of production processes, as well as intensified environmental protection.

Tigar was one of the first companies in the country to recognise the importance of long-term connections with foreign partners. The strategic partnership process, which lasted thirty years in the tyre programme with the American manufacturer B.F. Goodrich, started back in 1974, with the signing of the Contract on Business-Technical Cooperation, and then of the Joint Venture Contract in 1978. Takeover of B.F. Goodrich by Michelin Group in early 1990's marked the beginning of the globalisation process in the tyre production in world organisations and intensive concentration of production, research and development potentials with the leading manufacturers. The rising market demands, fierce competition, general regulations regarding quality, security, safety and environmental protection, complexity of access to markets of production materials, spare parts and equipment during the 90's, conditioned the linking of medium and small producers with the big ones, which started including in their programmes third and second-line products. Producers from Central and Eastern Europe and Far East also started to develop intensively, for most part, after joining major tyre systems. Due to the country's status, Tigar had no conditions for quicker development and investments and Michelin Group, as legal successor of B.F. Goodrich, became Tigar's partner within joint investments in the

tyre programme. In December 2001, a new Joint Venture Contract was signed with Michelin, under which strategic cooperation has been continued and a joint venture enterprise formed. (9)

Formation of a joint enterprise enabled tyre programme to modernise production capacities, ensure much better financing conditions, better quality access to markets of materials and equipment, employee training, better national and international positioning, growth of production, changes in the structure of product mix, growth of sales, particularly exports and capability to respond to sharp market requests. During 2007 it became clear that further successful development of the joint enterprise would be solely possible through the process of complete integration with the Michelin Group, since otherwise there was an actual danger for it to stagnate, which would have forceful adverse effects not only on the joint enterprise, but also on Tigar as a whole. Having in mind the interests of the joint enterprise on the one hand, and interests of enterprises under control ownership of Tigar AD on the other, definition of the most favourable strategy for a way out was launched, which would primarily secure the capital for the development of other programmes, good-quality commercial and service cooperation, as well as save jobs. That was all in the interest of owners, because it created foundations for long-term good-quality preservation of their investments. In 2009, Michelin Group became the sole owner of Tigar Tyres.

Fully taking into account the real effects of partnership it could be rightfully said that two respectable business systems have been developed through this process - Tigar AD and Tigar Tyres, which is important not only for the employees and owners, but also for the local community and country as a whole. Through this process Michelin showed that, although being one of the strongest multinational companies, it's not a company that merely pursues its own interests in individual countries, but is ready to render its full development contribution to partnership relations. Through this process, Tigar AD, for its part, implemented a unique project in Serbia, as the plant has not been closed down, not worker lost his job and the ownership structure was regularly changed on the Stock Exchange in line with the valid world trends. In addition, a strategic partner was included, who gradually fully integrated Tigar Tyres into its business system, full cooperation with the international financial institutions was achieved and all other programmes underwent or are in process of intensive modernisation and restructuring so as to position themselves in the best possible way on the domestic and world markets..

During these transformations, apart from permanent investments in the equipment and technology, constant investments were made in knowledge, which is one of the basic features of the company's business policy.

Tigar's strategy is that which gives the company the competitive edge, provides direction, builds the brand reputation, sets objectives, creates superior performance, defines market position and creates a unique offered business value. All basic programmes within the Corporation have been conceived so as to have or achieve the leading position, or to be among the leaders on the competitive market.

5. CONCLUSION

Globalisation, rising competition, large number of strong companies, which come from new world economic powers, such as China, India and Korea, admission of new states into the European Union and strengthening of their firms, limited raw materials and energy resources, have all defined the broad business environment in the last years. Deep disturbances in world finances and key changes on the international plane have directly affected business operations of many national and international companies.

On the other side, on the national level evident are major changes brought about by preparations for the integration in the European Union. The market is becoming ever more open. With the reduction of customs rates and other duties on imported goods, they become more competitive compared to national products. Prices of food and energy grow and foreign investors are withdrawing from the national capital market, with constantly present threat of rising inflation and sudden changes in the exchange rate.

The survival of an enterprise and its progress under contemporary conditions depend exclusively on the enterprise's ability to adapt its production programme, technology and product quality to the demands of the modern market. Competition oriented enterprise is the enterprise which can offer on the market a good-quality product.

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under more favourable conditions than its competition. A product is not produced just to be sold, but also to meet the consumers' expectations and wishes. Today, that is very hard to achieve, because competition is getting larger by the day. Enterprises have to transform into leadership enterprises that will achieve differential advantage on the global market. Such enterprise orientation imposes greater requests for itself, raising new challenges along the way. Accepting the risk will undoubtedly lead to greater success and better performance.

In order to make profit, it is necessary to follow modern trends in science and technology development, IT achievements and modern management information system.

In the global economy, the most successful enterprises become those which initiate activities based on knowledge created in the enterprise. That's the know – how, expertise, as well as the organisation's development concept which learns by securing its survival and improvement of overall business results.

In the context of today's global and national situation and state on the capital market, only those companies will survive which anticipate and understand changes occurring in their national, but also world surroundings, and which are ready to change by following these changes. Those are companies headed by the top management with strong leadership characteristics. Without strong leadership a company cannot survive and develop further under modern conditions of doing business. It is the responsibility of leaders at all levels, from CEOs to lowest-ranking managers, to help employees recognise and understand the necessity of changes and accept new ways of performing jobs.

In the world characterised by global competition, diversity, sharp technological changes and political turmoil, discontinuous organisational change is imposed as a determinant of organisational adjustment. Companies that can initiate and implement discontinuous organisational change gain competitive edge. Although not all changes are successful, the fact remains that inertia is a certain road to failure. Top management is of most crucial importance for initiating and implementing changes in the organisation. A charismatic leader is of vital significance for managing important changes in the system. Charismatic leaders provide vision, direction and energy.

However, charisma in itself is not enough for making crucial changes. Also required is good organisation, which includes tasks, responsibilities and stimulation of employees. Since many companies are large and complex, it is necessary to include managers at all levels in such systems for successful implementation of changes.

Successful implementation of changes is not based only on the strengths of persons implementing them – each of these personalities has to be capable of making teams, systems, procedures, of bringing in his energy so that the vision can be successfully achieved.

Even with highly inspirational leaders it is not simple to fully implement the plan. Changes require time. In the course of changes mistakes happen, environment changes, many key people leave. Irrespective of all these turbulences and complexity of change, the executive team has to develop ability to adapt to new conditions and, which is very important, must learn from mistakes, but also success too.

Just like an organisation cannot remain stable in the changing environment, the management has to be flexible. The ability of the executive team to continuously learn and be flexible is a measure of a successful proactive management process of the organisational changes of an enterprise.

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REVIEW OF THE ORGANIZATIONAL AMBIDEXTERITY: LESSONS FOR MANAGERS AND OTHER PRACTITIONERS

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Abstract: *The reason for writing a review on organizational ambidexterity can be found in the necessity to establish a unified theoretical framework from a flood of papers being published on this topic in the last fifteen years. This growing body of knowledge deserves to be reviewed and systematized, which is why the authors survey, classify and synthesize different theoretical concepts and empirical studies that examine the nature of organizational ambidexterity. The paper starts by explaining the reasons for achieving and sustaining organizational ambidexterity, i.e. the need for ambidextrous organizations in the contemporary environment is explained. The paper continues by providing an insight into a delicate balance between differentiation and integration as the prime mechanisms for fostering organizational ambidexterity. Finally, it ends with practical guidelines on the manner in which organizational ambidexterity may be achieved. This paper is useful for academics as a solid foundation upon which other theoretical and empirical contributions ought to be built. On the other hand, it is also useful for managers and other practitioners in terms of specific guidelines for achieving and maintaining organizational ambidexterity.*

Key words: *Organizational ambidexterity, Ambidextrous organizations, Exploitation, Exploration, Continuity, Change.*

1. INTRODUCTION

Business environment today may be seen as discontinuous because the mapping from firm actions to performance outcomes changes frequently, profoundly, and in ways that are difficult to predict (cf. Siggelkow & Rivkin, 2005; Stefanović, Prokić & Vujović, 2012). Contemporary organizations are facing the unpredictable and more complex environment than ever before, which is why organizations ought to pay attention to a much larger number of variables in the environment and their dynamics than was the case earlier (Stefanović, Prokić & Vujović, 2012). Rise in complexity of the environment calls for an increase in search diversity of the organization, while rise in dynamics of the environment calls for an increase in its speed. Thus, in an environmental setting characterized by both turbulence and complexity, a firm must balance speed and search in order to achieve and retain its viability (Siggelkow & Rivkin, 2005).

For a firm to be successful in the contemporary environment, it must maintain continuity of its on-going operations, while fostering innovations and change at the same time. It is now well known that the archetypal tension between continuity and change might be better understood in terms of relational, synergistic tendencies rather than conflicting, incompatible forces that must be resolved one way or the other (Graetz & Smith, 2008). Continuity and change come together when stability, hierarchy, specialization, formalization and centralization are coupled with attributes such as speed, flexibility and responsiveness (Graetz & Smith, 2008). As Brown and Eisenhardt (1998) have noted, organizations will secure their existence only if they maintain a balance between flexibility and stability, because too many changes may create chaos in organizations if continuity is not taken into account, whereas the opposite could lead to inertia (Levinthal & March, 1993). In other words, due to the changes in their environment, organizations must learn how to do these and others seemingly opposite things at the same time. Therefore, organizations need to strive to become dualistic entities (Pettigrew & Fenton, 2000).

If one takes a closer look at organizations, he will notice that they are characterized by dualities or paradoxes, such as: efficiency and innovation, integration and differentiation, control and freedom, centralization and decentralization, and competition and co-operation (Child & McGrath, 2001). In order to remain successful over long periods, organizations, as well as their managers, must become ambidextrous (Tushman & O'Reilly, 1996). Organizational ambidexterity, the term first used in this context by Duncan (1976), represents a firm's capability to manage the tensions between simultaneous, yet contradictory processes (Duncan, 1976). In general, the concept of organizational ambidexterity has been used to "describe a variety of distinctions in organization behaviour and outcomes" (Simsek, 2009, p. 599). More specifically, it has been used to depict an organization's ability to simultaneously work on two different things,

such as: exploration and exploitation, efficiency and flexibility, incremental and radical innovation or alignment and adaptability.

In order to define the organizational ambidexterity more precisely, one must incorporate the level of observation, i.e. whether the object of observation is a group of organizations, a single organization, a specific group within an organization, or perhaps an individual. Some studies indicate that ambidexterity is rooted in individual's ability to explore and exploit. Thus, organizational mechanisms may be required to enable ambidexterity at the individual level (Raisch et al., 2009). On the other hand, the majority of studies regard ambidexterity as a set of mechanisms enabling exploration and exploitation activities simultaneously. In this sense, organizational ambidexterity ought to be regarded primarily as an organization-level construct that manifests itself in the organization's balance of high levels of exploitation and exploration, efficiency and flexibility, incremental and radical innovation, as well as alignment and adaptability. In other words, ambidextrous organizations are the ones that are fully capable in attaining a high level of innovation, flexibility and effectiveness, without losing the benefits of stability, routinization and efficiency (Simsek, 2009). Even though organizational ambidexterity gained significant attention in recent years, it remains poorly understood phenomenon (Simsek, 2009). For example, scholars and practitioners agree on the importance of balance between exploration and exploitation, but "there is considerably less clarity on how this balance can be achieved" (Gupta et al., 2006, p. 697), which is why numerous authors are trying to build a more comprehensive framework (e.g. Andriopoulos & Lewis, 2009; He & Wong, 2004; Jansen et al., 2006; O'Reilly & Tushman, 2011; Simsek, 2009).

The purpose of this paper is to synthesize various theoretical and empirical contributions on organizational ambidexterity in order to build a more comprehensive theoretical framework and to provide guidelines for managers and other practitioners on how to build ambidextrous organizations.

2. THE NEED FOR AMBIDEXTROUS ORGANIZATIONS

Knowledge intensive businesses, such as design and engineering services, advanced electronic, biotechnology, software design, healthcare, consulting, etc., feed upon a continuous cycle of innovation (Miles et al., 1997). For this kind of business, it is necessary to simultaneously achieve high level of exploration, resulting in viable innovations, as well as a high level of exploitation, i.e. high level of performance in on-going day-to-day operations. Therefore, exploration of the future and exploitation of the past is a necessity (Lewin & Volberda, 1999).

The exploration-exploitation trade-off is a well known subject (Schumpeter, 1934; March, 1991). Exploration can be defined by terms such as: search, variation, experimentation, and discovery, while exploitation includes: efficiency, refinement, selection, and implementation (March, 1991). The basic trait of exploitation is the refinement and extension of existing competences and technologies. Thus, these are steps taken into relatively known future with predictable returns. On the other hand, the essence of exploration is experimentation with new alternatives and probes into unknown future. The returns are usually uncertain and distant (March, 1991). Neither one alternative for itself is a good choice for an organization. A delicate balance between exploration and exploitation must be obtained in order to achieve long-term survival and development of an organization. A firm must "engage in enough exploitation to ensure the organization's current viability and to engage in enough exploration to ensure future viability" (Levinthal & March, 1993, p. 105).

Tushman and O'Reilly (1996) noted that an ambidextrous firm that is capable of operating simultaneously to explore and exploit is likely to achieve superior performance than firms emphasizing one at the expense of the other. These firms are able to simultaneously pursue both incremental and discontinuous innovation. On the other hand, they argued that in reality, few firms may succeed in managing exploration and exploitation at the same time, because these notions assume fundamentally different logics and require different strategies and structures, and the resulting tension is difficult to reconcile. But this is not all. To be ambidextrous, organizations have to reconcile these internal tensions with the conflicting demands in their task environments (Raisch & Birkinshaw, 2008), which makes this issue even more complicated.

Nevertheless, the tension between exploitation and exploration may be viewed as the problem of a firm's choice: whether it ought to continuously adapt to existing environmental demands, thus fostering structural inertia and reducing its capacity to adapt to future environmental demands (Hannan & Freeman, 1984) or experiment with new alternatives, thus reducing the speed at which existing competencies are improved (March, 1991). This particular problem may be resolved by finding an adequate balance that matches the

existing environmental and organizational context. Thus, the central organizing challenge has become the ability to develop systems that thrive in paradox, providing both efficiency and innovation along with a centralized vision and decentralized power (Child & McGrath, 2001). "The real test of leadership, then, is to be able to compete successfully by both increasing the alignment or fit among strategy, structure, culture, and processes, while simultaneously preparing for the inevitable revolutions required by discontinuous environmental change. This requires organizational and management skills to compete in a mature market (where cost, efficiency, and incremental innovation are key) and to develop new products and services (where radical innovation, speed, and flexibility are critical). A focus on either one of these skill sets is conceptually easy. Unfortunately, focusing on only one guarantees short-term success but long-term failure. Managers need to be able to do both at the same time, that is, they need to be ambidextrous." (Tushman & O'Reilly, 1996, p. 11)

3. ENABLING ORGANIZATIONAL AMBIDEXTERITY: THE BALANCE BETWEEN DIFFERENTIATION AND INTEGRATION

Differentiating and integrating are two opposing, yet complementary processes needed in order to achieve ambidexterity. These processes enable one another. Differentiation refers to the separation of explorative and exploitative activities into distinct organizational units, while integration represents the mechanisms that enable organizations to address exploitative and explorative activities within the same organizational unit (Raisch et al., 2009). "Differentiating pulls apart the existing product and innovation by focusing on how they differ from one another. Integrating, in contrast, reinforces and makes mindful possible synergies between these products... It is the engagement in both of these cognitive processes that leads to... balanced decision making." (Smith & Tushman, 2005, p. 529)

In order to achieve equilibrium, firms must match structural differentiation and integration to key contingencies (Lawrence & Lorsch, 1967). They need to balance differentiation to adapt rapidly with integration to achieve efficiency (Westerman, McFarlan & Iansiti, 2006). Thus, blending integration and differentiation is very important for ambidextrous organizations. Integration tactics accentuate the importance of both poles of exploitation-exploration tension, while differentiation helps maximize the distinct benefits of these opposing poles by clearly focusing actions on them (Andriopoulos & Lewis, 2009). Cao, Gedajlovic and Zhang (2009) have shown that ambidexterity is fostered by close interrelations between existing and new knowledge. They argue that synergistic effect can be achieved by allowing existing resources to be more fully employed to acquire new capabilities, while at the same time permitting new knowledge to be more fully integrated into the existing pool of resources. Structural differentiation and integration play a crucial role in a firm's ability to pursue exploratory and exploitative innovation concurrently, even though these two types of innovation require fundamentally different and inconsistent architectures and competencies that create paradoxical challenges (Jansen et al., 2009). Andriopoulos and Lewis (2009) showed that the simultaneous use of both integration and differentiation approaches to managing paradoxes of innovation demonstrate managerial creativity. Raisch et al (2009) have noted that integration and differentiation are complementary mechanisms for achieving organizational effectiveness. The natural tension between these opposing forces requires ongoing managerial attention, which is why the managerial task is to determine the right degree of differentiation and integration.

Perhaps the main question is whether the same organizational unit or even an individual will assume the different roles (e.g. exploration and exploitation) or different organizational units/individuals will assume responsibilities for different roles. This kind of analysis on the group level has been provided by Smith and Tushman (2005). They argue that two fundamentally different types of top management teams are able to execute balanced decision making: leadercentric and teamcentric. In leadercentric teams, the leader integrates the contradictory agendas of the team members, whereas in teamcentric teams, the teams themselves integrate the contradictory agendas.

In order to achieve ambidexterity, firms have a myriad of options available. Different organizational solutions may substitute for each other to yield a functionally equivalent effect (Gresov & Drazin, 1997). In this sense, architectural and contextual ambidexterity will be depicted in this paper as different options leading to the same goal. The theory of architectural ambidexterity emphasizes dual structures and strategies, i.e. differentiating efforts to focus on either exploitative or exploratory innovation (Gupta et al., 2006). These segregated efforts rely on: (1) spatial separation that parses work into distinct units, (2) temporal separation in order to utilize the same unit but at different times for either exploitation or exploration, and (3) parallel structures in which two kind of structures exist at the same time, switching people back and forth between them (Puranam et al., 2006; Raisch & Birkinshaw, 2008). On the other hand, the theory of contextual

ambidexterity proposes behavioral and social means of integrating exploitation and exploration (Birkinshaw & Gibson, 2004), i.e. a carefully selected set of systems and processes that collectively define organizational members' behavioural context (Simsek, 2009). Thus, contextual ambidexterity may be perceived as "the behavioral capacity to simultaneously demonstrate alignment and adaptability across an entire business unit" (Gibson & Birkinshaw, 2004, p. 209). This behavioral view posits organizational ambidexterity as a function of high performance context in which individuals are embedded. In this case, managers are responsible for creating a context that enables employees to use their own judgment on dividing their time between exploration and exploitation (Birkinshaw & Gibson, 2004; Eisenhardt, Furr & Bingham, 2010), but ultimately, ambidexterity is rooted in individual's ability to explore and exploit (Raisch & Birkinshaw, 2008). This context is characterized by a combination of stretch, discipline, support and trust to facilitate organizational ambidexterity (Gibson & Birkinshaw, 2004). Ambidextrous organizations are supported by a common vision and by supportive leaders who both encourage the culture and know enough to allow appropriate variations to occur across organizational units (Tushman & O'Reilly, 1996). Raisch et al (2009) have noted that managers can exhibit to different degrees personal ambidexterity by engaging both in exploitation and exploration activities. The variance in the degree of personal ambidexterity stems from both personal characteristics and organizational contexts faced by the manager.

Nevertheless, both architectural and contextual ambidexterity have some pitfalls that need to be addressed. For example, while strict structural separation is likely to result in sharp interfaces, ambiguous priorities, and a lack of common orientation, contextual ambidexterity shifts the problem of balancing flexibility and efficiency from the level of organizational to the individual level. It is doubtful that members of an organization can deliver what the organization as a whole fails to do (Schreyögg & Sydow, 2010). On the other hand, even though architectural and contextual ambidexterity have been implicitly conceptualized as alternative solutions, there are complementarities between them (Raisch & Birkinshaw, 2008; Tushman & O'Reilly, 1996). An ambidextrous organization may be characterized by structural separation, clear strategic intent, an overarching vision and values, and an aligned senior team with the ability to manage trade-offs (O'Reilly & Tushman, 2007). In the remainder of this paper, the focus will be solely on architectural ambidexterity, i.e. on spatial separation and parallel structures (in brief), while there will be no discussion regarding the temporal separation. In the opinion of authors, organizational unit that either exploits or explores does not reflect the nature of ambidexterity. Integration mechanisms for achieving ambidexterity will be depicted as well.

3.1. SPATIAL SEPARATION

There is significant difference between structures designed for efficiency and those forged for innovations. For example, Burns and Stalker (1961) emphasized the difference between mechanistic and organic structures. While mechanistic structures are created for efficiency and stability, organic structures are made for effectiveness and adaptability. Nevertheless, contemporary organizations require both types of structures: organic to create innovations and mechanistic to implement and deploy them (Duncan, 1976), which means that these two completely different structure must blend in one in order for a firm to be successful. In other words, ambidextrous organizations must reconcile opposite tensions and inconsistent demands, such as demands of exploration and exploitation, by building internally inconsistent architecture within an organization. This inconsistent architecture retains the benefits of experimentation and variability, along with the benefits of exploitation and efficiency. It allows for uncoupling the variance-decreasing units and activities from those organizational units where variation is critical. Exploratory units are usually small and decentralized, with loose cultures and processes, while exploitation units are larger and more centralized, with tight cultures and processes (Benner & Tushman, 2003; Tushman & O'Reilly, 1996).

Tushman and O'Reilly (1996) have noted that organizational ambidexterity may be achieved when one or more business units in the organization focus on exploiting and one or more on exploring. This kind of structural differentiation, which is the product of subdivision of organizational tasks into different units (Lawrence & Lorsch, 1967), protects ongoing operations in exploitative units from interfering with processes and competencies being developed in exploratory units (Jansen et al., 2009). It allows very different frames to coexist in the firm, while not requiring different cognitive frames to coexist within individuals. The only frame integration that does occur within individuals is at the corporate level, where they need to engage different frames without the risk of creating operating inconsistencies (Gilbert, 2006). In other words, these differentiated autonomous business units ought to be strategically integrated through a senior executive's vision, while having limited tactical integration between themselves (Tushman & O'Reilly, 1997). Managers can highlight different goals and measures at different times. In this way, they can encourage more exploration or more exploitation, by emphasizing different aspects of performance, i.e. by operating several different performance measurement systems and by altering the degree to which these systems overlap or

diverge (Anderson, 1999). Usually, structurally differentiated units move from a primary orientation on exploration toward a more ambidextrous or even exploitative orientation over time.

Nevertheless, there are only a few options at disposal for a firm that wants to engage both in exploration and exploitation. It may differentiate its structure, i.e., adopt decentralized structure in terms of more or less independent internal division or a free-standing subsidiary. In contrast, a firm may adopt centralized structure and integrate its existing and innovative activities through fine-tuning and incremental changes or higher-dimensional, systemic reconfigurations (Siggelkow & Levinthal, 2003).

Westerman, McFralan and Iansiti (2006) suggested three options for achieving exploitation and exploration simultaneously: (1) separate-early, (2) integrate-early, and (3) wait-then-transform. Each of these options has its positive and negative implications on performance. The firms ought to choose the mode that best fits their strategic context and capabilities.

Separate-early approach strongly differentiates exploratory units and minimizes their interdependencies with exploitative ones. This option structurally optimizes for uncertainty, meaning that innovating unit can engage in rapid variation to respond to uncertainty, free from the existing limitations and boundaries in existing units. At the same time, this option suboptimizes interdependence. It cannot fully exploit benefits resulting from valuable interdependencies. Separate-early is well fit for variation early in the life cycle, but it becomes less fit later, requiring a transition to more integrated form. "This adaptation mode appears well suited for highly uncertain innovations or for firms where senior management cannot devote attention to coordinating interdependencies early in the life cycle. However, senior management involvement is still required to both set limits on early local search processes and to manage the transition to an integrated form." (Westerman, McFralan & Iansiti, 2006, p. 236)

Integrate-early is an opposite choice. It optimizes interdependence, while suboptimizing uncertainty. This approach is usually more efficient than the previous one because it makes use of existing resources in operating units. "However, it can be slower to act than the separate-early mode because it requires extensive effort to manage interdependencies early in the life cycle (although this coordination effort decreases over time)" (Westerman, McFralan & Iansiti, 2006, p. 237). Firms that do not lack strong integrative capabilities or the ones that can devote sufficient senior management attention to coordination early in the life cycle, would seem appropriate for this mode.

Wait-then-transform is the mode that avoids managing conflicting contingencies early in the life cycle. In other words, the firm must have enough slack resources to outwait uncertainty. After uncertainty passes, the firm optimizes for interdependence (Westerman, McFralan & Iansiti, 2006).

For firms that experience a large shift in their environment, a temporary decentralized response might be more appropriate than either a fully centralized response or a long-term decentralized structure. In this situation, firms may change their organizational structure from the aspect of balance between centralization and decentralization, both immediately after environmental change toward decentralization and after a period of initial exploration, back to a higher level of centralization, which can take place even though the environment is not changing. The benefit of temporary decentralization arises from its ability to sufficiently dislodge a firm from its prevailing practice so that the firm escapes its current development trajectory (Siggelkow & Levinthal, 2003). In order to reap the benefits from higher-dimensional changes affected by large environment shifts, a firm requires mechanisms for stability and coordination, i.e. a firm must employ organizational features that both push the firm toward exploration and pull it toward stability. In this manner, exploration and exploitation are not achieved simultaneously, but rather sequentially by adopting different organizational structures (Rivkin & Siggelkow, 2003). Furthermore, Siggelkow and Levinthal (2003) argue that in environments that experience a high frequency of large shifts, firms ought to repeat the process of going back and forth between exploration and exploitation. "As a result, firms might cycle through different organizational structures, pulsating back and forth between decentralization, to ignite new search, and centralization, to increase coordination." (Siggelkow & Levinthal, 2003, p. 665)

3.2. PARALLEL STRUCTURES

The difference between permanent and temporary organization can be explained using several criteria, but perhaps the most important one concerns the nature of the work to be done. In this sense, temporary organization is focused on a task, i.e. on action, while a permanent organization emphasizes goals and recurrent goal revisions, which primarily provide foci for decision-making (Lundin & Söderholm, 1995).

In order to achieve ambidexterity, some organizations are using parallel structures, i.e. they allow people to switch back and forth between two or more types of structures, depending on the requirements of their current task (Bahrami, 1992; Raisch & Birkinshaw, 2008; McDonough & Leifer, 1983). A good example of ambidextrous organizations using parallel structures is provided by Bahrami (1992), who describes some of the organizations operating in the Silicon Valley as “structured and yet chaotic... between stability on the one hand, and flexibility on the other” (p. 39). She argued that these organizations consist of two components. “The first component is a substrate of the formal structure which only periodically undergoes major transformation. This provides a formal mechanism for grouping skills, clustering activities, and assigning reporting relationships, as well as a base unit, which gives many employees an anchor of stability. However, due to inertial forces, these bedrock structures cannot be changed as frequently as may be warranted by internal and external changes. Many firms compensate for the relative inflexibility of the bedrock structure by using overlays of temporary project teams and multi-functional groups whose members are drawn from various operating units. These enable a firm to focus on critical assignments without causing major disruptions” (p. 39). Another example of dualistic structures in terms of employees moving back and forth between a bureaucratic structure for routine tasks and an organic structure for nonroutine tasks is provided by Adler, Goldoftas and Levine (1999). They have described how production workers switch between the two tasks supported by “parallel” organizational structures, such as quality circles.

Thus, these dualistic arrangements depicted here enable organizations to create a relatively stable setting within which people and resources can be effectively deployed in a flexible manner. Two structures coexist in order to ensure efficiency and flexibility at the same time. Parallel structures therefore allow competing demands for exploration and exploitation to be addressed within a single organizational unit (Gibson & Birkinshaw, 2004).

3.3. INTEGRATION

Firms that compete in environments characterized by high levels of complexity and dynamism require a higher level of division of labour in order to monitor many rapidly changing sectors of the environment. This leads to greater differences within the top management team regarding formality of structure, interpersonal orientation, and time orientation (Lawrence & Lorsch, 1967). Such divergence in perspectives makes consensus on the strategic direction of the firm difficult. Thus, Lawrence and Lorsch (1967) showed that increased differentiation necessitates an increased use of integrating structure to achieve high levels of performance. In less differentiated firms basic integrating structures such as managerial hierarchy of authority, rules and operating procedures, and informal integration by managers outside official channels may suffice, whereas in more highly differentiated firms, complex mechanisms may be necessary.

In organizations in which ambidexterity is achieved through spatial separation, integration may occur in form of loosely coupled organizational units. In this form explorative units are strongly buffered against exploitative units (Leonard-Barton, 1995; Levinthal, 1997). On the other hand, integration may occur even in form that combines both tight and loose coupling (Tushman & O'Reilly, 1997). In this kind of ambidextrous organizations, explorative and exploitative units are physically and culturally separated from one another and have different incentive systems, as well as management teams. Integration across units is achieved through coordination at the senior management level and a strong, widely shared organizational culture (O'Reilly & Tushman, 2004).

Jansen et al. (2009) examined the manner in which formal and informal senior team integration mechanisms, such as contingency rewards and social integration, as well as formal and informal organizational integration mechanisms, i.e. cross-functional interfaces and connectedness, mediate the relationship between structural differentiation and ambidexterity. They discovered that differentiation has positive effects on ambidextrous organizations. This effect is indirect, operating through both informal senior team integration and formal organizational integration mechanisms, such as liaison personnel and teams. The results of this research for senior team integration mechanisms showed that senior team contingency rewards, i.e. the formal component of senior team integration mechanisms, do not contribute to the achievement of ambidexterity. On the other side, senior team social integration fully mediates the relationship between structural differentiation and ambidexterity, and Jansen et al. (2009) concluded that structural differentiation is only detrimental to informal social relations at lower levels of hierarchy. This is why ambidextrous organizations need to resolve conflicting tensions between the members of senior teams, and to integrate diverse knowledge sources, which are located across exploratory and exploitative units (Smith & Tushman, 2005; Jansen et al., 2009). As for the organizational integration mechanisms concerns, regarding the formal

component of integration, Jansen et al. (2009) found that cross-functional interfaces are effective integrative mechanisms in structurally differentiated ambidextrous organizations. These interfaces have a mediating effect regarding the discussion of the hierarchical level at which integration between exploratory and exploitative efforts needs to happen. Gilbert (2006) argued that cross-functional interfaces are very important because of their ability to facilitate flows of knowledge between exploitative and exploratory units. Jansen et al. (2009) showed that, regarding informal social relations within organization, connectedness, viewed as the overall pattern of a firm's social network in terms of density, directly contributes to achieving ambidexterity, but it does not mediate the relationship between structural differentiation and ambidexterity. They stated that it becomes more difficult to develop and maintain informal social relationships between organizational members working in differentiated exploitative and exploratory units. Thus, according to them, connectedness (i.e. dense social relations) and its specific features, such as discipline, trust and support, directly affect the achievement of contextual ambidexterity.

Thus, informal integration mechanisms provided by senior management teams ought to be expanded by incorporating lower-level cross-functional liaisons (Gilbert, 2006; Jansen et al., 2009). Ambidextrous organizations need to incorporate more formal organizational integration mechanisms (i.e. cross-functional interfaces) at lower levels of hierarchy, because organizational members at these levels face high differentiation, but low level of interdependency, which requires more formal integration. On the other hand, at the higher hierarchical levels, ambidextrous organizations need to foster informal social integration among senior team members. At these levels, managers also face high differentiation as well as high dependency, which require frequent adjustments and more informal means of integration (Jansen et al., 2009).

4. CONCLUSION

Organizational ambidexterity gradually becomes a necessary condition for all firms that are trying to achieve long-term viability and prosperity in the discontinuous environment. However, this task is not an easy one. In order to become ambidextrous, organizations must learn how to achieve superior performance both in explorative activities, resulting in viable innovations, as well as in exploitative ones, resulting in high level of performance in on-going day-to-day operations.

The development of ambidextrous organizations would certainly be helpful for numerous firms in developing countries trying to achieve at least similar competitive positions as their counterparts in developed countries. In this way, they would have a chance to outperform those rivals that are still focused on being the best either in exploitation or in exploration. Therefore, gaining sufficient amount of knowledge regarding this issue is one of the most important tasks for the managers leading organizations, especially in developing countries, which is why the lessons presented in this paper are primarily dedicated to them.

This paper provides a profound insight into the concept of organizational ambidexterity. Authors are hoping that it will present a solid foundation upon which other authors can continue to build theoretical framework regarding ambidextrous organizations. On the other hand, authors are also hoping that this paper may present a set of guidelines for further empirical research on this subject, as well as for managers and other practitioners on how to build ambidextrous organizations. Only thorough understanding of the nature of ambidextrous organizations and the manner in which they ought to be built will enable scholars and practitioners to jointly put additional effort in order to enhance the probability of contemporary organizations to thrive in the age of discontinuity.

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FROM VERTICAL TO HORIZONTAL: REORGANIZING A LARGE COMPANY IN SERBIA

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Abstract: *This paper depicts the intended reorganization of a department in a large company operating in Serbia. If this pilot project proves successful, it will be spread throughout the major part of this company. The aim of the reorganization in stake is to make a shift in this department: from a vertically structured into a horizontally oriented, process-driven one. This kind of reorganization has been insufficiently documented within companies operating in Serbia. It means that managers in these companies cannot expect to have any kind of guidelines when starting these endeavours. Therefore, authors are hoping that this paper will present a solid foundation upon which the body of knowledge relevant to practitioners in Serbia will be built. The reason for writing this paper is to share some thoughts on this kind of reorganization and extract experiences from a discussion hopefully to be initiated on this issue, in order to come up with coherent conclusions that would be helpful for all organizations in Serbia trying to achieve a higher level of competitiveness through the adoption of a process-oriented perspective.*

Key words: *functional organization, horizontal organization, decentralization, reorganization, hierarchy, process.*

1. INTRODUCTION

The world of organizations is subjected to the increased pace of constant changes within the environment, thus making the global organizational landscape a very hostile place. Some organizational forms presumably fail to flourish in these environmental circumstances while other forms successfully compete with them for essential resources (Hannan & Freeman, 1977). In order to make organizations sensitive and responsive to the relevant shifts in its environment, a major change in the concept of organizing must occur, i.e. the focus of organizations needs to be placed on their core processes and the manner in which they create value for the customers. Thus, vertical bureaucracies, i.e. functionally organized firms, ought to be transformed into the horizontal corporations, focused on its core processes. These organizations represent dynamic and strategically planned networks of self-programmed, self-directed units based on decentralization (Castells, 1996).

However, this is not an easy task. Adopting process perspective within an organization represents a major shift in organizational structure and culture (Davenport, 1994). In this paper, authors are depicting the complexities of such endeavour. The paper illustrates an intended reorganization of one department in a large company operating in Serbia. The aim of this reorganization is to increase overall effectiveness and efficiency of the department in stake. In order to achieve this objective, a shift from the classical functional, vertically integrated organizational structure into the process-oriented, horizontal one, must be made.

2. THEORETICAL BACKGROUND

In a functional organization (sometimes called the “unitary form” or “U-form”), all the activities pertaining to a particular function are organized into departments (Harris & Raviv, 2002). The functional form is structured around inputs required to perform the tasks of the organization (Hax & Majluf, 1981), and the primary building block of performance is the individual and his or her job (Ostroff & Smith, 1992). Functional organization uses a centrally coordinated, vertically integrated structure to manage employees in highly specialized jobs and is well-suited to single-business strategies (Miles et al., 1997; Miles et al., 2009). Thus, this form is more predominant in organizations having single or dominant products (Hax & Majluf, 1981). Its crucial advantage is functional excellence. “A functional organization tends to develop highly qualified technical skills and a climate conducive to technical excellence and high efficiency. It provides a ‘critical mass’ for the career advancement of its professionals. But its inherent stress on specialization pushes the decision-making process upwards, because only at the top do we find the confluence of all inputs required for a final decision” (Hax & Majluf, 1981, p. 421).

On the other hand, it is well known that the functional organization was a dominant organizational form in the era of standardization (Miles et al., 1997). However, contemporary organizations are facing the unpredictable and more complex environment than ever before (cf. Stefanović, Prokić & Vujović, 2012). In order to achieve long-term viability, organizations must develop a system of organizational response to any relevant change in the environment in real time (Ansoff & Antoniou, 2005). Taking this general shift in the organizational environment into account, one would argue that the main disadvantages of the functional organization are coordination and flexibility, i.e. the ability to quickly respond to all significant shifts in its environment. Bureaucracy, who is regarded as one of the main traits of functional organizations, is slow to adapt when a change is necessary because signals for change need to filter their way to decision makers and back again to those entrusted with execution (Child & McGrath, 2001). Taking this into account, Ostroff and Smith (1992) have noted that “because so many of today’s competitive demands appear to call even more on coordination than on functional excellence, it is no surprise that vertical organizations have a hard time responding to this kind of challenges...” (p. 150). Therefore, a different kind of organizing is necessary for a firm in order to thrive in the contemporary environment.

Since the beginning of the 90’s numerous academics and practitioners have come to realize that the opportunity for firms to become more agile and responsive to the environmental stimuli lies in adopting a different kind of perspective on the issues of management and organization. They discovered that the focus on the core processes within organization instead of the tasks and hierarchy will much likely produce significant improvements of the overall results. “A process is simply a structured set of activities designed to produce a specified output for a particular customer or market. It has a beginning, an end, and clearly identified inputs and outputs. A process is... a structure for action, for how work is done... [Business] processes are therefore the structure by which an organization does what is necessary to produce value for its customers” (Davenport, 1994, pp. 134-135). In other words, business processes are the driving force of any organization (Hammer & Champy, 1993).

Taking a process perspective implies adopting the customers point of view (Davenport, 1994). “In this alternative form of organization, work is primarily structured around a small number of business processes or work flows, which link the activities of employees to the needs and capabilities of suppliers and customers in a way that improves the performance of all three...” (Ostroff & Smith, 1992, p. 151). This is why the implementation of the process approach in organization is likely to yield certain benefits in terms of the overall performance but it is very important that there are reasonable expectations for success that will be fulfilled (Davenport & Stoddard, 1994).

Ostroff and Smith (1992) argue that, in order to make a transformation from vertically structured, functional organization, into a horizontally structured, process-oriented organization, a firm must take these steps: (1) organize around processes, not tasks; (2) flatten hierarchy by minimizing the subdivision of work flows and non-value-added activities; (3) assign ownership of processes and process performance; (4) link performance objectives and evaluation to customer satisfaction; (5) make teams, not individuals, the principal building blocks of organization performance and design; (6) combine managerial and non-managerial activities as often as possible; (7) treat multiple competencies as the rule, not the exception; (8) inform and train people on a “just-in-time to perform” basis, not on a “need to know” basis; (9) maximize supplier and customer contact; and (10) reward individual skill development and team performance, not just individual performance.

The benefits of the transformation from the vertical functional organization into the horizontal process-oriented one may be seen through the achievement of higher level of a firm performance. Firm performance indicates the quality of the firm’s continuous co-alignment with the environment (Chakravarthy, 1986). Thus, the process-oriented organization ought to develop a performance model of its operations that relates process performance, and the customer satisfaction level resulting from it (Davenport, 1994). Process performance represents a degree of stakeholder satisfaction, which is why process performance measurement ought to be focused on those individuals who have an interest in the business process. In order to develop this stakeholder-driven performance measurement system, stakeholders of the process have to be identified and their process-relevant goals clarified. Each group of stakeholders needs to be represented by an aspect or dimension of performance (Kuong, 2000).

Kuong (2000) suggested an approach to compose a holistic process performance measurement system (PPMS) comprised of the following steps: (1) eliciting appropriate process performance indicators (using a generic set of performance and picking up the right ones, which is a less expensive and less time consuming approach, or starting from scratch, which is a more effective approach, because the indicators will be tailored

according to the specific needs of the processes within an organization); (2) determining targeted values for each indicator (input can be derived from: scanning the market, asking stakeholders, benchmarking, simulation and experiments, or research institutions); (3) developing methods to gather data (data sources, methods and instruments have to be defined in order to gather the necessary data); and (4) creating an information system that manages collected data (the gathered data have to be compared against target values and historical values, information regarding the performance gap has to be acquired, and the results must be disseminated to the process participants).

Another important issue, which cannot be viewed separately from the issue of reorganizing from the vertical to horizontal organization, is achieving an appropriate balance between centralization and decentralization. On one hand, an organizational structure is perceived as decentralized when decision making has been disaggregated into a number of organizational units, each making its own decisions (Siggelkow & Levinthal, 2003). Therefore, decentralization represents the transfer of decision-making authority and resources to lower levels of the organization: from the top management level down the hierarchy. It promotes internal and external organizational flexibility that is required for firms to respond speedily and appropriately to market signals (Hill, Martin & Harris, 2000). At corporate level, decentralization involves assigning responsibilities to semi-independent operating units and reduces the role of the corporate core to a minimum (Kay, 1993). The most radical form of decentralization is so-called “marketization”, either the contracting-out to external suppliers of activities previously performed in-house, or the creation of internal quasi-markets among semi-independent units within the firm (Hill, Martin & Harris, 2000). On the other hand, an organizational structure is perceived as centralized when decisions are made only at the level of the firm as a whole or one specific organizational unit (Siggelkow & Levinthal, 2003). Centralization is the tightest means of coordinating decision making in organizations, but the rationale for decentralization stems from the fact that: (1) many decisions cannot be understood at one center or in one brain; (2) it allows the organization to respond quickly to local conditions; and (3) it is a stimulus for motivation of employees (Mintzberg, 1979).

Numerous researches have been conducted on the topic of centralization versus decentralization. For example, Vancil (1978) empirically examined around 300 companies and concluded there is a strong tendency to decentralize functions that are closer to the customer. Tushman and O'Reilly (1996) have argued that an important part of the solution of very successful firms such as: ABB (Asea Brown Boveri), Johnson & Johnson and Hewlett-Packard, is massive decentralization of decision making, but with consistency attained through individual accountability, information sharing, and strong financial control, as well as a common overall culture. In this vein, Hill, Martin and Harris (2000) have stated that “one needs to distinguish between the different types of decision affected by decentralization. There is a broad distinction between financial and strategic issues, on the one hand, and operational issues on the other. Decentralization may be implemented on ‘tight-loose’ principles. Financial and strategic issues may be centralized while the others are decentralized” (p. 566). However, they have shown that patterns of centralization/decentralization are sensitive to historical contexts, particularly to initial starting points. With different initial conditions, the trajectories of development may reasonably be expected to differ.

Three empirically confirmed hypotheses seem to be very useful here. *The first one* is that centralization is negatively associated with effectiveness in turbulent environment (e.g., Child 1984; Randolph & Dess, 1984). “Turbulent environments require organizations to act frequently and quickly and this in turn requires that information about the environment be processed rapidly. Since each level in a hierarchy creates a delay in the vertical movement of information, and assuming that lower-level units are dealing with the turbulent environment, it follows that organizational actions should be selected by the lower-level units and with the involvement of as few upper hierarchical levels as possible” (Huber, Miller & Glick, 1990, p. 13). *The second one* considers the relationship between centralization and effectiveness regarding the size of an organization. It states that centralization is negatively associated with effectiveness in large organizations (e.g., Child, 1975; Daft, 1992). Regarding this hypothesis, Huber, Miller and Glick (1990) stated that “because communication distortions and delays increase as the number of organizational levels between message senders and message receivers increases, decision making is more effective if decision makers are organizationally near those with relevant information (presumably lower-level members) and if decision makers are organizationally near those who carry out decision-maker directives (presumably lower-level members)” (p. 14). And finally, *the third hypothesis* depicts the implications of centralization on efficiency and effectiveness (productivity). It is hypothesized that “centralization is more positively related to efficiency than it is to productivity” (Huber, Miller & Glick, 1990, p. 15).

Thus, two issues are of prime importance for this paper: (1) the particular manner in which the classical functional, vertically integrated organizational structure may be reorganized into the process-oriented,

horizontal one, and (2) achieving an appropriate balance between centralization and decentralization along the way. In this vein, Keidel (1990) argues that the search for balance between control (centralization) and autonomy (decentralization) needs to be complemented with cooperation (teamwork), which is a fundamental trait of horizontal organizations.

It should be noted here that moving toward process-oriented organization is not a universal solution that needs to be adopted by every firm. On the other hand, not even the most process-oriented firms have created an entirely process-based organizations, because there is still a need for specialized functions (Davenport, 1994). Each firm must seek its own unique balance between the vertical and horizontal features needed to deliver an appropriate level of performance (Ostroff & Smith, 1992), as well as its own balance between centralization and decentralization.

3. REORGANIZING A LARGE COMPANY IN SERBIA

The focus of this paper is on a large company operating in Serbia and employing more than 9.000 people. The name of the company and its industry are confidential and will not be revealed. This company is a vertically integrated system that encompasses the whole process of creating value: from the raw material production to the sales of final products directly to the customers through its own distribution network. The company consists of four sequentially related semi-autonomous divisions in terms of producing value for the customer with clear boundaries between them. On the other hand, the headquarters of the company consists of a number of functions (e.g. finances, legal and corporate, strategy and investments, etc.), which provide support to the semi-autonomous divisions. These functions are very influential within divisions. Most of them have their own functionally subordinated organizational units within each division. People employed in these organizational units are subordinated through the line of hierarchy to the executive director of the division they work in, but are also functionally subordinated to the function in which scope of work they operate. Thus, this company is characterized by specific line-function relations. In this vein, it may be concluded that its model of organizing is somewhere between the classical functional organization and classical divisionalized form.

Within this company, the processes usually follow existing boundaries of organizational structure and authority. The only exception is functionally subordinated organizational units within divisions already mentioned. The process owners in these units are located in the headquarters, i.e. the functions and departments within them. In other words, functions are in charge for the manner in which the work within these units will be done, while line managers in divisions determine what will be done. Nevertheless, processes should not be determined by the existing organizational structure, but rather represent the basis for organizational structure design. In this way, a process may cut across business functions, geography, product groups, or even the boundaries of a single organization (Davenport, 1994). On the other hand, frequent miscommunication and duplication of work in the company in state is the sign of not having the proper coordination mechanisms in place. Coordination mechanisms are design tools that are used in addition to a firm's hierarchical reporting arrangements to increase coordination, communication and decision making across organizational boundaries (Brown, 1999; Daft, 1992; Galbraith, 1994).

The scope of the intended reorganization is not the overall company, but rather one department (we will refer to it as Organizational Optimization Department or OOD) that provides support to the whole company in terms of organization design, business processes, and integrated management systems. The organizational structure of OOD is presented in the Figure 1. This department consists of three sectors within the headquarters, and four functionally subordinated sectors out of which each operates in one of the four divisions already mentioned (shown by the dotted lines in Figure 1). Each of the three sectors operating in the headquarters is in charge for one domain of work, namely: organization design, business processes and integrated management systems. They develop know-how within their domain of work and define standards according to which the job ought to be done within the headquarters, where they provide their services to the other functions and departments, as well as within divisions by the functionally subordinated sectors in charge. On the other hand, sectors operating in divisions are in charge for all of these work domains. They need to implement the know how and standards provided by all three sectors from the headquarters. Sectors in divisions are physically dispersed on several locations, which means that some form of decentralization regarding the actual operations is required, but simultaneously a high degree of centralization regarding the know-how and methodological issues exists at the level of headquarters, which ought to result in a uniform quality of services provided to all divisions, as well as the headquarters. Thus, the role of the headquarters is to facilitate operations and make them go faster and better, which is why the staff in headquarters ought to possess only the expertise that the field wants and needs (Tushman & O'Reilly, 1996).

The aim of OOD reorganization is to increase overall effectiveness and efficiency of its processes in terms of the increase in quality of outputs (viewed from the client standpoint, i.e. divisions, as well as functions in the headquarters) and reduction of its cycle time and resources engaged. In order to achieve radical improvements in terms of effectiveness and efficiency of its work, it has been realized that the focus of the reorganization must be on the processes. Some analyses and numerous discussions lead to the conclusion that the process perspective ought to be adopted and OOD needs to be reorganized in a manner that will facilitate its processes. Another issue seemed very important: whether existing line-function relations need to stay in place or functionally subordinated units need to be entirely incorporated within the OOD. Thus, the comparative analysis has been done and its results are presented in the Table 1 and Table 2.

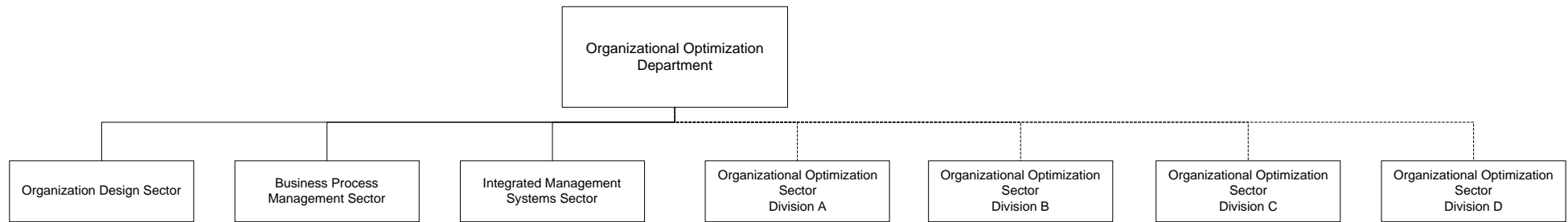


Figure 1: Current organizational structure

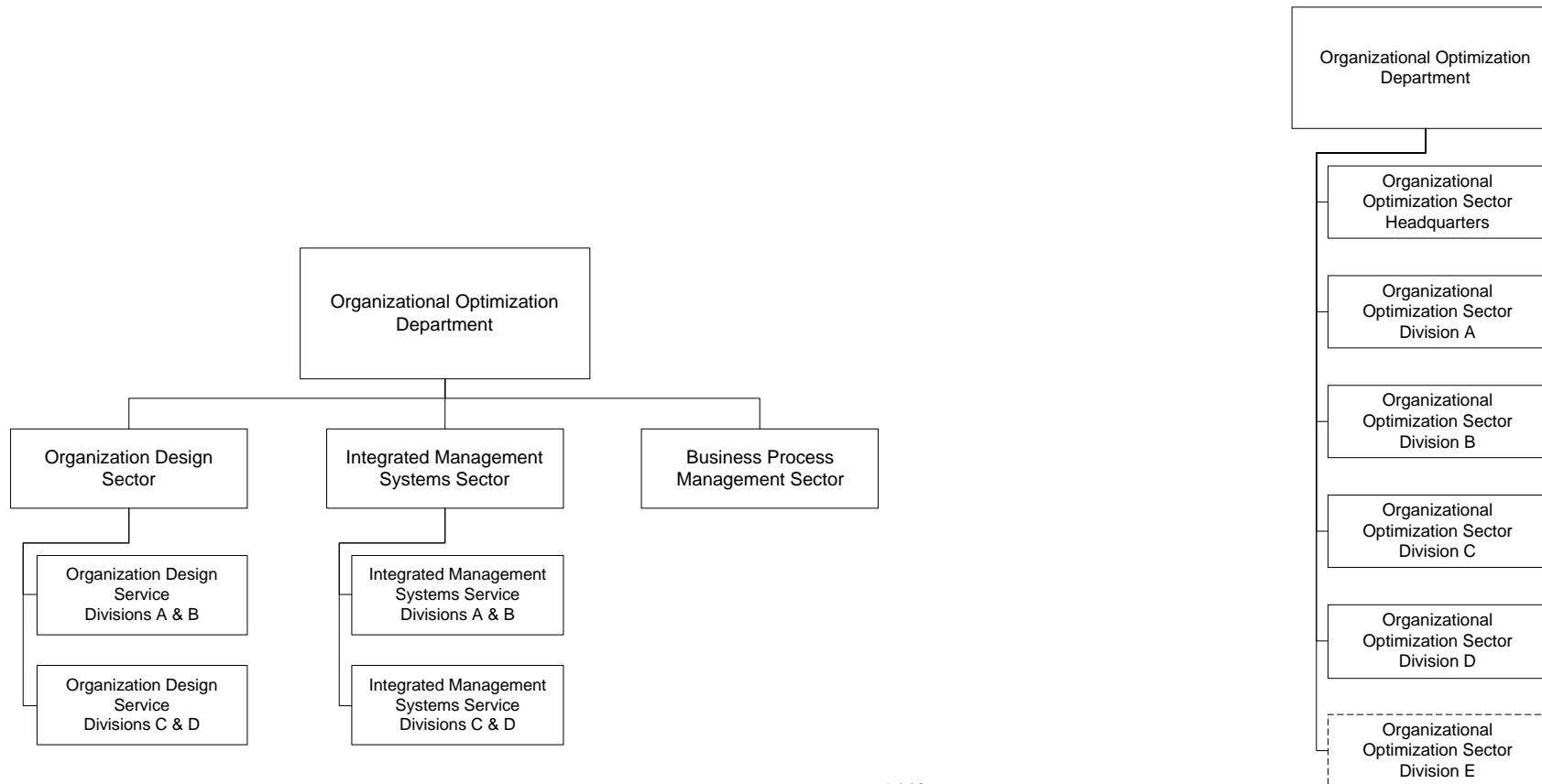


Figure 2: Proposed organizational structure in the 1st phase

Figure 3: Proposed organizational structure in the 2nd phase

Table 1: Functional vs. Process Organization

Organizational Issues	Functional Organization	Process Organization
The number of levels of hierarchy	Tall organization; more levels of hierarchy	Flat organization; less levels of hierarchy
Span of control	Narrow	Wide
Importance of Coordination Mechanisms	<ol style="list-style-type: none"> 1. Standardization of work 2. Direct supervision 3. Standardization of output 4. Mutual adjustment 5. Standardization of skills 	<ol style="list-style-type: none"> 1. Standardization of work 2. Standardization of output 3. Mutual adjustment 4. Direct supervision 5. Standardization of skills
Degree of specialization	Employees as specialists	Employees as universalists
Departmentalization Criteria	Knowledge and skills	Work-flow interdependencies
Level of Centralization	High centralization	Low centralization
Process Boundaries	Process is fragmented by the functional sylos	Process brakes the functional sylos
Process Owner	Line manager	Manager accountable for customer satisfaction
Performance Measurement and Reward System	Vertically defined; line manager determines the reward	Horizontally defined; customer determines the reward

The source: Authors

Table 2: OOD Director as Line vs. Functional Manager

Organizational Issues	OOD Director as a Line Manager	OOD Director as a Functional Manager
Unity of Command Principle	Obedied (one manager)	Violated (two managers)
Unity of Direction Principle	Obedied (goals are decomposed on several subgoals down the hierarchy)	Violated sometimes (due to the overlap of the goals of the line and functional manager that may be in collision)
Process Owner	Line manager	Line and functional manager (each within its domain of authority)
Performance Measurement and Reward System	Vertically defined; line manager determines the reward	Vertically defined; both line and functional manager determine the reward
Conflict Risk	Low	High
Knowledge Transfer between the Headquarters and Divisions	High	Low
The Possibility of Process-approach Implementation	High	Low
The Possibility of Work Duplication	Low	High

The source: Authors

The results of these analyses show unambiguous need to conduct the radical organizational shift from the vertically established hierarchy to the more flexible, horizontally oriented department focused on its processes and the value they create. In order to achieve this shift, the process perspective must be adopted, which means that divisions and other functions within the headquarters ought to be perceived as clients instead of partners, as it was the case until now. Therefore, a number of things need to change in order to facilitate this shift. One of the first things to change is the performance measurement system, as well as the reward system, because these two are inextricably intertwined. New performance measurement system needs to implement horizontal KPIs that will follow the processes indicating its performances until the delivery of services to the clients (divisions and functions) where it would measure the satisfaction of the clients with the service provided, i.e. in which degree does the services provided to the client facilitate its own operations and business results. These horizontal KPIs ought to complement the existing vertical KPIs, not to replace them. As for the reward system concerns, it must be related to KPIs and to the level of competencies achieved by the process team and each individual within it. In process-based organizations "information and training get provided just-in-time – on a 'need to perform', not a 'need to know' basis. Career paths follow work flows: advancement goes to people who master multiple jobs, team skills, and

continuous improvement. Compensation rewards both individual skill development and team performance" (Ostroff & Smith, 1992, pp. 151-152). In this vein, Davenport (1994) argues that managers and other individual contributors should be evaluated and compensated on the basis of their contribution to cross-functional processes. On the other hand, two major obstacles for achieving this organizational change are identified. The first one is concerned with unevenly distributed competencies between sectors. The competence base is located within the headquarters, which means that their transfer has left out. In other words, the first task on this route of reorganization is to make nivelation of competencies, i.e. that all employees within OOD possess similar level of competencies in their scope of work. The other one concerns the resistance of certain groups of employees that is expected once the plans for reorganization are being communicated. Therefore, the reorganization ought to be conducted in two phases. Organization structure that will result from the first phase ought to achieve competencies nivelation, after which the second phase ought to result in a horizontal, client driven, process organization.

The first phase of the intended reorganization will result in a taller hierarchy, accompanied by a high degree of centralization in order to make the existing processes uniform and more efficient. It is well known that hierarchy represents the formal coordinating mechanism that aims to minimize the deficiencies that have resulted from the division of labor. In the functional organization, it ties together business units, functions, departments and even individual tasks, thus providing the unity of efforts for achieving identified goals (Ostroff & Smith, 1992). In this phase employees ought to be routinely moved across units to ensure the development of personal relationships and greater interunit cooperation (Dess et al., 1995), as well as similar level of competencies. It is planned that this phase, in which functionally subordinated sectors will be renamed into sections and transferred from divisions into OOD, lasts between a year and a year and a half. The people working in these four sectors will be evenly distributed between the new sections directly subordinated to the Organization Design Sector and Integrated Management System Sector (according to their knowledge and previous experience) in order to obtain all the competencies required within this domain of work, while all of them will be trained by the Business Process Management Sector because this domain of work is equally important to all employees in OOD. However, employees from divisions A and B will be put into the same section because the divisions they came from have a lot of similarities regarding the nature of operations being performed. The same will happen with employees from divisions C and D. The result of the first phase of reorganization is represented in Figure 2. *The second phase* of reorganization will be characterized by a high degree of decentralization and focus on the process teams in order to achieve the highest level of responsiveness to the client's needs. The sections will become sectors again out of which each one will be in charge for one client, i.e. division. At this moment, employees will possess a satisfactory level of competencies. Thus, they will be returned into their own sectors comprising a true process teams. Each team organized around the process will need to take the front-line, problem solving initiative required to meet its overall objectives. The team members will be cross-trained so that they can perform each of the tasks necessary to the entire process, i.e. they will possess complementary skills. "For most employees in most organizations, the cutting edge standard of specialized task expertise is illusory. Whether they are front-line workers or executive vice presidents, most people contribute more to the customer satisfaction by understanding, even if at a moderate level, a large number of the tasks required to produce satisfaction than by being extraordinarily good at only a few" (Ostroff & Smith, 1992, p. 162). The result of the second phase of reorganization is exhibited in Figure 3. Division E, which is represented by the dotted lines indicates that each new division established will be accompanied by the new sector.

One of the benefits of transforming an organization from the vertical to the horizontal one is the flattening of hierarchy, which results in the cost reduction and increase of the flexibility. This is not obvious in the reorganization just described, because the focus is on one department only, but will be more evident when the reorganization spreads on the larger part of the company. "The way to flatten hierarchy is to combine related but formerly fragmented tasks, eliminate activities that do not add value or contribute to the achievement of performance objectives (unnecessary inspection, for example), and reduce as far as possible the number of activity areas into which each core process is divided" (Ostroff & Smith, 1992, p. 157). Very often managers developed in rigid hierarchies find it difficult to make the transition to the more democratic, participative style that teamwork requires (Dess et al., 1995), which must be taken into consideration before the reorganization starts.

4. CONCLUSION

The shift from the vertically structured, rigid hierarchy to the horizontal, process oriented company armed with the speed and flexibility is not a matter of possibility, but rather of necessity, if the company wants to achieve long term success and thrive in the complex and dynamic environment such as the one we live in.

As Ostroff and Smith (1992) noted: "Enough companies have moved away from their vertical past, at least in part, to convince any responsible managerial jury that significant performance gains do follow the shift to a horizontal organization" (p. 167).

The intended reorganization depicted in this paper ought to be regarded as a pilot project. If it proves successful in terms of the expected results, it will be spread on a number of other departments throughout the company. The experience gained from this project will be very useful for other endeavors similar to this one, not only for the company in stake, but for the others as well if it is to be communicated with them. Only radical organizational changes aimed to alter the very core of organizational architecture, such as this one, will foster the increase of competitiveness of numerous enterprises in Serbia that are currently struggling for its very existence.

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EXTENDING HOLDING AS AN INSTITUTIONAL MODEL TO THE PUBLIC SECTOR

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Abstract: *In most cities the public sector directly affects the lives of all residents, so these public companies are among priorities for city authorities. In order to improve public services, many city governments have performed the restructuring of the public sector and formed holding organizations of public companies. This paper will show the examples of several European cities, where holding is the current organizational form in the public sector. Special focus will be on the possibility of implementing this approach in the city of Belgrade. These examples contain concrete methods, which lead to improved control and handling of the whole system, reduction in management costs and overheads, and eventually, to a better quality of public services. Having in mind the success of implemented institutional solutions in the examples shown in this paper, we may conclude that forming a holding of public companies is one of possibilities for the future development of the public sector in the city of Belgrade.*

Keywords: *holding, public sector, restructuring, organizational structure, reorganization, network organization*

1. INTRODUCTION

Main characteristics of modern business, such as rapid changes, new business models, development of ICT, and many others, generate the demand for usage of advanced organizational models. Since public sector is very important for local community, many authors discussed which organizational form of public companies is the most suitable, not only to provide most efficient services to the residents, but also to reduce the expenses and use the city budget optimally. Many of these authors mention different network organizational models in this context. The advantages of network models, in both public and private companies, are significant. They include improvements in learning system, better allocation of resources, more efficient planning, easier dealing with complex problems, identifying the key values and, in the very end, increased quality of products and services (Jaško, Jaško & Čudanov, 2010). These models are all based on specialization. It means that every organization should identify its primary activity (or primary activities), which is the main cause of their existence, and then focus on it. This basic activity is called core business. Organizational concept like this is necessarily followed by cooperation with other organizations, in order to complete the value chain, so the customers can receive full service. There are many ways for every organization to eliminate all the activities that are not part of its core business. Outsourcing is one of them. Having completed this, the process of developing a network model can be started (Popović, Jaško & Prokić, 2010). Network consists of main company and network members, which are specialized for different functions.

One reason for forming a network is reducing of transaction costs in companies where market relations are frequent and of high value. Transaction costs are expenses of products' transaction across the border of organizational system or one of its parts (Dulanović & Jaško, 2007). This leads to infusion of hierarchical elements into market exchange (Zenger & Hestrelly, 1997), which is also known as quasi internalization (Sydow, 1999). Analysing transaction costs, management of the company may decide to form a network organization with its intensive partners, in order to be more profitable. Increased relationships formalization and business processes standardization will definitely reduce the expenses.

Another approach considers releasing some of the functions that were previously part of company's business. This is known as infusion of market management into hierarchy (Zenger & Hestrelly, 1997). One of the goals of internal functions outsourcing is their motivation to become an equal player on free market and to do business at market principles. This process is followed by creation of profit centres.

In first scenario, an external network of independent organizations is created. There are two types of these organizations. More stable solution is called strategic network structure, while less stable one is known as virtual organization, whose main characteristic is high level of flexibility. Stable network structure is formed when a company decides to focus on those activities that represent its best performance, which is in most cases core business, while others are released to external organizations. This may be great concept for

organizing supporting functions in large companies, such as maintenance or security. These activities are usually not part of core business in large companies, so idea is to hire specialized firms, in order to significantly reduce costs.

In second one, an internal or modular network organization is formed. It is usually holding or concern. Internal network organization means that all the parties are under the same ownership. Its main characteristic is that every entity is large enough to do the business independently and to interact not only with other members of the network, but also with the third parties on the market. Independent organizational entities are specialized for certain activities. They are controlled by Mother Company, so they become dependent companies within it (Dulanović & Jaško, 2007). Therefore it is clear that holding is an institutional form of internal network.

Holding is the term that stands for society (Mother Company) that controls other societies (Daughter Company, branch) through shares ownership (Dulanović & Jaško, 2009). This control considers the influence that holding company has on branches' business, while they remain independent formally. General opinion is that the main benefit of holding organization is on fiscal plan, tax reduction actually. However, the main advantage is holding's control of every branch, especially of their financial management (Vasiljević, 2009). When it comes to competency and responsibility, level of this control can move from simple checking of business results to active involvement in company's functioning. Branches access the financial markets through holding company. For large transactions approval from holding is needed. Besides that, all the investments that Daughter Companies make are strictly controlled by Mother Company. On the other hand, holding company usually leaves its entities large space for doing core business, industrial or commercial, at will. Nevertheless, holding can always direct its branches, perform some common activities such as marketing, public relations, research and development, human resources, accounting or legal services. It may also own their patents and licenses ([Charvériat](#), [Gouthière](#), [Bardet](#) & [Beetschen](#), 1991).

Public sector holdings first appeared in the beginning of 20th century in energetic, when large number of small producers in some countries in USA formed holding companies. However, this approach led to the monopoly in certain industries, so it was forbidden by the law very soon (Public Utility Holding Company Act of 1935). Still, this law did not forbid forming a holding of city companies, since they belong to different industries, so this does not cause the monopoly. This brought to new model of public sector organization in some cities. The energetic companies mentioned before were public, but were not owned by state or city. They were profit-oriented, which is the main reason why their unification was not allowed, since it would harm the residents. Purpose of existence of public sector is to satisfy public needs. However, local public companies should not be considered as non-efficient monopoly organizations (Hall, 1998). All over the world we can find examples of successful public companies that are owned by the city, but also do their business on regional markets. One of them is water company 100% owned by the city of Berlin, which was one of the key partners during water supply privatization in Budapest.

One of the main reasons for forming a holding of public companies is the increase in costs in public sector. During 1990s complete reform of public sector was conducted in Italy. It was caused by expenses and many cities formed public holdings then. Parts of these holdings were later sold, which led to the public-private partnerships. In Genoa, for example, city holding was formed in 1995 (Azienda Mediterraneo del Gaz and Acqua- AMGA), and already in 1996 49% of shares were sold to private investors. Similar examples can be found in Germany, in Frankfurt and Mannheim (Hall, 1998).

This paper will analyse public holdings in four European cities: Győr, Milano, Ljubljana and Vienna. Each city is of different size and has many specific characteristics. Nevertheless, holding solution was implemented successfully in public sector in every one of them, which proves the universality of this concept.

2. GYŐR, HUNGARY

In 2007, city authorities in Győr, city in northwest of Hungary, decided to form a holding of public sector, in order to create a city owned company that will manage city assets professionally. Together with that, this company should manage and control other independent public companies, achieving better efficiency then previously. Organizational structure of Győr holding is shown on Figure 1 (Szabo, 2008).

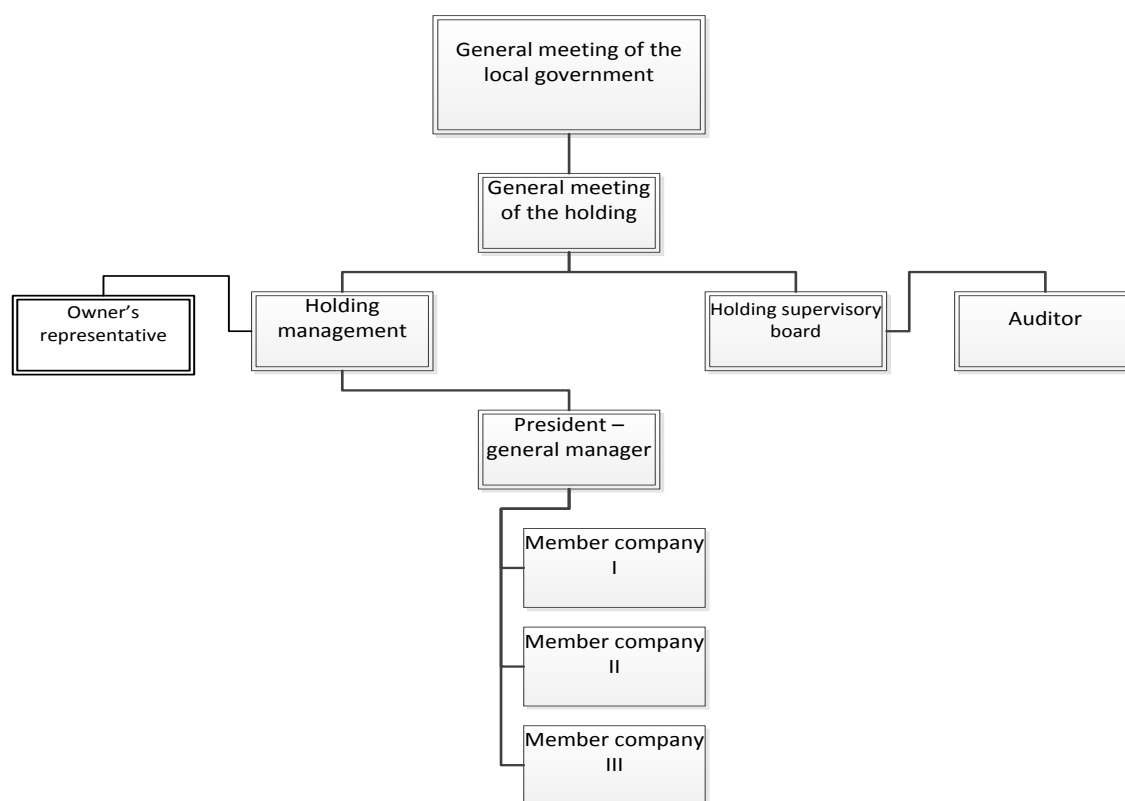


Figure 7: Organizational structure of municipal holding company, Győr, Hungary

Since one of the goals was better control of public companies, a supervisory board was formed. The idea was to introduce professional management into public services, which would consist of professional managers, instead of leading party members. However, if we look at the Figure 1, we can notice that city authorities still had the possibility to place their representative in the board, which allowed them to keep immediate insight and control. This problem of non-professional managers in public companies, such as in Győr, is also very present in Serbia, even in Belgrade. Increased control leads towards more transparent activities, which can reduce constant pressure that public puts on city authorities when it comes to public sector business results.

On the other hand, since there is no centralized organizational unit which could help in achieving economies of scale, so the increase in public companies efficiency can be questioned. Strategic decisions are made on the top level, which means that holding managers' task is to define goals for all public companies, plan and coordinate their work, approve operational plans and budgets, secure and allocate financial resources, manage the investments etc. Forming this strategic holding releases the managers of Daughter Companies from strategic tasks, which allows them to be completely focused on their core business and responsible for its efficiency.

Most cities commit large part of their budget to public sector. One of the most important goals of Győr holding was to reduce this financial pressure that existed. Common financial management is maybe the most important characteristic of holding company. This was implemented in Győr. Common liquidity control and investments optimization led to certain savings when holding was formed (Szabo, 2008). Besides that, holding's position on financial market is much better than any of the independent companies ever had. Before the restructuring, each company could raise loan at different interest rate, depending on their business results, size, activity risk etc. However, holding is now able to get credits at more affordable terms, and allocate the money in accordance with city strategy. Taking loans from commercial banks is just one of self-financing concepts that holding management wanted to implement, in order to reduce dependence on the city budget. Another one considers sort of internal bank, whose task is to manage holding's free resources. This would open the possibility for companies to get credit from some other member of the holding, at more affordable interest rate than any commercial bank could offer.

Implementation of organizational structure on Figure 1 reduced the management costs. Each public company used to have its own steering committee, while now only one board exists in holding. This approach could lead to huge savings in city of Belgrade, since 25 public and public communal companies now do their business separately. Certain savings are also possible during procurement, although there is no independent organizational unit for these activities on top level (Szabo, 2008). Procurement of goods and services of large values should be done for every holding member together, while companies would get certain specific items, when necessary. Besides all this, network organization of public sector enables wide spectrum of internal services that companies can provide to each other. They can be charged at market prices or transfer prices, depending on strategic decision of holding board when it comes to profit allocation, since all the resources remain in holding.

Cornerstone of all changes is development of integrated information system, which will increase the efficiency and control level in public companies. Changes in organizational structure are followed by technological improvements (Todorović, Čudanov & Komazec, 2012). It also supports decision making process. This should be followed by integration of financial and accounting activities, with standardization of planning and reporting. Integrated system allows more reliable measurement of companies' performance that not only increases the quality of decision making, but also brings more transparency in business.

3. LJUBLJANA, SLOVENIA

Public holding Ljubljana was founded in 1994, and today consists only from four companies. "Energetika Ljubljana" is company that provides heating services to residents, while "Vodovod i kanalizacija" is responsible for water supply. Another member is city transportation company "Ljubljanski potnički promet" (LPP). Fourth public entity, "Snaga" company, provides the maintenance of green areas, sanitation and garbage management.

One of its characteristics is that it also has other sources of financing, in addition to its core business, which was mentioned before. Reason for this is the fact that holding members are able to offer their services on free market, so they can compete with private companies. For example, LPP is authorized to provide technical reviews, so besides processing its own vehicles, it also offers this service to other parties. Anyone can do technical review and complete vehicle registration process here. Many public companies in Belgrade, considering work experience and expertise of the employees, could be extremely competitive on free market in certain fields.

If we compare the activities in public holding Ljubljana and those in Belgrade public sector, we can conclude several things. Public holding Ljubljana has significantly less coverage than all public companies in Belgrade. City size cannot be taken as an argument in this case, since certain public services simply need to be provided, despite the number of residents or area size. Some services that are in Belgrade provided by public sector, in Ljubljana are outsourced to private companies, due to economic reasons, since they are able to do more quality job, with less expenses. The model present in Ljubljana, which turned out to be rather efficient in many cities, could be implemented in city of Belgrade, by forming a public holding and then privatize some of its parts.

4. MILANO, ITALY

As part of already mentioned public sector reform in Italy, public holdings were formed in many cities. Besides the activities that are usually under the control of cities, such as heating, water supply or public transportation, city of Milano also manages sports objects, cultural manifestations and food supply of schools and kindergartens. Before the holding was formed, city of Milano provided the services directly or via some agencies that it owned 100%, so called "aziende municipalizzate". Reform goal was to implement modern management principles in public companies' functioning. City of Milano today manages all the mentioned activities using certain instruments, joint stock companies that form the holding, which is owned by the city. Private companies are also included in public sector, through partial ownership of some holding entities.

A very complex set of control instruments was formed, in order to control the activities of public companies, holding members. Besides increased level of control, another goal of this system is to secure the city demands in terms of quality and quantity of the services provided. Relationship between city of Milano and city holding is shown on Figure 2 (Longo & Cristofoli, 2008).

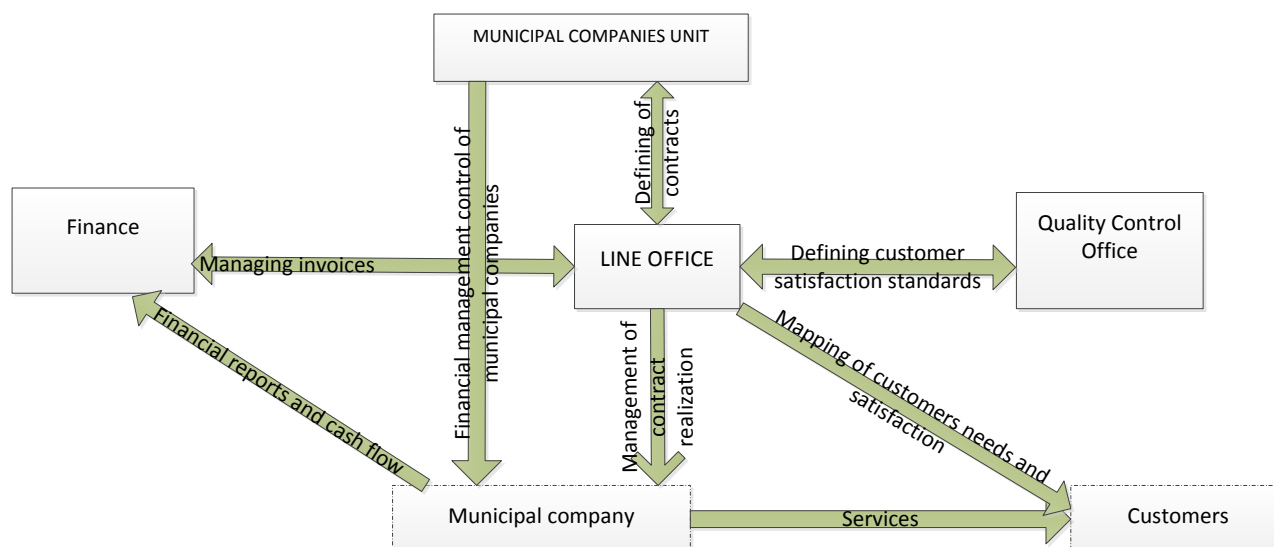


Figure 8: Set of control instruments for activities of municipal companies

Figure 2 shows the system that enables adequate control level of activities of public companies to city authorities, and focus on residents as end users. Finance department and Line office are part of the same mechanism. While Line office manages contracting between city of Milano and public holding, Finance department controls the financial transactions of public companies that form the holding (Longo & Cristofoli, 2008). These two units represent the financial connection between the city and holding. First step is to define the contract between the city and city holding (purchaser-provider contract), where all the demands, in terms of quality and quantity of services, are clearly specified. Another point is the price that city will pay after the service is provided. This contracting is done by different organizational units, specialized for certain services, grouped in Line Office. Another task of Line Office experts is to follow the execution of these contracts and to, in cooperation with Finance department, approve the payment of services. Part of the job that these two units perform can be compared to the activities that City secretariat for public and public communal companies conducts in Belgrade. However, Finance department also controls financial reports of all public companies that are members of city holding in Milano. It is authorized for financial management of the holding, especially for the investments.

One of main characteristics of city holding in Milano, that makes it different from most other similar models, is the existence of separate quality management organizational unit. Purpose of quality management concept in public sector is to identify resident's needs and to define the way to satisfy those needs. Quality management department in Milano holding performs the researches in order to determine the level of satisfaction with the public services among the residents. End product of this research should be clear standards, that city holding must fulfil. These defined standards, in cooperation with Line Office, are implemented into contracts. If some holding entity does not satisfy them when providing the service, Line Office will stop the payment for that service.

City of Milano achieves its ownership rights through steering committee, which consists of the representatives of current city government. This is the top level of holding management and the lowest hierarchical level where politics play key role.

We may conclude that the most important characteristics of city holding in Milano are: increased control of public companies, control and steering organizational units that consist of experts and professional managers and clear focus on end users, city residents. For city of Belgrade it would be very useful if one quality management department for all public companies was introduced, in order to determine the level of residents' satisfaction with their work and to see what they expect from public sector. Holding as institutional model would enable implementation of certain control instruments, as mentioned before, which would further put pressure on public companies to provide more quality services to residents.

5. VIENNA, AUSTRIA

City holding in Vienna is an antipode to city holdings that provide small number of services (Győr, Ljubljana). Currently, it is 100% owned by city of Vienna and it consists of 75 small and large companies, which are involved in different jobs. Founded in 1974, it represents one of the first city holdings in this part of Europe. Vienna holding connected two concepts that are usually considered to be antagonistic. First one is satisfying the needs of Vienna residents, and the second one is gaining profit and providing other services besides the public ones. Share owned by the city of Vienna has been changing since then, during the last decade of 20th century Bank Austria owned significant stake, but since 2001 the city has been the only owner.

The question that appears is whether it is good solution when the city owns complete portfolio, while doing business in so many different areas. In Vienna, this approach turned out to be successful, since profitability was achieved without additional taxes or other expenses for the residents. On the other hand, according to the researches done by Mercer consulting company, Vienna was the world number one city in the quality of living in years 2010 and 2011. Cities were ranked according to 39 different criteria, divided into 10 categories, where only one is the quality of public services, which are usually controlled by city government, no matter what the organizational form is. Nevertheless, city holding definitely has large influence through its 75 companies on different spheres of residents' lives, which positively affects the living quality in Vienna. Of course, it is just one of the factors, since general economic situation in Austria must not be leftover when calculating this indicator.

One of the main characteristics of Vienna holding, that may be very useful for further development of Belgrade, are partnerships between public sector and private companies. The partnerships tend to share risks and profits and the aim is to reach synergy effects, implying the possibility to create competitive advantages (Weiermair, Peters & Frehse, 2008). In many areas of business, Vienna holding forms partnerships with private companies, which provides added value for the residents, with small financial investments. The most common form of partnership is the situation when private company, after financing the building of some object, has the right to use it until it recovers the investment and gain certain profit, after which that object becomes the ownership of the holding. The example of partnerships between private and public companies in Vienna is Central Danube Region GmbH, the company for cooperation with other cities on central Danube and infrastructure development in this region. Another one is the reconstructing of the house where famous Austrian composer Wolfgang Amadeus Mozart lived. Both projects were done in cooperation with Raiffeisen Bank in Austria.

Organizational structure of this group is shown on Figure 3.

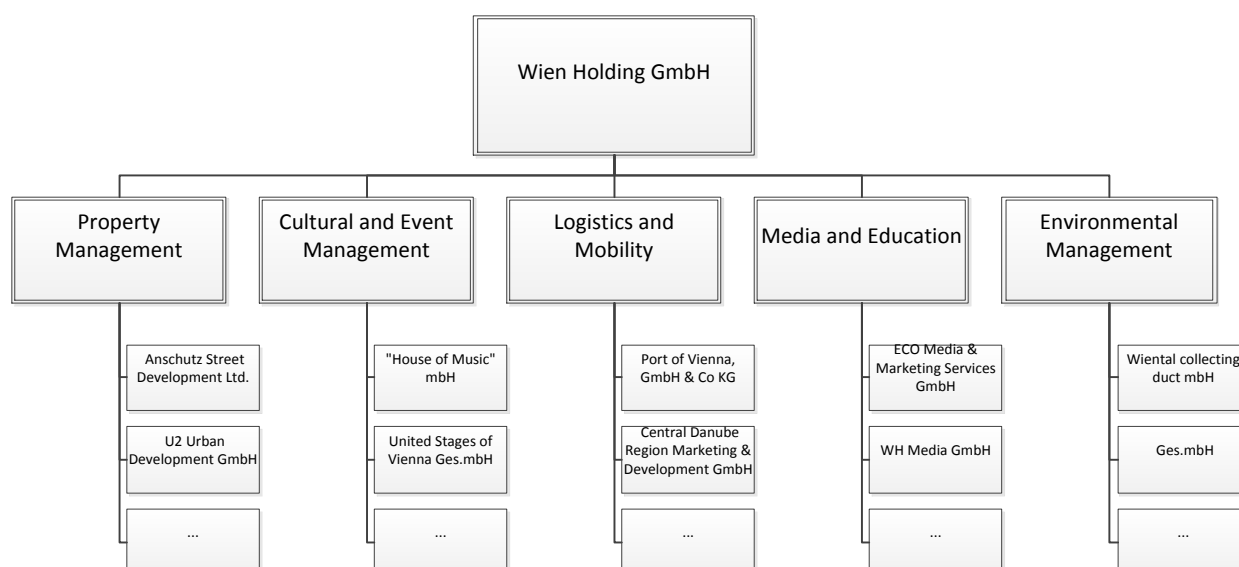


Figure 9: Organizational structure of Wien City Holding

Members of this holding are classified into five clusters, in order to achieve more efficient control of large number of companies.

6. CONCLUSION

Concrete examples that were described in this paper show why authorities in the city of Belgrade should consider forming holding institutional model of public companies, in order to improve global functionality of public sector. During period of crisis and difficult economic situation, city government should tend to decrease the expenses of public and public communal companies, which would reduce the pressure on the city budget, so the funds could be used to reach other goals, such as infrastructure development, cultural development, social protection improvement etc. Holding company, as shown in all the examples in this paper, would reduce management costs and overheads, since more than 20 steering committees (Krivokapić & Čudanov, 2010) would be replaced with only one board, through which external stakeholders could make an impact. Such organizational model enables the introduction of professional managers in public companies, followed by forming of certain control instruments, as in Győr. Costs reduction can also be achieved through economies of scale, especially when it comes to procurement. City of Belgrade, considering the size of complete needs of public sector, could demand from certain foreign suppliers to organize the local production, which can lead to industrial development of city and whole country. On the other hand, position of city holding on financial market would be much stronger than any public company currently has individually. This would definitely generate savings when it comes to interest rate when taking loans, but also through liquidity and indebtedness management.

City of Belgrade, by forming the holding of public sector, would advance the handling of public companies. There are two base elements that lead to these improvements. First one is integrated information system, which provides the support for decision making process. Second is adjusted financial and accounting system, which would enable comparison of public companies. Better control increases the business transparency of public sector, which is one of the main expectations of Belgrade residents.

Milano example can be used, too. Certain organizational units, which would focus on residents and their needs, should be formed. Their task would be to define the quality and quantity of services that public companies, holding members, should satisfy. They should also be responsible for decision making, when it comes to payments. This would put pressure on city companies to do better job.

As we can notice, if holding institutional model is implemented in city of Belgrade, certain disadvantages that currently exist in public sector will be overcome. Future researches in this area should determine the feasibility of this concept in Belgrade.

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BENEFITS OF INTRODUCING A HOLDING INSTITUTIONAL MODEL TO THE PUBLIC SECTOR IN THE CITY OF BELGRADE

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Abstract: *A modern business environment has caused significant changes in the public sector functioning in cities worldwide. In order to provide more quality services for its residents, city authorities started to abandon traditional models of public sector organization and tried to find a better way to connect public companies. Many cities turned to modern types of organizational structure, such as networks, using mostly holding as an institutional model of the public sector organization. Through the analysis of performance, structural and functional analyses of public companies owned by the city of Belgrade, this paper will identify the disadvantages of the current organizational model of the public sector in Belgrade, determine a possibility of establishing a holding, and point out the improvements that the implementation of this solution could bring to public companies. Since the analysis has shown a number of potential benefits for both public companies and city residents, future research should focus on the legal aspect of establishing a city holding in Belgrade.*

Keywords: *holding, network, organizational structure, restructuring, public sector, public company, Belgrade*

1. INTRODUCTION

During last 30 years many significant changes have been occurring in term of public services provided by local governments, in both developed and developing countries. These changes are stimulated by demands for public sector modernization. The ideas that dominate in all the attempts of reforming are decentralization, liberalization and partnerships with between public and private companies (Garcia & Marcou, 2003). Many theorists considered the contracting out concept, which includes privatization and deals with private companies, as a way to increase the efficiency of public sector, since the efficiency is one of the main problems of services provided by public companies.

However, some authors do not consider local public companies as the organizations that are necessarily non-efficient (Hall, 1998). This point of view has been proved in certain empirical researches (Boardman & Vining, 1989). This encouraged the authorities in many cities to try to improve the organizational model of public sector, which led to the signing of contracts with private companies, forming of partnerships between public and private companies and privatization. Considering the needs for public companies coordination, holding potentially presents the most efficient model for public sector organization. It is a type of network organization that implies the existence of the society that controls other societies through the shares ownership (Dulanović & Jaško, 2009). Network organization, through better coordination, increases the efficiency of resources allocation, brings more flexibility, enables organizational learning, improves planning process and upgrades the quality of services (Jaško, Jaško & Čudanov, 2010).

In many cities these advantages have been recognized as the possibility to gain benefits both for residents and public companies, which led to the restructuring of public sectors into holdings. Public sector reform during 1990s introduced holding solutions to many cities in Italy. Parts of these holdings were later sold to private companies, but in most situations cities remained major owners (Garrone, Grilli & Rousseau, 2010). Decision whether to sell part of public holding to some private company or not is based on transaction cost analysis, which plays very important role in this process (Warner & Hefetz, 2008). These costs represent the expenses of products' transaction across the border of organizational system or one of its parts (Dulanović & Jaško, 2007). Sometimes it is more profitable to concede certain functions to external subject. Holding should be released from all the activities that other companies are able to process more efficiently and more quality, and then different types of inter-organizational relationships ought to be established with those companies (Popović, Jaško & Prokić, 2010). The fact that the ownership of city holdings can be mixed, partially private actually, is their very important characteristic, since this is the intermediate step towards completing the process of privatization (Schmitz, 2000). Of course, certain legislation must be voted first, as happened in Italy (Bognetti & Robotti, 2007).

In this paper we analyzed the organization of public sector in Belgrade and identified major disadvantages of current model. We showed that introducing holding as institutional model could lead to significant improvements, when it comes to management, coordination and control. Special focus was on the benefits that this solution could bring to public companies, in terms of reduced costs and overheads, and to residents, in terms of upgraded quality of public services and increased business transparency in public sector. All the data used in the following analysis were gathered by the project team from Faculty of Organizational Sciences, during the work on project "Analysis of organization of public and public communal companies in the city of Belgrade".

2. ANALYSIS OF PERFORMANCE

Performance of total public sector in Belgrade was analysed using the Porter's value chain, which includes clear differentiation of core business and supporting activities (Jaško, Krivokapić & Čudanov, 2010). This tool enables the standardization of the activities performed in different public companies and the comparison of their performance, so the summary recommendations can be made for public sector in global. Having performed this analysis, we came to the following conclusions:

- Total number of full-time employees in all public companies in Belgrade is 18.806
- Total reserves in public sector are 1.819 employees
- Supporting activities are performed by 26,5% of employees, the reserves are 679 people
- Core business occupies 76,5% of total number of employees, including the reserves of 1.140 people
- Largest reserves are discovered in inbound logistics function, that is the part of core business, and their amount is 664 employees

However, in order to better understand the situation and notice the divergence that exists among public companies in Belgrade, we have to analyse total number of employees and their performance for every company individually, in order to determine the reserves in each part of the public sector. The results are presented in Table 1.

Table 1: Individual performance analysis of public companies in Belgrade

N o	Public company	Number of employees	Average performance	Reserves (in N° of employees)
1.	JKP "Beograd put"	1.346	97,80%	30
2.	GSP "Beograd"	6.631	89,17%	718
3.	JKP "Pogrebne usluge"	480	89,45%	51
4.	JKP "Beogradske elektrane"	2.260	88,28%	265
5.	JKP "Gradska čistoća"	1.782	93,85%	110
6.	JKP "BVK"	2.686	90,14%	265
7.	JKP "Gradske pijace"	240	85,09%	36
8.	JKP "Zelelnilo Beograd"	1.270	91,91%	103
9.	JKP "Parking servis"	687	94,24%	40
10.	JP "Gradsko stambeno"	165	92,56%	12
11.	JKP "Infostan"	151	75,27%	37
12.	Direkcija za građevinsko zemljište i izgradnju grada Beograda	325	86,34%	44
13.	JUP "Urbanistički zavod Beograd"	141	87,99%	17
14.	JRP "Studio B"	232	89,35%	25
15.	"Arena Beograd" d.o.o.	46	84,86%	7
1	JP "Sava centar"	141	75,98%	34

6.				
1 7.	JP "Beogradvode"	128	89,52%	13
1 8.	Turistička organizacija Beograda	33	85,84%	5
1 9.	JP "Ada Ciganlija"	30	92,39%	2
2 0.	JP "Beogradska tvrđava"	16	85,12%	2
2 1.	JP "Hipodrom Beograd"	16	78,54%	3
TOTAL IN BELGRADE PUBLIC SECTOR:		18.806	90,33%	1.819

Observation of these results leads us to the following conclusions:

- There is no public company in Belgrade that is without any reserves in term of number of employees
- Largest absolute amount of reserves (670 employees) is present in GSP "Beograd", which is expected since this is the public company with largest total number of employees
- Highest average performance is noticed in JKP "Beograd put", due to large number of employees in core business and the fact that their productivity is on a very high level

3. STRUCTURAL ANALYSIS

Since all the public companies in Belgrade are independent subjects, the analysis of their organizational structures needs to be done separately. Current type of organizational structure in every company is shown in Table 2.

Table 2: Types of organizational models in public companies in Belgrade

Nº	Public company	Type of organizational structure
1.	JKP "Beograd put"	Functional
2.	GSP "Beograd"	Divisional
3.	JKP "Pogrebne usluge"	Functional
4.	JKP "Beogradske elektrane"	Functional
5.	JKP "Gradska čistoća"	Functional
6.	JKP "BVK"	Functional
7.	JKP "Gradske pijace"	Functional
8.	JKP "Zelee nilo Beograd"	Functional
9.	JKP "Parking servis"	Functional
10.	JP "Gradsko stambeno"	Functional
11.	JKP "Infostan"	Functional
12.	Direkcija za građevinsko zemljište i izgradnju grada Beograda	Functional
13.	JUP "Urbanistički zavod Beograd"	Functional
14.	JRP "Studio B"	Functional
15.	"Arena Beograd" d.o.o.	Functional
16.	JP "Sava centar"	Functional
17.	JP "Beogradvode"	Functional
18.	Turistička organizacija Beograda	Functional
19.	JP "Ada Ciganlija"	Unknown
20.	JP "Beogradska tvrđava"	Functional
21.	JP "Hipodrom Beograd"	Functional

Functional model of organizational structure is identified in almost all public companies in Belgrade. Only in GSP "Beograd" we can find divisional type of organizational structure. Large disadvantage of functional

model of organizational structure is its tendency to generalize the efficiency and contribution of different parts of structure to total business success of the company (Hansen & Mouritsen, 2006). This problem may occur even during successful time, not to mention periods of crisis, when much larger damage may be caused. Side effect that was described can easily be identified in every public company. It can be overcome by introducing network type of organizational structure to public sector in the city of Belgrade, with holding as institutional model.

Currently, level of cooperation between public companies is very low. Although they are allowed to hire each other for certain tasks without announcing a tender, very often this right is not used. The main reason is lack of coordination, caused by the large number of governing bodies in Belgrade public sector. Actually, each public company has its own steering committee, and some of them consist of more than ten people. This usually leads to the situation that the public company which is supposed to perform certain task for another public company usually has no resources available at that moment. In that case, some private company needs to be hired, at higher price, so the costs are increased. And if this happens often, in every public company, total expenses of public sector are much higher than they could be if network organization model was implemented.

4. FUNCTIONAL ANALYSIS USING CORE/NON-CORE CRITERIUM

Due to current institutional model, public companies in Belgrade operate as individual subjects and perform their tasks independently, under strategic governance of city authorities. As a consequence, most of them have formed certain non-core units in their organizational structure, whose purpose is to provide necessary activities of support. The problem is that these functions cannot be used optimally, which generates the reserves that were mentioned before. Volume of their work is very small, so they are not occupied all the time, but the current model of business organization does not allow them to serve other companies owned by the city of Belgrade.

Functional analysis provides the number of core and non-core organizational units in every public company in Belgrade. The results are presented in Table 3.

Table 3: Number of core and non-core organizational units in Belgrade public companies

N°	Public company	Number of organizational units on top hierarchical level	
		Core	Non-core
1.	JKP "Beograd put"	6	1
2.	GSP "Beograd"	27	9
3.	JKP "Pogrebne usluge"	11	8
4.	JKP "Beogradske elektrane"	6	4
5.	JKP "Gradska čistoća"	15	3
6.	JKP "BVK"	18	10
7.	JKP "Gradske pijace"	1	5
8.	JKP "Zelee nilo Beograd"	5	1
9.	JKP "Parking servis"	2	1
10.	JP "Gradsko stambeno"	1	2
11.	JKP "Infostan"	2	1
12.	Direkcija za građevinsko zemljište i izgradnju grada Beograda	5	3
13.	JUP "Urbanistički zavod Beograd"	3	0
14.	JRP "Studio B"	3	0
15.	"Arena Beograd" d.o.o.	3	0
16.	JP "Sava centar"	3	2
17.	JP "Beogradvode"	9	4
18.	Turistička organizacija Beograda	3	2

19.	JP "Ada Ciganlija"	Unknown	Unknown
20.	JP "Beogradska tvrđava"	1	2
21.	JP "Hipodrom Beograd"	1	2

In most public companies in Belgrade some functions are not the part of core business. Certain of those non-core functions, such as marketing, finance, accounting, security, objects maintenance, human resources or general and legal affairs are often the same in several companies, which means that forming a holding as network organizational model could enable the unification of these functions in order to serve the complete holding. This would increase the level of coordination, facilitate the control and significantly reduce the costs and overheads.

5. ANALYSIS OF MANAGEMENT AND CONTROL

As we mentioned before, due to the existence of many steering committees, the unity of direction which is one of the main principles of management, does not exist in Belgrade public sector. This also causes certain overheads that could be significantly reduced if holding institutional model was introduced. All the disadvantages that were identified would be eliminated by forming unique board at the head of the city holding, that would deal with strategic decisions on the top level, while operational activities would remain in the companies. The board should consist of the members of all public companies and representatives of the city authorities.

In order to get insight into current management and control system in public sector, we analyzed the control range in public companies. This parameter compares the number of managers and executors. Control range in certain public companies in Belgrade may seem to be appropriate. However, even the average number is near the optimal value, some organizational units may demand certain changes. Control range may and should differ on different hierarchical levels. That is the reason why this parameter was analysed in every public company separately and why every organizational unit was taken into account. The results are shown in Table 4.

Table 4: Control range in public companies in Belgrade

N°	Public company	Control range		
		Total	Minimal	Maximal
1.	JKP "Beograd put"	10,86	3	40,83
2.	GSP "Beograd"	19,59	1,33	168,35
3.	JKP "Pogrebne usluge"	5,96	2	20
4.	JKP "Beogradske elektrane"	8,46	1,25	11,6
5.	JKP "Gradska čistoća"	7,50	3,45	24
6.	JKP "BVK"	4,32	1,25	24,75
7.	JKP "Gradske pijace"	4,60	3,28	28
8.	JKP "Zelee nilo Beograd"	12,66	4,62	18,78
9.	JKP "Parking servis"	7,38	4,67	19,33
10.	JP "Gradsko stambeno"	6,22	6	7,75
11.	JKP "Infostan"	4,92	2,5	15
12.	Direkcija za građevinsko zemljište i izgradnju grada Beograda	5,71	0,2	10,5
13.	JUP "Urbanistički zavod Beograd"	4,38	3,5	7,75
14.	JRP "Studio B"	8,44	3,6	12,67
15.	"Arena Beograd" d.o.o.	3,18	2,67	5
16.	JP "Sava centar"	4,72	3,57	15
17.	JP "Beogradvode"	8,71	0,8	28
18.	Turistička organizacija Beograda	2,30	0,5	4
19.	JP "Ada Ciganlija"	2,33	/	/
20.	JP "Beogradska tvrđava"	4	/	/
21.	JP "Hipodrom Beograd"	4	/	/

The analysis showed that there is a lot of space for improvements in this area. If we use the process model as the base for the improvements of organizational structure (Komazec, Todorović & Jevtić, 2012), we can find in some companies certain organizational units that should be integrated. This would not only reduce the costs of management by decreasing the number of managers, but also improve the control range and upgrade the unity of command, which is another important principle of management. And if we remember that the functional analysis showed that certain functions should be serving more than one company, we can conclude that implementation of holding institutional model would affect positively on control range and the unity of command by reducing the number of managers.

6. CONCLUSION

The analysis of public companies' performance using the Porter's value chain as a tool identified certain reserves in almost every public company in Belgrade. The largest reserves can be found in GSP "Beograd", JKP "Beogradske elektrane", JKP "Gradska čistoća", JKP "Beogradski vodovod i kanalizacija" and JKP "Zeletinlo Beograd". Although this can be explained by large number of employees in these companies, the reserves are significant and their optimization would increase the business efficiency. Even if the performance of certain companies is near maximum, they generate large expenses on global level, since complete public sector in Belgrade is financed from the city budget and should not be observed as a group of independent companies, but as a single entity.

Structural analysis identified functional model as the most common type of organizational structure in Belgrade public companies. Its tendency to generalize the contribution of different functions is very present, and can be overcome by introducing holding solution to the public sector. This would also improve the coordination, which is on a very low level at this moment. Main cause of bad coordination is the existence of many steering committees, one in each public company. Unique board for whole holding, including the representatives of all public companies, would definitely solve this problem.

Functional analysis identified the existence of certain non-core organizational units in most public companies. It also showed that many of these non-core functions are common for different companies. The implementation of network model of organizational structure could increase the efficiency of public sector. Same non-core functions from different companies could be integrated in order to form unique departments that will serve the complete holding. That would increase the level of control and significantly reduce the overheads in Belgrade public sector.

Finally, the analysis of management and control shows that reorganization could lead to the decrease in management costs, since several functions would serve all the members of the network. This would cause the integration of some organizational units in public sector, which would reduce the number of managers. It would also upgrade the control range and improve unity of command and unity of direction, two very important principles of management.

All these results prove that introducing holding institutional model to public sector in the city of Belgrade would bring significant improvements, in terms of organization, efficiency, control, direction, coordination and cost reduction. As the consequence, the quality of services that public companies provide would be upgraded, so the residents would also benefit. Since this approach already achieved good results in many cities worldwide, Vienna, Ljubljana and Milano are just some of the examples, there is no reason why city authorities should not consider the implementation of holding solution as one of the alternatives for future development of the city of Belgrade.

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CRISIS PREVENTION AND CRISIS MANAGEMENT MODEL

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Abstract: *This paper focuses on crisis prevention as an integral part of successful crisis management. The paper explores scholarship regarding the basic concepts of crisis management. A new crisis prevention and management model will be presented afterwards. This new model consists of four Balanced Scorecard perspectives and five main organizational crisis. The model is made in matrix form, and relevance for every Balanced Scorecard perspective and organizational crisis is determined by assigning the proper number of points, or coefficient to them.*

The goal of the model is to determine key indicators for an organization which will then be used for overall business observation and prediction of potential crisis. Using this model and defined key indicators, organizations can conduct effective crisis management in order to overcome the crisis. The model also ranks the key indicators in order to distinguish the most important ones, so that the organization can react to the most urgent issues and handle them before the crisis strike. The way the model is used and its practical application will be shown on the example of a transportation company.

Keywords: *crisis, crisis management, crisis prevention, Balanced Scorecard, crisis prevention and crisis management model*

1. INTRODUCTION

Since 1960's when the phrase crisis management was first used to describe well known Cuban crisis, its meaning and area of application have extended to almost every sphere of everyday life, especially in business. Crisis management is the main field of research of many scholars and practitioners. Since the world economy is faced with a great recession in the last few years, crisis management and its practices are now in need more than ever before.

Organizational crisis are not something unknown and new in the world of business, but it seems that even with the great amount of available book knowledge made in crisis prediction and crisis management is insignificant, or none. This is the main reason why this problem is in the center of this paper, and its goal is to change the way crises are seen by companies, and the way crises are handled. Having that in mind, this paper will be based on "Crisis prevention and crisis management model" which will be explained in detail through the rest of the paper. This model incorporates some well-known concepts of crisis management, and it can be easily adjusted for use in many different industries. The purpose of the model is to help organizations to predict potential crises and adequately prepare for them, but this model can also be used for managing a crisis that has already hit a company.

2. CRISIS AND CRISIS MANAGEMENT

In order to better understand the model it is necessary to always have in mind the basic concepts of crisis and crisis management. Definition of crisis which will be used here is probably the most used and known definition of crisis: "Contrary to popular belief, crisis may not be necessarily bad. It is merely characterized by a certain degree of risk or uncertainty" (Fink, 2000).

Crisis management can be defined as a number of functions or processes which goal is to identify, learn about and predict possible crisis, define procedures that will allow the organization to prevent the crisis or overcome it much easier than if it was unprepared, thus minimizing the consequences of crisis. Even though crisis management in theory seems relatively easy to implement, situation radically changes when you have to implement it in a concrete company. That's the reason why "Crisis prevention and crisis management model" will be presented as a possible solution to this problem.

This model utilizes key indicators defined by using Balanced Scorecard perspectives and five main organizational crisis. It is necessary to analyze entire company and its business processes, and to make predictions for every segment of company, which will force the company management to create a new view

of its company and help guide it to a right path. The goal is to define key indicators for each of the five main organizational crisis, and define proper actions to overcome the crisis.

The model focuses primarily on crisis prevention, because if the company predicts a crisis on time, resources and time at its disposal will enable the company to overcome the crisis much easier. If the company does not notice the early signs of the crisis and the crisis has already occurred, resources and time at its disposal are limited and it will be significantly more difficult to overcome the crisis. It is much easier to manage a crisis if the company is already prepared and knows what to expect, what the potential hazards are and what to change in order to avoid a crisis. That is why this model has great significance in the prediction of the crisis.

3. CRISIS PREVENTION AND CRISIS MANAGEMENT MODEL

The proper use of the model requires seeing a bigger picture of company, considering company internal and external environment, industry, suppliers, customers and other indicators depending of the company observed. It is clear that just observing financial indicators won't be enough to fully implement this model into crisis management of a certain company. Therefore, we'll need to implement indicators other than financial, in order to create an appropriate model for a company. These indicators can easily be adjusted to any industry.

As presented in Figure 1, model is a 5x4 matrix. Rows are reserved for main organizational crisis that can hit a company, and those are:

- Performance crisis; The examples of these crises are: reduced number of orders, sales scope decline, market share reduction.
- Identity crisis; The examples of these crises are: there are no plans for a period longer than 6 months, introduction of the program beyond the core competencies of the company, non-core programs show higher profitability than the core ones.
- Innovation crisis; The examples of these crises are: rare initiation of development projects, RD orientation to copying, increase in costs without RD results.
- Crisis of company management; The examples of these crises are: autocratic style of leadership, complete centralization of decision-making, the top executives are leaving the company, failures are justified by the objective circumstances.
- Work collective crisis; The examples of these crises are: conflict between management and staff, priority of individual goals over the collective ones, intergroup and interdepartmental rivalries.

Columns consist of 4 Balanced Scorecard perspectives (Kaplan & Norton, 1996):

- Financial perspective
- Customer perspective
- Internal perspective
- Innovation and learning perspective

Table 1: "Crisis prevention and crisis management model"

Crisis / Perspectives	Financial perspectives	Customer perspective	Internal perspective	Innovation and learning perspective
Performance crisis				
Identity crisis				
Innovation crisis				
Crisis of company management				
Work collective crisis				

The reason why Balanced Scorecard was used is because we can identify up to 25 key indicators by taking in consideration its four perspectives. These 25 key indicators are more than enough to predict crisis in time and identify possible solutions to overcome any issue. There is no use in keeping track of a large number of indicators since company may lose sight of what really is important. After identifying up to 25 key indicators using Balanced Scorecard, those indicators are then sorted to a belonging type of crisis.

This many indicators are quite enough for a company to prepare for crisis and predict it, and then with appropriate set of actions overcome it much easier.

Here are some basic rules of how to properly use this model:

Table 2: Determining the importance of crisis for a company

	Points
Performance crisis	
Identity crisis	
Innovation crisis	
Crisis of company management	
Work collective crisis	
Σ	100

It is necessary to assign points for each type of crisis, so that in total all points for crisis are worth 100 points. Points are assigned based on the importance of crisis for one company, and it is decided subjectively by company managers, or after taking in consideration opinion of the consultant.

Four perspectives from Balanced Scorecard are assigned with a weighted coefficients in total of 1.

Table 3: Assigning weighted coefficients to Balanced Scorecard perspectives

	Weighted coefficient
Financial perspective	
Customer perspective	
Internal perspective	
Innovation and learning perspective	
Σ	1

Weighted coefficients are assigned based on the importance of each perspective for one company, and it is decided subjectively by company managers, or after taking in consideration opinion of the consultant.

Another reason why the model is made in a matrix form is because it will be used as basis for AHP method to get the ranks for every key indicator. That doesn't mean that key indicator with the highest value is the only one that is important to a company. Once when the key indicators are determined, they are all of great importance to a company in the term of preventing the crisis. The reason why key indicators will be ranked is to group them, and then depending of the group they belong to, they will be monitored for progress. Those key indicators that have the biggest value will be assigned to the first group, and those indicators should be monitored on daily or weekly basis. Indicators from second and third group should be monitored on monthly basis, or every three months.

3.1. Basic rules of "Crisis prevention and crisis management model"

You have to comply with the three basic rules of "Crisis prevention and crisis management model" in order to create an appropriate model for a specific company.

The first rule refers to assigning points to organizational crisis. Each crisis can be assigned to maximum of 40 points. The reason for this rule is to prevent managers to overestimate one crisis, and ignore other crisis. For example, managers have a tendency to assign too many points to a performance crisis, thus ignoring other crisis, like for example work collective crisis.

The same reasoning is used for the second rule, which refers to assigning weighted coefficients to Balanced Scorecard perspectives. Each Balanced Scorecard perspective can be assigned to maximum of 0.35 coefficient.

These first two rules limit the number of points and coefficients that can be assigned to each crisis and perspective. Following those two rules managers are forced to think in different way, and they can't favour only one crisis or only one perspective. They need to see a bigger picture and be prepared for any kind of crisis in order to overcome any potential issue or crisis. They can't see a company just through a couple of

financial indicators or only through good relationships with customers. With limited amount of points and coefficients available, managers have to be extra careful and create a perfect balance of between crisis and perspectives, in order to create just the model they need for their company. Company is not just a bunch of numbers and reports or its properties, a company is made of people who work there, its customers who buy their products and satisfy their needs, and many others.

The third rule refers to assigning the minimal number of points and coefficients to crisis and perspectives. Each of the crisis and perspectives must be assigned with at least minimal number of points and coefficients, for crisis at least 10 points, and for perspectives at least 0,1 coefficients. This way managers have to think about the possible crisis that they haven't thought of before, and they can't say that for example, innovation crisis will never hit our company, or that innovation and learning perspective have no importance for us.

3.1. Advantages and disadvantages of the model

The first advantage of the model is that it requires from managers to see a bigger picture and to observe a company as a whole. Carefully identified key indicators allow the managers to observe every aspect of their business on daily, weekly or month basis.

Rules defined within the model force the managers to have a rather new view on their business. They will start thinking of the new crisis and issues that can occur of which they may not have thought before. This way they can gain a new insight of their business and make proper changes in order to prevent future crisis. "Crisis prevention and crisis management model" is very flexible model, meaning that it can be easily adjusted for use in any industry and for every company. Model provides the guidelines which properly followed allow the user to create a model for his company. However, because of its flexibility and its use in many industries, it has its disadvantages.

One of disadvantages is to determine wrong key indicators. If by any chance wrong key indicators are determined and observed, managers can be convinced that company is doing fine, while in reality it is not prepared for the upcoming crisis.

Other disadvantage is the obvious subjectivity of the model. Managers of the company assign points and coefficients according to their own opinion. This can be readjusted by asking for the opinion of the consultants.

4. PRACTICAL APPLICATION OF "CRISIS PREVENTION AND CRISIS MANAGEMENT MODEL"

Practical application of model will be presented using data from a transportation company. First, we'll show key indicators and how points and coefficients are assigned to specific crisis and perspectives. Afterwards, every aspect of the model will be explained in detail.

Table 4: Practical application of "Crisis prevention and crisis management model"

Crisis/Perspectives	Financial perspective 0,25	Customer perspective 0,2	Internal perspective 0,3	Innovation and learning perspective 0,25
Performance crisis 30	PCT0,045			
	PIT0,045			
	PintT0,045			
	PconT 0,045			
	PGT 0,045			
Identity crisis 15		PCD0,08		
		PA 0,05		
		NAC 0,07		
Innovation crisis 15			IBS 0,04	PET 0,03
			INIL0,04	LIC0,04
Crisis of company			PATR 0,08	ES 0,05

management 20	CNCE 0,025		VMS 0,06	KKE 0,05
			COU0,08	
Work collective crisis 20				PME 0,04
				EM0,04

Table 5: Legend of key indicators

KEY INDICATORS

PCT – Profit of city transport
PIT – Profit of intercity transport

PlntT – Profit of international transport
PConT – Profit of contracted transport
PGT – Profit of goods transport
CNCE – Core and Non Core expenses
PCD – Percentage of cancelled departures
PA – Percentage of accidents
NAC – Number of accidents with casualties
IBS – Investment in Bus station

INIL – Investment in new international line
PATR – Proper assignment of tasks and responsibilities
VMS – Vision, mission and strategy
COU – Control of organizational units
PET – Programs for employee training
LIC – Loss of intellectual capital
ES – Employee satisfaction
KKE – Keeping the key employees
PME – Personal motives of employees
EM – Employee motivation

After calculating the aggregated value for every key indicator and their ranking, they should be sorted into according groups. In this particular case, we will sort all of the indicators into three groups:

Key indicators rank	
1. PATR	1,6
2. COU	1,6
3. PCT	1,35
4. PIT	1,35
5. PlntT	1,35
6. PConT	1,35
7. PGT	1,35
8. PCD	1,2
9. VMS	1,2
10. NAC	1,05
11. EM	1,0
12. KKE	1,0
13. PME	0,8
14. EM	0,8
15. PA	0,75
16. IBS	0,6
17. LIC	0,6
18. INIL	0,6
19. CNCE	0,5
20. PET	0,45

I Group	
PATR	COU
PCT	PIT
PlntT	PConT
PGT	
II Group	
PCD	VMS
NAC	EM
KKE	PME
EM	PA
III Group	
IBS	LIC
INIL	CNCE
PET	

Figure 10: Ranks and groups of key indicators

Among these key indicators there are both quantitative and qualitative indicators. Even though it's easier just to observe quantitative data, it is not possible nor wise for the problem of crisis management to discard qualitative indicators and observe only the quantitative ones. As said before, a company is not just a bunch of numbers nor it is only its asset or machines, it is also made of people who work there and its customers. Company is a forever changing system.

Key indicators should be checked for progress on daily, weekly or monthly basis. Criteria used to assign key indicators to a specific group is their aggregated value which is calculated by multiplying points for a specific crisis and coefficients assigned to key indicator. Key indicators in the first group are the ones that managers need to track on the daily to weekly basis and that require imminent action. First group of indicators are the ones that relate to profit in organization units, but there are also two indicators regarding the crisis of company management. Those are proper assignment of tasks and responsibilities and control of organizational units.

The reason why these two indicators are within the first group is an obvious lack of proper assignment of tasks and responsibilities. There isn't any manager that can precisely tell what his tasks are and how his performance is measured. For example, there is no marketing division in company. There are no employees with the task of creating marketing promotions, or taking care of the company's image. Management is in a unique situation where everyone is doing everyone else's job, and no one is taking responsibility for the decisions made. Without the proper task assignment it is impossible to determine the responsibility for a single employee and the decisions made. Another problem is that organizational units have become organization for itself without any obligation to report to the top management, nor are they adequately controlled.

This shows how this model is finely tuned, and that not only financial indicators are the ones that should be observed if a company wants to be fully prepared for crisis. Those two non-financial indicators from the first group have the greatest aggregated value in the whole model. Having that in mind, the first task of the management would be to completely change the way company is runned and to assign proper tasks and responsibilities to every employee.

Second group of indicators are the ones like defining the vision, mission and strategy of the company, and the ones that refer to accidents involving the company's trucks and buses. There are also indicators related to employees, their satisfaction, motivation and personal motives.

Last but not least is the third group of indicators, consisting of investment indicators, core and non core expenses, loss of intellectual capital and employee training.

Defining the groups for indicators doesn't mean that there are some key indicators more important than the others. Ones determined, all of the key indicators are essential to a company in order to prevent and manage any crisis. Grouping the key indicators is to determine the urgency of reaction needed to handle the issues and manage the crisis. Indicators from the first group require urgent reaction from the company management in order for a company to survive. At the same time, other key indicators should be analyzed in order to create a better future for the company. In order to create a good and working "Crisis prevention and crisis management model" we must take in consideration every one of these 20 key indicators previously determined.

The goal of the model is to single out only the most important indicators in order to help accompany prepare itself for the upcoming crisis. Nevertheless, without defining the proper actions to improve those key indicator, this model would have no practical use. However, the task of designing and implementing just the right actions is simplified a lot by a fact that key indicators are already determined and managers only have to follow guidelines set by the key indicators.

5. CONCLUSION

This model emphasises the importance of crisis prevention, rather than managing the crisis. However, "Crisis prevention and crisis management model" can be used both for the purpose of crisis prevention and crisis management. This paper is focused on preventing crisis, because if crisis is foreseen there is more time to react and avoid the crisis or at least mitigate the effects of crisis.

"Crisis prevention and crisis management model" utilizes key indicators in a very simple, but effective way, and enables the company to be fully prepared for the upcoming crisis. This particular model which practical use was shown on the example of transformational company, can be easily adapted for use in the same industry. This model is not rigid, it is actually very flexible, and can be adapted for use in almost every industry.

Model can be enhanced in a way to determine key indicators for different industries, thus creating almost finished models that can be prepared for use with minimal adjustments. By accumulating that experience, a large database of models can be created that could be used both in education and for the needs of companies.

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CRISIS MANAGEMENT IN MILITARY ORGANIZED SYSTEMS

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Abstract: *This paper describes basic characteristics of military organized systems and assumes that the crisis as a category is present in all spheres of human activity. Involvement of military organizational systems in dealing with various types of crisis is a reality that we follow in any crisis situation. In order to act in a crisis situation it is necessary to know the basic characteristics of a crisis and how to overcome and mitigate it. This paper is a result of experience in tackling various crises, and theoretical development in the sphere of crisis management. The way of crisis management is a good basis for further structuring in terms of successful implementation in the process of the practical resolving of various crisis situations along with the institutionalization of a unified approach to crisis management.*

Key words: *military organized, systems, crisis, phase of the crisis, management*

1. INTRODUCTION

Crisis management in military organized systems has broader context that includes entire spectrum of activities focused on the crisis: prevention before the crisis occurs, crisis management in a strict sense, gaining new experiences in the process of mastering the crisis. Activities related to the process of dealing with crisis are considered to be a crisis managing process and crisis resolving process. Crisis managing is carried out through different phases, which are characteristic of the crisis management process.

Before the crisis occurs, preventive actions are necessary, aimed at the acquisition of knowledge, which are the product scenic visions of development in the future or how the prediction of crisis appearance.

After the crisis occurs, despite the measures taken to prevent it, the focus on it's resolving. This includes activities aimed at alleviating the crisis and harm reduction. Experiences important to be extracted from the process of mastering the crisis include certain facts about the characteristics of the crisis and its real consequences. This particular part of the crisis related to the fundamental questions that concern the identification of the crisis, its force and effect, are crisis management in a strict sense.

From the broader context of crisis management, the last step is the reaction to the crisis. The main issue to be resolved relates to the further response actions. The focus is on the experiences and lessons learned from the crisis resolving process and on defining future actions of any military organized system despite its type and size.

The main element in comprehension and setting crisis under control should be a specific place and role of the organization (including any military organization, and organizational units). This is primarily conditioned on the environment and the stability of the environment in which the military organization exists, its competences and, finally, its identity in functioning in the specific task.

2. TERM AND CHARACTERISTICS OF MILITARY ORGANIZED SYSTEMS

The military organized systems include organisations basically defined by the structure in which particular business units or business processes are taken. It implies different hierarchical levels expressed by certain responsibilities in its functioning. It is very important from the point of military organized systems and their study, primarily because of that any military organization in any system, regardless of the level and structure include different objects that have some specific features, that are or may be of some interest. There are immediate links that directly cause changes in the whole system.

An important assumption in functioning of military organized systems is their guidance expressed through certain functions and processes that lead to achievement of goals. The objectives of the military organized systems are determined by a specified functions of the given system and its characteristics.

When discussing the characteristics of military organized systems, there are different criteria according to which features can be expressed. This paper expresses the view in terms of monitoring the status of management as an important element and an integral part of every military organized system. The essence of the approach, in the context of understanding military organized systems, is based on needs and concrete results in solving complex and practical problems.

Currently, what attracts the attention when it comes to military organized systems and researches in this field, is an approach to developing management skills and elements of commands and commanders who are directly related to the military organized systems in terms of their management. So, we are in the stage of development, when scientific researches, setting up certain theories in solving systemic problems in the area of military organized systems, especially in the field of crisis management should be considered equally.

If issues relating to military organized systems are looked more carefully, especially those issues regarding the importance of defence activities, it can be concluded that even though there are practical solutions in the sphere of operational management, there are no completed and comprehensive built systems of universal and comprehensive action to all levels, particularly in areas of crisis. This is the consequence of real circumstances that have arisen from the need for restructuring military organized systems and this process is still in process (Karovic, S. et al. Military management - scientific events of science and business management or defence science, SIMNOD, Belgrade, 2011.)

3. BASIC ELEMENTS OF CRISIS

Any crisis carries negative connotations. It is a term nowadays often used as a slang. It describes personal status or situation or general condition of the negative and undesirable (hazardous) consequences. However, taking into account often use of the above term, there is no comprehensive and conceptual content of the term, but there are many different situations that reflect the above term.

The modern concept of the term crisis is derived from the medical literature which indicates a dangerous state of health. This state cannot be recovered without permanent damage, external intervention or fundamental restructuring. Therefore, self-defence mechanisms are not enough for resolving a crisis. This characteristic, when it comes to social sciences, is used to explain and describe the crisis in the economic, political, social and cultural systems.

It is important to emphasize that the crisis means a condition that leads to the edge of survival of some organization, the state of vulnerability of its existence, environment in which it cannot act normally, which threatens its ability to survive, disables it in achieving goals, and, finally, affect the ability of future normal operation.

This process reflects the current tendency in the organization that can be used in processes realized in levels to reduce the risk (prevention) and increase the ability of an adequate response. The elements of the crisis, its general form is shown in Figure 1.

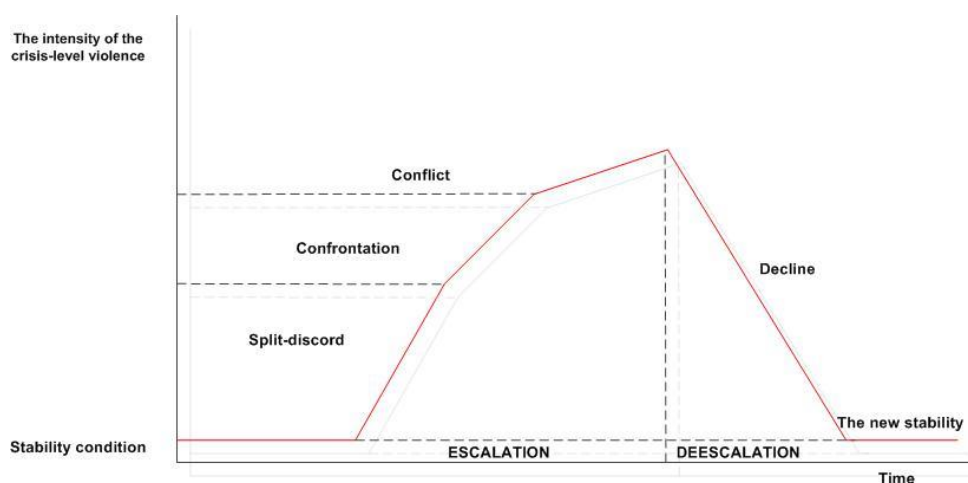


Figure 1: The general form of crisis

Through reviewing crisis and its expressions, and stages that manifest its actions, models of action at particular stages could be defined. Common characteristics of activities or processes carried out in a period previous to a crisis are defined by the type and circumstances in which it manifests. Action in the field of prevention includes activities which will ensure that an organization will be able to activate the next stage of the crisis can be successfully resist. Model of crisis management in a given circumstances, is based on measurements of real and objective analysis of form and threat degree and possible consequence of the interaction of different factors in this phase, which may have effects in the next crisis phase.

The Figure 1. shows that in certain crisis phases some specific elements could appear, which arise in a period previous to a crisis and build continuously while leading to its culmination and the highest point, no matter whether it is a crisis in the system or a crisis caused by the action of nature. However, it is important to distinguish between actions in a particular situation where there is no developed system that would fully meet all the criteria. There is a general attitude that, depending on the type of crisis, different resources will be engaged to act. It is impossible to define the specific model of action, because in the particular case prepared plans for a specific situation should be activated. This means that the plan is a model of action in a specific situation.

According to the views of modern armies, and especially NATO, approach or model for solving the crisis situation has elements shown in Figure 1. It is characterized by the existence of two distinct phases, divided by the culmination point, there are escalation phase and de-escalation of the crisis phase. This transition occurs in any definition of the process of crisis.

On "a stability period" diagram shows the form of crisis in which no violence or threats of priority objectives are present. There is a lack of potential tension between the conflicting parties.

- The diagram can be shifted up to the "disagreement" division - showing that a threat to priority goals is identified. It characterizes a warning on a possible crisis.
- The curve can culminate to the point of "confrontation", indicating the growth of violence on one or the other side in a crisis, showing that there is a crisis
- The curve shows that the crisis can grow up to a point when the situation turns into a conflict.

De-escalation phase of crisis is characterised by:

- Eventually the intensity of the crisis will subside by showing its course in the diagram. Curve shows a declination, in passing through a phase of decline of the conflicting parties may include the recognition that the threat of the priority objectives is in declination, does not mean that the crisis is over, it was brought into favourable condition. This form of crisis shows that the worst is over.
- Curve decreases to a relatively low-intensity diagram showing the stability of the "new" to the crisis may be higher or lower intensity than the original, shows the new "status quo" that is acceptable to all parties involved in the crisis.

4. CRISIS MANAGEMENT

From the point of crisis management considerations one should bear in mind the broader context that includes the entire spectrum of activities focused on the crisis: prevention before the onset of the crisis through crisis management in the narrower sense, in order to gain new experiences in the process of mastering the crisis. Activities related to the process of crisis management are considered to be a crisis or its mastering. Crisis management is carried out through different phases, which are characteristic for the process crisis management.

Before the crisis, it is necessary to have preventive action aimed at the acquisition of knowledge perspective, which are the products of scenery visions of development in the future or the model of prediction of the action.

After the crisis, despite the measures taken to prevent it, the focus has centred on its mastery. This does involve activities aimed at alleviating the crisis and harm reduction. The experiences that need to be extracted from the process of mastering the crisis include certain facts about the characteristics of the crisis and its real consequences. This particular part of the crisis related to the fundamental questions that concern the identification of the crisis, its force and effect, are crisis management in the narrower sense.

From the broader context of crisis management, the last step is the reaction to the crisis. The core issue to be resolved relates to further response actions. The focus is on the experiences and lessons from the crisis and the definition of the future courses of action in the organization of any type and size.

The main element in the knowledge and mastery of the crisis should be a specific place and role of the organization (including any military organization, and organizational units). This is primarily caused by the environment and the stability of the environment in which the military organization exists, its competence and, finally, its identity as a function of a specific task.

4.1. Crisis management in a broader sense

In particular crisis management through defined stages that manifest themselves in prevention activities identifying the crisis and respond to the crisis can be explained in more detail. In this sense it can be used, as pointed out by Osmanagić-Bedenik (2003). Two-dimensional matrix comprising five levels and five stages, with their emphasis on networking (Töpfer, 1999). Matrix ensures that at every level and every stage of investigating the antecedents and consequences of the crisis. The way research is presented in the following elements:

- The content-process level includes events that are in the process of crisis and directly related, or a moment of events,
- Information level has implications for early warning and knowledge as well as special forms of information provided by preventive action. Simultaneous realization of potential causes and consequences of the crisis and raises the question of collecting and sending information as a key segment
- The organizational level refers to the design of processes and structures, direction of the organization and shaping organizational units to master the crisis. The essence of the above refers to the level executives and direct holders of certain tasks and roles and
- The communication level refers to media information, associates, managers, owners and the general public of the crisis, its causes and the measures taken. Briefly define the issues related to information and content related to elements of who, when, how and what to inform?
- Psychological level includes attitudes, emotions, the degree of involvement, understanding, motivation and behaviour of all who are in contact with the crisis as the organization and outside the organization. The essential question of the levels above apply to the consequences of events and activities information on the persons directly or indirectly associated with the crisis.

Table 1: The matrix of crisis management process
(Osmanagic-Bedenik, N.: *Crisis as opportunity, school books, Zagreb, 2003.*)

Levels	Phases				
	Prevention	Early warning	Set crisis under control	rehabilitation (renewing)	Using the expiriance of the crisis
	As the crisis be prevented? ↓	As the upcoming crisis can be recognized? ↓	How can mitigate the consequences of the current crisis? ↓	How to reach the minimum positive level before the crisis? ↓	How to draw from the crisis overcome ↓ experience (used)?
contents	The moment of developments (What's going on?) →				
informations	Collection of information (Who collects and sends information?) →				
organizations	Holders of certain tasks (Who takes the roles and missions?) →				
communications	Who, when, and what informs? →				
psychology	What are the consequences of events, information and actions? →				

The final terms it can be stated that all the factors and stages are based on crisis management and they are universally applicable to all types of crises, such as natural, technological and social. Also, it is important to emphasize that when it comes to mastering the crisis, there are certain stages that can be formulated as:

- prevention, which is being taken and procedures to prevent the onset of the crisis and measures for its master,
- early warning, which includes symptoms (signals-indicators) of the occurrence of crises,
- setting crisis under control, including a system of measures taken to eliminate the negative effects caused by the action of the crisis and restore the original state and the functions that existed before the onset of the crisis and
- the adoption experiences of the crisis, primarily related to the lessons learned which were characteristic of the crisis period and its implementation in preventive action plans to reduce the risk of future onset of a crisis, or possibly build on indicators of the crisis.

These are important elements that one should bear in mind in relation to its crisis, and mastering. They are the key solutions crises.

4.2. Information Structure

Looking at the crisis from the point of mastery and the measures taken, it is necessary to understand and expand the area affected by the crisis in terms of process information. This applies primarily in the field of information if it is to manage the crisis in the way of a comprehensive system approach, which in this case, and it is an essential element, especially in the prevention phase, ie. preventive action. If we observe the phases of prevention, emphasis is given on a permanent progressive direction information, (Osmanagic-Bedenik, N.: Crisis as opportunity, school books, Zagreb, 2003.) from the bottom where the actual indicators and warnings, to the top, where the receiving information is, which is in some way connected with the flow of information within the organization. This is particularly specific to the military organization that has formalized the flow of information and strictly defined hierarchical structure that directly reflects the previously mentioned statement in terms of receiving information. With the advent of the crisis the direction of information flow can take different courses so that the process of mastering the so-called crisis occurs, star shaped or in a different direction which is basically an action activity.

Observing any organization, including the military, communication relations were established so as to allow a constant flow of information. The moment of occurrence is very important, as well as the aspect of preventing crisis because in this case the organizational process follows and prevents so-called bad news in the worst case, prevent rumours.

Hence the emergence of the crisis and the process of mastering the crisis include a rapid response that starts from the highest command levels, and ends with the lowest level that turns everything into action plans and practical actions to their goals of higher level tasks achieved.

From the point of considering communication networks and information flow, under the direction of movement, access is an important element of so-called progressive informational network, which essentially reflect the views of experts or other persons as the harbinger of the crisis, or sensors. Their main task is to accept the views of the above who can point out the occurrence of crises. His basic characteristic is openness and unidirectionality. However, it is not flexible in terms of applicability in the military organization, because of the strictly formalized relationships that characterize the military organization.

In contrast to progressive informational network, there is retrograde information network, which is based on a clearly structured and organization concept, which is characteristic of the military organization, where the flow of information takes place top down. The point is to master the crisis in the relationship that characterizes the relationship of subordination, ie. all information and orders are based on the commands, then from the top of the organization.

The command of a specific unit or organization that are outside the sphere of military organization, in a crisis situation, quickly analyze and assess the causes and consequences of the crisis and is taking concrete measures to master the crisis. The highest level of command decision-making is, in some cases the crisis staff. It should be noted, when the military organization is concerned, this is the command that is place-making and implementing individual measures.

As Osmanagic-Bedenik says, results and knowledge of crisis management process has five stages and five levels that can be displayed matrix flow, table 2. (Osmanagic-Bedenik, 2003). The matrix shows the process flow crisis that is basically the process of networking activities. The essential element that determines the

position of crisis management and its mastery is based on gaining experience from the crisis and overcome the constant study and implementation of such experiences in the appropriate emergency management plans.

In table 2, the flow is clearly evident, and interdependency of the activities that are important in terms of crisis management fields shaded in steps one to seven, then, from prevention to experience their full implementation, and coming up with new knowledge about the crisis.

It is important to emphasize that the initial initiation comes from the psychological point of view through the indicators and the feeling that something is "wrong" and thus produce a willingness to develop a crisis plan on the content level. In the next step, the attention is on early warning, therefore, the early discovery and early warning are the level of information where practical indicators and information are shaped. If we look deeper, we can conclude that the first two steps are essentially aimed at crisis prevention, and directed that a crisis does not occur at all. However, if a crisis occurs, ie. if the organization from "normal" moved in "emergency" situation, then all five levels in the third stage are activated.

The fourth step is to develop measures of crisis management, while in the fifth step, the emphasis is on communication and organizational fields emerging from the crisis.

Sixth step connects levels of mastering the crisis and use the experience of the crisis, while the seventh step is the emphasis in organizational communication areas out of the crisis.

Table 2: The matrix of the process flow of the crisis
(Osmanagic-Bedenik, N.: *Crisis as opportunity*, School books, Zagreb, 2003)

Levels	Phases				
	Prevention	Early warning	Set crisis under control	rehabilitation (renewing)	Using the experience of the crisis
contents		2	3		
informations	1			6	
organizations			4		7
communication				5	
psychology					

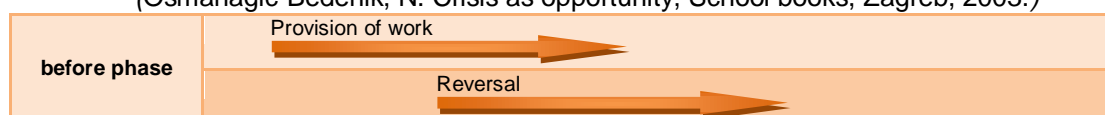
Direct connections and interactions of the individual phases and levels occur in a given time and space and represent a continuous relationship of mutual influence. The matrix of the process flow of the crisis highlights the dependence relationship of individual phases and stages of the process of crisis management (Osmanagic-Bedenik, 2003).

In essence, the process of crisis management is a constructive reasoning, decision making and action that is aimed to determine the future status and avoiding crises. If this is not possible, then it means mastering its success.

4.3. Crisis management in the narrower sense

If we take into account preceding paragraphs regarding crisis management, they emphasize the difference between crisis management in a broad sense, encompassing a wide range of activities of an organization focused on the crisis, and crisis management in the narrow sense which includes activities geared to action during the crisis, or for the period mastering the crisis. The process of crisis management in the narrower sense is shown in Table 3.

Table 3: Process of crisis management in the narrower sense (setting crisis under control)
(Osmanagic-Bedenik, N. *Crisis as opportunity*, School books, Zagreb, 2003.)



Display of crisis situation	Realisation of new concepts			
	phase 1: Appearance of crisis	phase 2: Beginnig of renewing	phase 3: Renewing	phase 4: Insurance new direction
<ul style="list-style-type: none"> • recognition of the symptoms of the crisis • search for help with field • hiring specialists to help 	<ul style="list-style-type: none"> • appointment of the crisis team • alignment of interests and activities of participants • The first factor analysis of the crisis • determination of the recovery team 	<ul style="list-style-type: none"> • commencement of the restoration team • analysis of the organization • preparation and presentation of the concept of restructuring • emergency measures 	<ul style="list-style-type: none"> • the introduction of structural change • implementation of measures for restructuring • implementation of control measures • Development of long-term conception of the organization 	<ul style="list-style-type: none"> • stabilization of the structure changes • usresredenost the key responsibilities • activation of additional features • achieve safe operation and functioning
	2-4 Weeks	1-2 Months	3-12 Months	2-3 Years

The picture is characteristic for the first phase of the recovery process engaging all resources that will ensure and facilitate operation of the organization in order to maintain key functions and relations. It is necessary to define priorities, external and internal accountability, and if necessary, enlist the help of the field, and some managers to assign certain powers. The priority work of the command in the military organization is aimed at restoring the basic functions of the organization and take concrete measures to eliminate organizational problems.

The second phase is characterized by the production of the basic concepts of restructuring based on the initial analysis of the situation in order to begin recovery.

The third phase is characterized by a concrete idea of strategic and operational restructuring of the organization. Activities are geared towards environmental action and are based on the activities and processes in a particular military organization to adapt its organizational structure. This phase, as seen in the previous picture, can take 1-2 months.

The last phase is characteristic for presupposes regeneration, determination of structural changes and concentration on core competences (responsibilities). It is based on a strategic dynamics which is preoriented towards the restoration and must be continued in order to avoid future crises.

It is know within the military practice, as well as based on analysis, and in this case, it is given its dimension. The basic and detailed analysis discover the real causes of the crisis. Only after understanding the causes of the crisis, it is possible to define measures that will lead organization (military) in a state of normal operation, and stable operation.

5. PHASES OF THE CRISIS MANAGEMENT

The process of crisis management, as previously noted, encompasses a wide range of activities that can show different stages. In a narrow sense, the crisis management activities include primarily during crisis or a period of mastering the crisis (turning point). The purpose of system management is much broader and includes all activities of preventive action, to master the crisis and reactive response, which is called crisis management in general.

The crisis is an essential part in the development of any organization, which also applies to military organizational systems, no matter what the level is, so it cannot simply be skipped. The success of coping with the crisis manifests itself in the length of time that passes through an organization and the consequences which remain at the organization after a crisis, if compared with the same organization take a factor of success as a category of successful or unsuccessful organizations. Effective organizational unit or organizational system, especially the military has been successful in terms of handling the crisis, especially if it has a "tool", ie. specific methods and instruments for the prevention, timely detection and mastering the crisis. It can be concluded that in such systems, organizational crises are rarely performed, and the consequences of shorter duration are less.

Finally, the crisis is a regular occurrence and common feature of any organizational system, particularly in terms of development of the organization. Practically, each stage in the development of the organization or its operation carries risks and requires a different type of management, a different strategy and governance.

The success of crisis management can be subsumed under the phase response elements, which essentially reflect the characteristics of the crisis. In this sense we can talk about the stages of crisis management which include:

- preventive action (prediction) to prevent the crisis,
- Identifying the crisis (if it is occurring, how to recognize it – indicators, the strength) and
- reactive crisis management, or mastery of a crisis (which is being done in order to master the crisis).

The main precondition of crisis management is timely observation or knowledge of hazards, and special attention is paid to the so-called warning signals - early warning systems that need to be sensitive to register the onset of the crisis. The crisis never occurs at once and suddenly, it starts slowly and becomes negative further on in all the prominent types.

If the intensity of the crisis is stronger, the meaning is clearer. Also, if the early warning signals are prominent, it is more difficult to "return" to a previous state or normal activity. The above mentioned statement certainly puts a priority responsibility to the unit commander, if it is a military organization, and management of the organization to build a collection of early warning signals or early warning, manifested in the data to the qualitative and quantitative scale on the occurrence of external and internal changes.

A particularly important segment belongs to the experience he needed to use as a lesson from the crisis. In crisis prevention, emphasis is given to the prediction capabilities, and the scenarios of future development directions. Therefore, prevention includes not only avoiding crises, but also applies to the preparation for the inevitable crisis and the crisis that simply cannot be avoided.

The central issue in this case, a contingency plan that defines all the activities required to master the crisis after its occurrence. When the crisis occurred, the focus is directed toward its mastery, including its moderation, harm reduction and recovery as a new beginning.

Bearing this in mind, the leadership of the organization, in this case referring to the military organization systems, commands are required to participate and address the main activities (actions) required for each stage of the process of crisis management.

6. CONCLUSION

The paper noted that the crisis is an integral part of our everyday life and crises that may be affected by all the organizations and the military organization systems. Among the factors in the monitoring and development of the crisis there are certain phases common to all types of crises. Universal for both the community and for the nature of the crisis. The subject of work are primarily social crises that have implications in the area of disturbed social relations with elements in a growing level of violence. The process of crisis management is a constructive reasoning, decision making and action that is aimed to determine the future status and avoiding crises. If this is not possible, then it means mastering its success.

Approach to crisis management systems in the military organization is facing views primarily broader and narrower approach dominated prevention and identification of the crisis. For crisis management in a broader sense identified by two-dimensional matrix of a matrix that includes five levels and five stages, with an emphasis on their networks. Matrix provides us with every level and every stage of investigating the antecedents and consequences of the crisis and is universally applicable to all types of crises.

The article also noted that successful crisis management is necessary for development of information structure. This applies primarily in the field of information if it is to manage the crisis in the way of a comprehensive system approach is an essential element, especially at the stage of crisis prevention. Information structure represents the connection between the management of the broad and narrow, especially the narrow sense includes activities geared to action during the crisis, or for the period of mastering the crisis.

Looking at crisis management in the narrower sense, given the identified phases of crisis management, which is known in military practice, in this case, gives its dimensions. The basic and detailed analysis discover the real causes of the crisis. Only after understanding the causes of the crisis, it is possible to define measures that will bring the military into a state of normal operation, and stable operation.

In particular that crisis management can involve a wide range of activities that are characteristic for each phase. Special measures relating to activities during the crisis belong to the sphere of inner control. However, to successfully master the crisis one requires a systematic approach that encompasses all the activities of preventive action, in order to master the crisis and reactive response, which is called crisis management in general.

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NATIONAL QUALIFICATION FRAMEWORK AND SYSTEMATIZATION OF WORK PLACES

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Abstract: *This paper discusses the impact of the National Qualification Framework (NQF) on Systematizations of Work Places (SWP) in companies and other organizations which do not comply with the framework. It takes into account the existence of the old system of marking degrees and names of professional titles. The paper presents analysis and comparison between old systems and NQF with the aim to determine similarities and differences. The NQF impact on SWP elements has been investigated too. The paper gives suggestions for making a SWP in compliance with new regulations and therefore could be useful for top managers, project organizations and human resource managers.*

Key words: *level of qualification, list of names, systematization, position, titles, occupations*

1. INTRODUCTION

National Qualification Framework of Serbia is adopted at the beginning of the year 2010. Beside the List of professional, academic and scientific names (LN) it should be the basic document for the redefinition of old and the making of new Systematization of Work Places in companies and other organizations. The redefinition has not been done yet in any organization because the responsible staff has not been familiar enough with the role of NQF and LN. The existence of the old system of marking degrees and professional titles aggravate the situation. Therefore it is necessary to define the relations between the old and new system and investigate the ways how to apply NQF in SWP.

2. SYSTEMATIZATION OF WORK PLACES

The basic document governing the operation of enterprises and other organizations is Regulation on organization and systematization of jobs. It is mandatory according to the Labour Law from 2005 and it defines the organizational units, the types of jobs, the type and level of education and special working requirements for that jobs. It therefore defines all elements related to the workplace and the conditions to be met by candidates. SWP is an organizational regulation of director that is used as basis for: planning, recruitment, recording and managing of employees, the rights arising from employment and calculation of earnings.

Labour Law speaks about "jobs" while the praxis uses "work places". Work place is the smallest technologically and organizationally completed unit within which a part of operation or production is performed. Within a work place one or several operations are performed. SWP is a list of places in a company which results from its organization. The list is adjusted to the organisational structure in a unique, unambiguous and uniform manner for the whole company in terms of the type and content of data defined by it. SWP is made as a table that contains data listed from 1 to 7 as shown in the table 1 below.

Table 1: Example of Systematization of Work Places

No. code	Title of work place	Nr of empl.	Education level	Education type	Expe-rience	Other requirements	Coeffi-cient
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Director	1	VII-1	Dipl. Ing. of work organization	5	English	6
2.	Head of accounting	1	VI-1	Economist	3	Computer skills	4

By making SWP the following rules have to be respected in order to define its elements:

(2) **Title of work place** - comes from the content of the work; the title defines employee's occupation. Here should be noted the difference between title (educational background) and occupation (the work performed by employee).

(4) **Education** (degree required for the workplace - type and level) - determined on the basis of professional consideration of the required knowledge, skills and ability to work at a workplace by appropriate choice of the existing type, direction and level of education provided by educational institutions of Serbia.

(6) **Other requirements** - additional knowledge and skills as a prerequisite for the job, e.g. knowledge of foreign languages, use of computer, safety at work course, driving licence and others.

For each work position from the SWP, a job description should be done (tasks, powers, responsibilities). The set of all descriptions makes an annex to the Systematization of Work Places.

3. QUALIFICATIONS - TITLES AND DEGREES

Before the Law on Higher Education passed in 2005, there were in Serbia job titles and degrees of education obtained by the University Law and High School Law. The titles and degrees were determined in the former Yugoslavia and during the political changes were just taken over. They are shown in the table below, (according to National Classification Framework of Serbia 2010)

Degree of education	Faculty/academy/university		College or applied studies		European Qualification Framework of Higher Education (Bologna process)	European Qualification Framework (levels)
VIII	Ph.D/doctorate				3. cycles	8
VII-2	Master of science/magister	Specialization			2. cycles	7
VII-1	II degree	graduate (diploma)			1. cycles	6
VI-2			Specialization	Study 3 years	short cycles	5
VI-1	I degree		Study 2 or 2,5 years			

Picture 1: Levels of education by 2005.

A characteristic of this system was the clarity in determining titles and level of education which derived from the type of educational institution and length of schooling. There was a unique approach to different professions; titles and degrees were in a logical order as in the following example: economist VI-1, degree of economy VII-1, magister degree in economics VII-2, doctor of economy VIII. (It is important to note that many study programmes were divided into different courses.) All diplomas obtained and issued before the accreditation of high school institutions include these, above mentioned titles. The large majority of graduates in Serbia have diplomas with these titles.

The previous titles were mainly in accordance with the degrees of European Classification Framework (EQF). The Doctor of Science VIII degree corresponds to the eighth level of EU, and all graduates VII-1 degree correspond to the 7th level of EU. There were discrepancies in the title of Magister of Science, which was in Serbia VII-2 degree and in the EU belongs to the 8th level. (It is interesting that in Croatia the Magister of Science was VIII degree.) There is another discrepancy with VI-1 degree which corresponds to EU 5th level. These two degrees (VI-1 and VII-2) do not exist anymore after 2005 neither in the Law on Higher Education nor in the accompanying legislation. However, these two and all aforementioned titles will be acquired and written in diplomas until the expire of legislative deadlines of the studies according to previous laws.

3.1 Records in the field of work

The title and degree of qualification is a data used in a various records in the field of work and particularly in the work of National Employment Service (NES). In 1998 in SR Yugoslavia was passed "Code List in the records of work" that contains "Code List of jobs and qualifications". (Gluvak, M. 1998) In the Code List of Jobs, occupations are divided according to two features:

- 1) according to complexity of work - categories I-VIII
- 2) according to similarity of fields - into 19 work fields within which 75 groups of professions are defined as shown in the table 2 (the field of work: Economy, Law and Administration)

Though the name of the document says The Code List of Jobs, it is in fact a Code List of professional titles. The same Code List (which is precisely explained by Gluvak, M. 1998) is still used nowadays in the unified information system of NES. In 2008 the Code List was harmonised with the List of Professional, Academic and Scientific Titles of National Council for

Table 2: Code of Titles-excerpt

XII Economy, Law and Administration
66. Managers and organisers
67. Economists
68. Lawyers
69. It specialists and statisticians
70. Human resources jobs
71. Administrators
72. Defence, Security, Protection jobs
73. Zanimanja osiguranja

Higher Education. In order to include new titles from the List, the Code List was amended with new codes for new titles in higher education (categories from VI to VIII). The new titles and their codes are entirely harmonised with the List. They are divided into five fields and several areas.

4. THE LEVELS OF HIGHER EDUCATION AND THE LIST OF PROFESSIONAL, ACADEMIC AND SCIENTIFIC TITLES

Law on Higher Education from 2005 united higher education in Serbia and brought significant changes in many aspects, especially in terms of professional titles. Aforementioned Law on Higher Education and accompanying regulations passed by National Council for Higher Education have changed fundamentally the previous qualifications (titles and degrees). The entirely new forms of higher education are introduced. Their titles are divided into three levels, shown in the Picture 2 (National Qualifications Framework of Serbia, 2010)

European Qualifications Framework levels	European Qualifications Framework on Higher Education (Bologna process)	Serbian National Qualifications Framework (SNQF)					
		Academic studies			Applied studies	ECTS	
8	3. cycle	Doctoral BA-3	Specialist BA-2b			180	480
7	2. cycle	Master BA-2a				120-60	300
					Specialist BC-2	240	
6	1. cycle	Bachelor 3y BA-1a	Bachelor 4y BA-1b	Integrated BA-2a	Medicine BA-2a	Bachelor BC-1	180-240

Picture 2: Levels of education by 2005.

A characteristic of this system is the existence of three levels of higher education adjusted to the three levels of EQF and to the first, second and third cycles of high education according to Bologna process - bachelor, master and doctoral studies. There is also compliance with ECTS. A new thing is that for the levels are defined alphanumeric numberings. So, the first level has got two marks for academic study BA-1a, BA-1b and one mark for applied study C-1. The second level has got one mark for academic studies BA-2a and one for applied studies BC-2. The third level has got two marks BA-3 and BA-2a. These marks have to be written in diplomas and supplement diplomas from 2012.

For these three levels, The List of Professional, Academic and Scientific Titles has been defined (Regulation on the list of professional, academic and scientific titles, 2010), adopted by National Council in 2007, changed and amended in 2010. The List defines: the field, the type of study, professional, academic and scientific titles, their abbreviations for each of the five fields within the system of higher education consisting of 48 fields:

- Field 1 - natural sciences and mathematics (8 areas),
- Field 2 - technical and technological sciences (16 areas),
- Field 3 - social and human sciences (16 areas),
- Field 4 - medical sciences (4 areas),
- Field 5 - art (4 areas).

The method of determining titles with academic studies is similar to the previous one, for example economist, graduate economist, master economist, specialist economist and doctor of science - in the field of economics. In the field management and business: manager, graduated manager, master manager, specialist manager and doctor of science. The new titles are: master and specialist, while the third level includes a somewhat different title.

With applied studies and levels, in front of titles is added the adjective "applied", for example applied economist, applied manager, and with level two is added the word "specialist", as specialist applied economist, specialist applied manager.

Abbreviations are defined for all titles of academic and applied studies, which is a novelty, because in the past they were used but they were not defined.

In the world there are a number of professional titles with the corresponding abbreviations that originate from English language and based on three levels: Bachelor, Master, Doctorate. The best known examples are: BA - Bachelor of Arts, BS - Bachelor of Science, MA - Master of Arts, MBA - Master of Business Administration. The review of all abbreviations can be found on the site www.all-acronyms.com/tag/academic_degree.

5. QUALIFICATIONS FRAMEWORK AND LEARNING OUTCOMES DESCRIPTORS

Higher education system is supplemented by Serbian National Qualifications Framework - SNQF, which was adopted by National Council for Higher Education on 23.04.2010. This document contains preamble, one table and two pictures. In the preamble objectives of SNQF are specified as follows: "integration of students into the labour market, preparation for life as active citizens in a democratic society, personal development throughout life, development and maintenance of a broad-based quality knowledge of the whole society". In order to achieve the objectives "SNQF defines what a student needs to know, what has to understand and what is he/she able to do on the basis of qualification he/she gained, it means SNQF defines what are learning outcomes expected of each qualification". Learning outcomes descriptions for two most common types of education: basic applied studies and graduate are given in the table 3.

Table 3: Learning outcomes descriptions SNQF (excerpts)

Type of education	Learning outcomes descriptions
BC-1:	<ul style="list-style-type: none"> to show knowledge in the field of study which is based on previous education and which enables for usage of specialized literature; to be able to apply knowledge and understanding in profession; to be able to pass on knowledge to other; to possess the ability to continue their studies;
BA-2a:	<ul style="list-style-type: none"> to show knowledge and understanding in the field of study which supports the knowledge acquired at undergraduate level and is the basis for the development of critical thinking and application of knowledge; to be able to apply knowledge to solve problems in new or unfamiliar environment in a broader or multidisciplinary areas within the educational-scientific-artistic field of study to have the ability to integrate knowledge, solve complex problems, to make judgments based on information available that contain reflections on social and ethical responsibilities associated with the application of their knowledge and judgments; to be able to clearly and unambiguously convey knowledge and way of reasoning to professional and general public; to possess ability to pursue studies in a manner which they will choose independently.

As you can see "SNQF defines only general learning outcomes. Apart from the outcomes, each specific program of study within higher education must meet specific requirements in relation to the scope of knowledge, skills and competencies appropriate for particular area, or educational-scientific field."

On 23.april 2008 the European Parliament adopted Recommendation C 111/1, with which was defined European Qualifications Framework - EQF. The European Framework in Annex II gives certain descriptors of learning outcomes for the three qualifying factors: knowledge, skills and competencies, as given in the table 4

Table 4: Descriptors defining levels in the European Qualifications Framework (EQF)

	Knowledge	Skills	Competence
Level 6 <i>The learning outcomes relevant to Level 6 are</i>	advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	manage complex technical or professional activities or projects, taking responsibility for decisionmaking in unpredictable work or study contexts take responsibility for managing professional development of individuals and groups

Level 7 <i>The learning outcomes relevant to Level 7 are</i>	highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research critical awareness of knowledge issues in a field and at the interface between different fields	specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
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It is further said in Recommendation: "The development and recognition of citizens' knowledge, skills and competence are crucial for the development of individuals, competitiveness, employment and social cohesion in the Community. Such development and recognition should facilitate transnational mobility for workers and learners and contribute to meeting the requirements of supply and demand in the European labour market. Access to and participation in lifelong learning for all, including disadvantaged people, and the use of qualifications should therefore be promoted and improved at national and Community level." This shows that the EQF has primary importance for the European Union. Therefore, member states will accept instruments EQF, so that from 2012, all new diplomas of qualification, certificates and European documents issued by the competent institutions contain a clear reference, from the national qualifications systems to the corresponding EQF level.

The Recommendation includes the Annex III - Common Principles for Quality Assurance in Higher Education and Vocational Education and Training in the context of the European Qualifications Framework and Annex I with the definitions of terms used. Some important terms are defined as follows:

- **knowledge** means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. Knowledge is described as theoretical and/or factual;
- **skills** means the ability to apply knowledge and use know-how to complete tasks and solve problems, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments);
- **competence** means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. Competence is described in terms of responsibility and autonomy.

6. CLASSIFICATION OF OCCUPATIONS

Many countries that have developed their own national qualifications framework have adopted the national classification of occupations. In Serbia, this is not the case. (In SFRY there was a "unique nomenclature of occupations", which was never implemented, but was neglected although it was being made long and very professional.)

The situation worldwide is quite different. Many developed countries have a very well organised national classification of occupations. The model for this is since 1958, the International Standard Classification of Occupations (ISCO) from International Labour Organization (ILO). ISCO is an ILO classification structure for organizing information on labour and jobs. It is part of the international family of economic and social classifications of the United Nations. The current version, known as ISCO-08, was published in 2008 and is the fourth iteration. The ILO describes the purpose of the ISCO classification as: "a tool for organizing jobs into a clearly defined set of groups according to the tasks and duties undertaken in the job. It is intended for use in statistical applications and in a variety of client oriented applications. Client oriented applications include the matching of job seekers with job vacancies, the management of short or long term migration of workers between countries and the development of vocational training programmes and guidance."

The ISCO-08 divides jobs into 10 major groups. Each major group is further organized into sub-major, minor and unit (not shown) groups marked by four digit. Number of sub-major (subgroups) is given in parentheses in Table 5. Then follows a great number of minor, and at the end are the units 671 in the ISCO-08. The units are in fact specific occupations that are described in detail.

Table 5: Classification of occupations ILO and Canada

ISCO-08 from International Labour Organization	National Occupation Classification (NOC) of Canada
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1 - <u>Managers</u> (4)	0 - Management occupations
2 - <u>Professionals</u> (6)	1 - Business, finance and administration occupations
3 - <u>Technicians</u> and associate professionals (5)	2 - Natural and applied sciences and related occupations
4 - Clerical support workers (4)	3 - Health occupations
5 - Service and sales workers (4)	4 - Occupations in education, law and social, community and government services
6 - Skilled agricultural, forestry and fishery workers (3)	5 - Occupations in art, culture, recreation and sport
7 - Craft and related trades workers (5)	6 - Sales and service occupations
8 - Plant and machine operators, and assemblers (3)	7 - Trades, transport and equipment operators and related occupations
9 - Elementary occupations (6)	8 - Natural resources, agriculture and related production occupation
0 - Armed forces occupations (3)	9 - Occupations in manufacturing and utilities

7. CRITICAL ANALYSIS OF SNQF AND THE LIST OF NAMES AND THEIR APPLICATION IN SWP

Most SWP (Systematization of Work Places) in companies and organizations in Serbia were made as described in Section 2. Better made SWP determine qualification in a way described in Section 3, in accordance with qualifications (titles and degrees) which were valid until adoption of the Lists of professional, academic and scientific titles in 2010. In many SWP, which were made worse, qualification is only defined the degree, which allows flexibility in recruitment for the work position. However, not specified kind of qualification, makes it impossible for any human resource planning, chaos in the labour market and disorient young people in deciding on the type of high-school education. Although, generally, the levels of education are similar to the levels of the EU, they are not harmonized, which can be a major problem in all the activities of cooperation and work with companies and organizations from the EU. Also, it can be a major obstacle to EU integration. The titles of qualifications and corresponding abbreviations existing prior to 2010 are completely incompatible with European and international academic degree. It is not any better with the titles and abbreviations from LN from 2010.

Bearer of SNQF, National Council for Higher Education, by establishing this document tried to provide a good basis and resolve these issues. Although it is stated in the preamble that "it is shown relationship of qualifications in education, and mobility between qualifications" it would not be concluded from the data given in Picture 1. It is necessary to define directly the relationship between the old and new degrees in higher education, particularly in connection with the detailed definition, once given as a "type of qualification". The relationship between old and new systems is shown in Table 6.

Table 6: Comparison of old and new systems of titles

O L D			N E W			
<i>degree</i>	<i>title</i>	<i>abbrev.</i>	<i>level</i>	<i>code</i>	<i>title</i>	<i>example of abbrev.</i>
VIII	Doctor	Dr	III	BA-3	Doctor	Dr
VII-2	Magistar	Mr		BA-2b	Specialist	Spec. manager
VII-2	Specialist	Spec.	II	BA-2a	Master	Mast. manager
VII-1	Faculty	Dipl.		BC-2	Applied specialist	Spec. appl. manager
VI-2	Program VI-2 degree	Spec.	I	BA-1b	Undergraduate 4 g.	Dipl. manag..
VI-1	College and I degree F	VŠ		BA1-a	Academic 3 g.	Manager
				BC-1	Applied	Applied manager

Only arranged in this way becomes clear what are potential problems related to professional titles. These problems come up when drafting a new SWP, because the old and new system are not harmonized. To overcome these problems the following rules should be used:

- a) the previous title "magister" no longer exists, and is not the same as the new "master" which is lower degree. It is the closest to a new specialist BA-2b;
- b) the previous title specialist is lower than a new specialist;
- c) the previous Faculty - Dipl. is higher than the new Bachelor of 3 years BA-1a;
- d) to the previous faculty which lasted 4 years corresponds basic academic 4 years study BA-1b;
- e) to the previous faculty - Dipl which lasted 5 years corresponds a new Master BA-2a;
- f) to the new basic academic 3 - year study does not correspond none of the old ones;
- g) to the old degree VI-2 does not correspond none of the new ones but it could be compared to applied specialist study BC-2;
- h) to the previous degree VI-1 does not correspond none of the old ones but it could be compared to applied BC-1.

The old SWP should be transformed and a new one should be done with new professional titles and codes. The aforementioned rules should be used in allocation of persons who previously acquired high and higher education as Annex to the document.

Table 7: Changes in systematization of work places

No. code	Title of work place	Nr of empl.	Qualification code	title	Expe-rience	Other requirements	Coeffi-cient
(1)	(2)	(3)	(4)		(5)	(6)	(7)
1.	Direcor	1	BA-1b	Dipl.manager	5	English	6
2.	Head of accounting	1	BC-1	Applied economist	3	Computer skills	4

A much larger problem will be to harmonise the new forms of education defined in SNQF (table 3) with the levels defined by the EQF descriptors (table 4). There is a significant difference between the levels defined uniquely by SNQF and EQF which provides descriptors structured as: knowledge, skills and competencies. This method of determining learning outcomes is much better and contributes to the usability of a qualifications framework and achieving the objectives of its adoption. This is especially true for the use of SWP for which is the SNQF practically useless. It is therefore urgently necessary to change its "learning outcomes descriptors" and harmonize with the way of determining descriptors for: knowledge, skills and competencies as in EQF.

Even if it were done quickly, which is realistic, because the EQF could be used, modified SNQF still would not be of much use for it as such is not operationally useful. On the basis of it should be made standard qualifications and occupational standards. The definitions of these two standards (according to Dželalija, M. 2009) indicate the nature of these documents, which allows for the development of operational use of SWP.

"Qualification Standard means the content and structure of certain qualifications, and includes all information required to determine the level, volume and profile of qualification, and data required for quality assurance and improvement of standards of qualification.

Occupational Standard is a list of tasks that an individual carries out and a list of competencies required for their successful performance."

Only after the establishment of these two standards can be accessed to the development of **National lists of qualifications of Serbia** which should replace The list of professional, academic and scientific qualifications. Then the **National List of Serbian occupation** should be made, modelled on the ISCO-08, which should replace the Code List of Occupations. By this, all required documents, which are important for the regulation of human work, will be completed. Only in this way can be established the relationship between higher education and employment in companies and other organisations. The key link in this relationship is SWP which, because of the errors in SNQF and the lack of these standards, cannot be shaped in the required way to ensure **employability** - "individual competitiveness in the labour market regarding the necessary competence to achieve initial employment, its retention or acquisition of new where necessary." (Dželalija, M. 2009)

8. CONCLUSION

The existing SWP are not in accordance with SNQF and LT in terms of the titles of work places - occupations and qualifications - and titles. List of Titles, issued by the National Council for Higher Education is in line with the Law on Higher Education but is essentially a reworked old system titles. The new master and

professional titles are added and abbreviations are defined. Titles are generally balanced and aligned with the levels of the Framework for Qualifications of the EU, but completely deviate from the usual academic titles in the world, which can be a problem for comparability purposes.

Adopted SNQF defines descriptors of learning outcomes that are appropriate for editing pass between the forms of higher education, but are inadequate for the needs of the SWP, as it does not define the knowledge, skills and competencies by level, in which SNQF significantly deviate from the EQF. Neither LT nor SNQF fully comply with international standard qualifications, so they are not a good foundation for the development of the National Classification of Occupations, which does not exist in Serbia.

Therefore the existing SWP can be harmonized with the Law on Higher Education, SNQF and LT only in terms of professional qualifications, so that their level will be described with literal numerical codes, and the type with abbreviation from SNQF. It is not possible to define the names of jobs - occupations in a new way until adoption of the National Classification of Occupations. Until then, all the activities of human resources managements and employability of highly educated persons will be inappropriate.

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BUSINESS MODEL OF RESEARCH DATA REPOSITORY

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Abstract: *Objective of our paper is to present outline of the business model for research data repository. We have used data gathered from questionnaire distributed to universities in Balkan environment. Our findings are presented through descriptive statistics reports. Also, conclusions from analysis are fitted into a business model. Basic framework for it is provided by business model canvass of Osterwalder and Pigneur. Main result of our paper is analysis of user needs for research data repository and outline of self-sustainable business model, which could also find application in different milieus. Conclusion is that two-sided platform of researchers and companies with research needs is the best solution. It would be of interest for researchers due to easy access to research data, networking, collaboration and opportunities to earn additional resources. Limitation of our paper is level of detail in description. We hope that this model will find opportunity to be further elaborated and finally implemented in real environment.*

Keywords: *business model, organization, collaboration, research data, repository.*

1. INTRODUCTION

This paper presents business model outline for research data repository. Data repository would be valuable to researchers from Balkan area, having pressures to publish research in indexed journals. It would facilitate collaboration and ease the research process. It would be hosted on a website containing other Web 2.0 forms of interaction, like forums, wikis and basic social networking. Our plan is to develop self-sustainable business model for website in order to boost cooperation among researchers from Balkan area in the long term. Repository can also be used as pilot project for future projects which could cover larger scope than regional.

In brief, main idea is to use available funding from organizations such as CERGE as initial financial resource needed for development of site, and make it as economical as possible without significant loss of functionality, combining XML and folksonomies in order to use, classify and access research data. Data is planned to be uploaded by researchers, with free registration. Registered users could upload their research data, and access partial set of other research data, while advanced users would have accessible advanced search, more functionality and all research data. Research data would be ranked by other users, and according to those ranks, interaction level with other users and collaborative activities on forums users would be automatically ranked. Higher ranks mean higher accessibility of data, as well as advanced functionalities and search. This is basic outline of idea, while main part of this research paper is development of a business model according to canvas developed by Osterwalder and Pigneur (2010).

One of first strategic decisions in starting a new enterprise is development of sound business model. Business model can be understood as abstract representation of basic business logic (Osterwalder, 2001). It can be defined as architecture of a firm and its network of partners for creating, marketing and delivering value and relationship capital to one or several segments of customers in order to generate profitable and sustainable revenue streams (Dubosson-Torbay, Osterwalder and Pigneur 2002). Recent research shows following conclusions the business model is emerging as a new unit of analysis; business models emphasize a system-level, holistic approach to explaining how firms “do business”; firm activities play an important role in the various conceptualizations of business models that have been proposed; and business models seek to explain how value is created, not just how it is captured (Zott, Amit, Massa, 2011).

2. METHODS

For the purpose of this paper we have performed data gathering among teaching and research staff of universities in Balkan area, named “The content of the database on a new website in the Balkan area”. Overall we have gathered 38 responses from Romania, Serbia, Greece, Macedonia and other countries.

Analysis of questionnaire results was initially performed only on descriptive level for the purpose of this paper. Entire questionnaire is presented in following.

Identification and contact information for University (company, enterprise, institution etc.)			
Position / function in the university (company etc.)			
University (company etc.) address			
University (company etc.) phone			
University (company etc.) website:			
A. University (company etc.) profile*			
Code * 1 = complex; 2 = technical; 3 = human and socio-economic; 4 = medicine and pharmacy; 5 = agricultural and veterinary; 6 = arts, architecture and sports; 7 = military; 8 = other profile			
B. Key areas where students (employees) are trained**			
Code** 1 = general; 2 = natural sciences; 3 = humanities; 4 = theology; 5 = technical; 6 = social and political sciences; 7 = economics; 8 = arts; 9 = architecture and urban planning; 10 = physical culture; 11 = agricultural and forestry sciences; 12 = veterinary medicine; 13 = engineering sciences; 14 = military science and information; 15 = health; 16 = other areas.			
C. Are you interested in a new database or information website in the Balkan area?		YES	NO
D. Please specify the first three important domains of interest to include in this new website***			
Code*** 1 = demography; 2 = education; 3 = history; 4 = economics; 5 = tourism; 6 = culture; 7 = management; 8 = entrepreneurship; 9 = environment ; 10 = other (please specify)			
E. Please specify the form of collaborative activities and detail the specific way that you want to collaborate:			
F. What kind of information as result of cooperation do you want to get from this website?			
Code**** 1 = statistics; 2 = courses organized by the universities for company, enterprise, institution etc; 3 = equipment / software enterprise in education; 4 = applied research and development projects; 5 = new plans for education in universities or new topics in university curriculum, reflecting market demands; 6 = projects and partnerships in the company enterprise, institution ; 7 = international projects and partnerships. 8 = other (please specify)			
G. Please mark the type of collaboration based on the new website and its information:			
Code***** 1 = scientific research (contract research); 2 = consulting (contract services); 3 = project partners / project consortium (partnership agreement / consortium); 4 = rent space by the university or company (lease); 5 = sponsorship / mecenate (sponsorship contract in the company) 6 = other type (please specify)			
H. What level do you need to access information as result of this website?		National	Regional
I. What benefits do you expect from the information as a result of this new website?			
Code***** 1 = raising students' and employees' knowledge; 2 = increase teacher qualifications; 3 = curriculum changes; 4 = purchase of equipment and soft; 4 = research contracts; 5 = common research centres, incubators, technology transfer centres; 6 = adapting training offer; 7 = other result (please specify)			

2. BUSINESS MODEL PATTERN

Model of this enterprise will be simplified and presented in business model canvas, developed by Osterwalder and Pigneur (2010). This canvas has already been used in context of Web 2.0 science journal (Nüesch and Andrea 2011), development of internet based business in e-trade (Rajkov and Čudanov 2012) and genetic sequencing data analysis business (Čudanov, Krivokapić and Komazec 2012a; Čudanov, Krivokapić and Komazec 2012b). Main components of their canvas are:

- Customer Segments

- Value Propositions
- Channels
- Customer Relationships
- Revenue Streams
- Key Resources
- Key Activities
- Key Partnerships
- Cost Structure

Customer segments as first element of the model defines different groups of individual clients and organizations to whom cooperation should be aimed. Those groups generally enable existence of observed organizational system. Thus they deserve attention, and best way to apply it is to segment them into different groups. Following step is defining priority of each segment, and development of business model which will serve each segment. Group of customers can be observed as a segment when their needs require and justify certain proposition, when they are approached by different distribution channels, demand different kind of relations or have generally different profitability and wish to pay different segments of the value proposal (Dubosson-Torbay, Osterwalder and Pigneur 2002; Osterwalder and Pigneur 2010). Company can however focus toward one specific segment, and form a unique business model. An example of customer segment can be market niche, as smaller market parts with clients of the same characteristics or demands (Dalgic and Leeuw 1994).

Value proposal can be defined as package of products and services created for needs of customer segments. If proposed value is different from those existing in the market in order to differentiate organization from competition. Values created for customer segments basically attract their attention to organizational system. Value creation can be aided by novelty in business, product/service performance, adjustment to client needs, product design, brand and status organization has in public, price, cost reduction, risk reduction, accessibility, convenience and usability (Osterwalder and Pigneur 2010).

Distribution channels are a way to attract and communicate with customer segments. Those are “contact” points between company and clients. Through distribution channels company awakens customer awareness, help them to access value propositions, enables buying of products/services, delivers proposed values and post-sales support. Channels can be divided into direct and indirect, or partner and owned. Right mix of distribution channels provides efficient satisfaction of user needs.

Customer relationships define relationships between organization and market segments. Each segment should have defined relationships. Goals of are to attract new customers, retain existing one, or to increase “wallet share”, i.e. amount of sales toward the customer, and in that goal relations can be personal assistance, dedicated personal assistance, self-services, automated user services, different communities and co-creation of relationship (Osterwalder and Pigneur, 2010).

Revenue streams define amounts of cash that is generated from each customer segments. Question to which a company needs to give answer is: what value us each customer segment really willing to pay? Only after clear, realistic and correct answers to those questions can we propose viable business model. Transactions can be viewed in simplest as one-time payments and recurring payments, while Dubosson-Torbay, Osterwalder and Pigneur (2002) further classify revenues from asset sales, usage fees, subscription fees, renting/lending/leasing, licensing, brokerage fees and advertising.

Key resources can be described as most valuable physical, intellectual, human and financial assets related to functioning of organizations. Those are resources without which organization would not be able to create value proposition in a desired way.

Key activities are list of most important activities to be performed in order for model to function and for Companies need to apply those activities while creating values in dynamic markets, keep relations with customer segments, thus creating revenues. Porter defines most important activities as “core activities”, consisting of inbound logistics, operations, outbound logistics, marketing, sales and post-sale services (Porter and Miller 1985), while knowledge sharing, supply chain management and product development process activities are identified as most important in manufacturing industry context (Huang, Stewart and Chen 2008). Elaborate list of key activities is deeply dependent on the nature of the business, and even best categorizations cannot be fully utilizable for individual cases.

Key partnerships describe network of suppliers and partners who enable business model to function. Partnerships are foundations of activities and relationships within companies, which can help it to be differentiated in market through unique offer. Partnerships can be formed when partners recognize advantages of forming a new business model and economy of scale, in order to reduce risk or uncertainty or to ensure resources for successful operations. That can lead to virtual or network organizations, often associated with e-enterprises (Zhou, Peng, Li, Wang, Wu & Shao 2010). Osterwalder and Pigneur (2010) divide partnerships into: strategic alliances between non-competitors, strategic partnerships between competitors, joint ventures to develop new businesses and buyer-supplier relationships to assure reliable supplies.

Cost structure represents all the costs organization has incurred through developing and utilization of business model. If key resources, key activities and key partnerships are defined, it can be relatively easily estimated. While elaborating minimization of costs, it is very important to define business model in order to decide if company will aim to minimizing costs or maximizing the delivered value. In first case, company will try to minimize costs whenever possible, using value proposals of low prices, maximizing automation or utilization of external resources. Companies lead by high value on the contrary increase value, and can be usually recognized by higher amount of personal input, services and adoption. Cost structure is usually analyzed through fixed, variable costs, economies of scale and economies of scope (Osterwalder and Pigneur, 2010).

This canvass connects, and in a very understandable way shows elements of business model, which are main reasons for choosing it as a main background for research. If system is generally understood in its entirety, it can be important for obtaining good business results (Christopher, 2011). This canvass is also flexible enough to view organizational goals, clear out real value proposals as well as ways for its achievement. It is useful as a tool for translating idea into business plan and processes, and successful execution. Appliance of this canvass is very wide, ranging through all industries, from manufacturing to high-technology services, from basic operations to most innovative business. Application is also not limited by organizational size, from small to multinational organizations. One of main strengths of Osterwalder's and Pigneur's canvas is that it helps us prevent losing focus from the entirety of system towards details. It is thus very helpful for strategic planning and business development.

3. RESULTS

Gathered data was analysed by descriptive means at first, for the purpose of this paper. Out of 38 returned questionnaires 37 (97.37%) applicants have agreed that they are interested in a "new database or information website in the Balkan area". That justifies development of business model for research data repository, as it was dubbed in our paper. Following results are presented in order to depicture technical and business aspects of developed business model. First important part is university profile, given in Figure 11. We can see that complex and technical universities are dominant, ensuring multidisciplinary of research data that should be gathered in future repository. That implies open nature of key partners, which is presented in our business model.

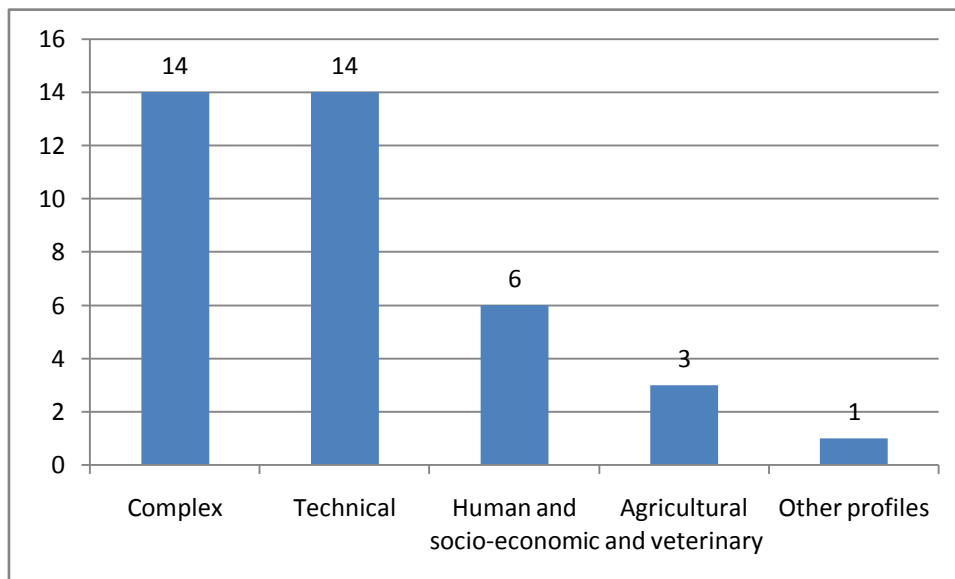


Figure 11: University profiles

Next aspect analyses key area in which students are trained, and is similar to university profiles, and leads to similar directions for our business model, where first choice answers are presented in Figure 12.

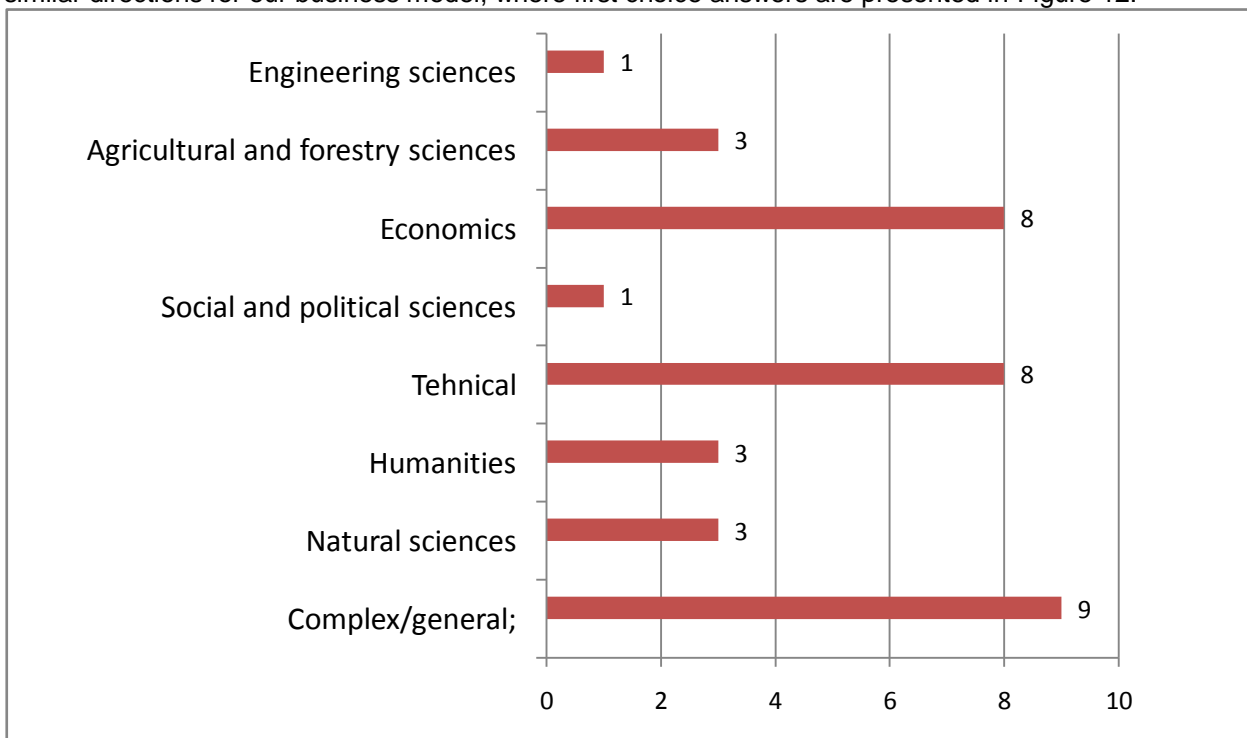


Figure 12: Key areas where students are trained.

However, domains that would be desired for inclusion in this research data repository are rather biased towards education (27%), economics (13%), tourism (13%) and management (21%), suggesting rudimentary classification of data sets. Results are presented in Figure 13.

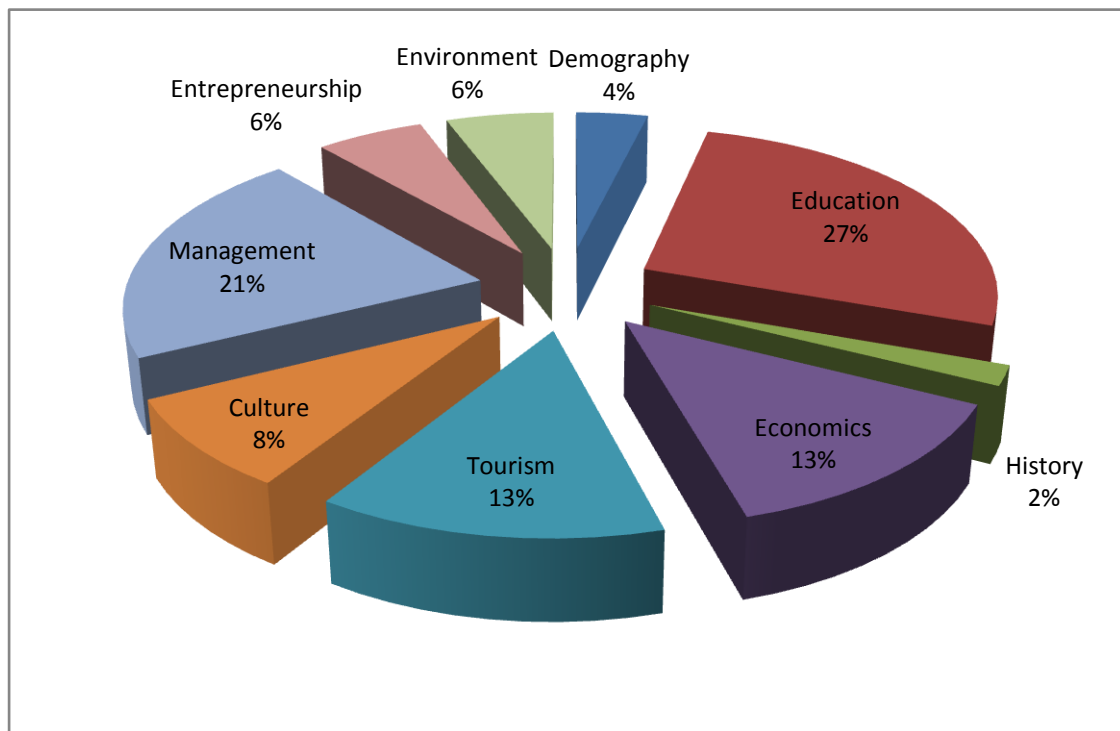


Figure 13: Domains of interest for research data

Next figure shows expected results from research data repository. Common conclusion is that cooperation is needed for any of desired outcomes, so it is a component that has to be included in the nature of business model. Desired outcomes are synthesized in value proposals of business model, and shown in Figure 14.

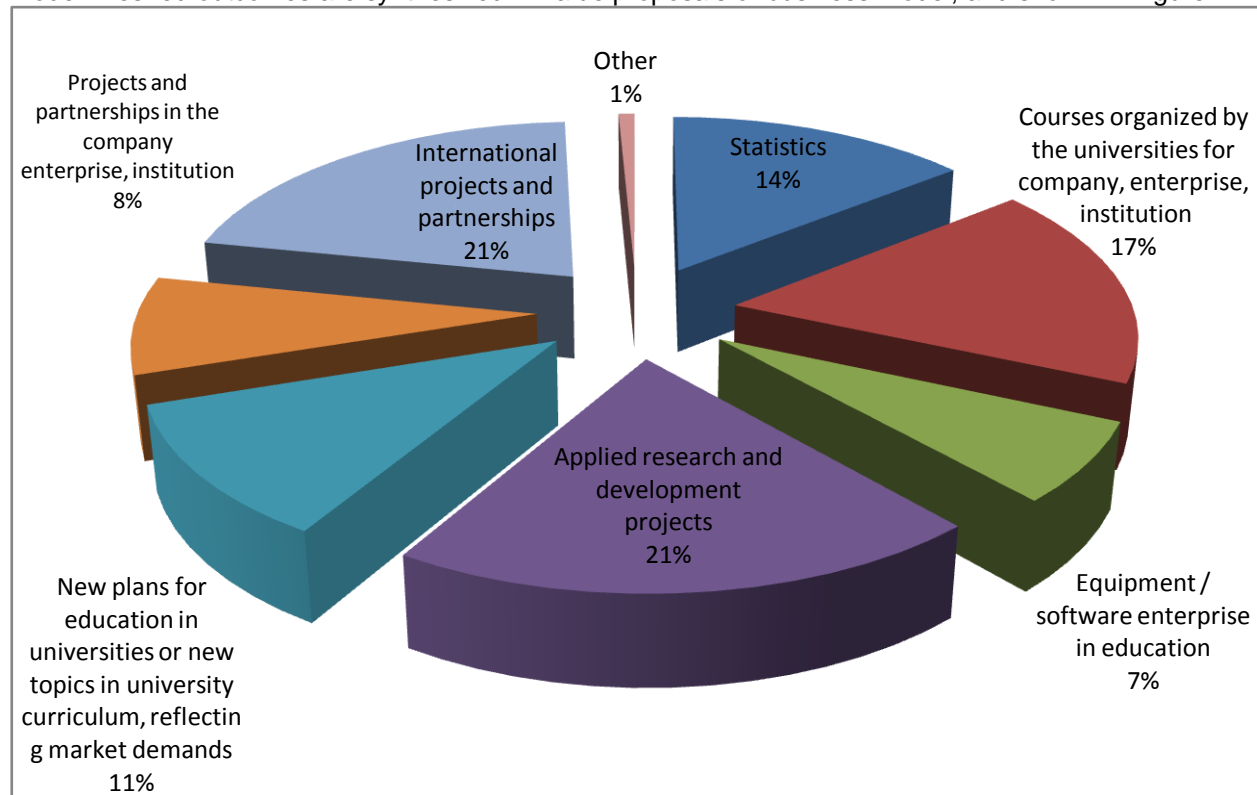


Figure 14: Expected outcomes of new data repository

4. BUSINESS MODEL

On the basis of questionnaire feedback and analysis results our business model was developed. One of the basic reasons for development of business model for this enterprise is increasing reliability and chances of success. Lack of business models was especially observed during dot.com market crash, where lack of clear business strategy which would result in clear plans and business models is listed as reason for bankruptcy of those companies, along with external crises caused by external market crash (Hwang and Stewart, 2006). Internet based business has quite unsuccessful history of alignment of business systems and IT processes, and such alignment is one of the main success factors for IT investment performances. (Pajić, 2011). In order to ensure success of research data repository, it is important not only to satisfy technical aspects of programming the Web platform, but also to develop sustainable business model. Figure 15 shows draft business model for future research data repository.

Key partners Funding organizations (CERGE) Universities and research communities Companies with research demand	Key activities Platform maintenance	Value proposition Accessible research data Automated data combination for synergy Cooperation in curriculum development Access to research community	Customer relationships User communities Folksonomies Automated relations	Customer segments Research institutions Individual researchers Companies with research demands
	Key resources Web platform Image of reliability		Channels Web portal	
Cost Structure Costs of platform maintenace and development Cost of control against misuse			Revenue streams Fees for research demands Targeted advertizement	

Figure 15: Business model of research data repository

5. CONCLUSION

This paper presents business model for research data repository. Technical aspects, both software and functionality design is not elaborated in this paper. Main focus is on business aspect, with idea to develop self-sustainable model which could maintain its own existence and possibly spread to cover more than one region. In order to do that, we had to develop two-side platform, where main parties would be researchers, along with companies with research demands. In this model, website with research data repository would have main purpose to gather research community, providing value for companies in need of some research. Companies could on the other side provide their research demand along with related data and description. Also, companies demanding research could offer a fixed reward to all interested researchers, and pay it to best researcher/research team, or the researcher/team with first applicable results or solution. On the other hand, companies could demand research for free, if researchers are interested. Anyhow, companies must pay a nominal fee for posting research demand. That fee will be used to cover costs incurred by maintenance and future development of this platform, as well as control against misuse. Although such costs are not expected to be high, some amount of revenue is necessary in order to maintain website. That revenue can also be supplemented by targeted advertisements. All that completes model which is initially to be funded by donation. Our paper gives only the basic outline of the model due to text length restrictions. Details in all categories, like financial, technical, market or processes can be a topic for some of our future articles.

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THE ADJUSTMENT OF ORGANIZATIONAL FORMS TOWARDS BETTER HIGH-TECH PROJECT PORFOLIO'S PERFORMANCE

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Abstract: *Project managers support the idea that successful projects occur when the resources necessary for their work are obtained. Functional managers support the idea that resources should be made available based on the overall needs of the organization. In fact, organizations are much more complex entities as different project groups compete for scarce resources. One successful project may divert essential resources from other projects and thereby prevent the organization from achieving an overall successful performance. Thus, in contrast to the customary emphasis on the needs of individual projects when thinking about matrix forms, effective implementation calls for an 'optimized' equilibrium between the satisfaction goals of the different organizational units. The paper introduces some insights into the implementation of matrix forms in high-tech project portfolios where uncertainty, ambiguity, and complexity are looming.*

Keywords: *matrix forms, project portfolio, flow of resources, purchase policy, setting priorities, low-tech environment, system dynamics model*

1. INTRODUCTION

The matrix structure has become the popular organizational framework for managing the development of new products and services (Perham, 1970) and the primary organizational means for maintaining an efficient flow of resources in project portfolios. This structure operates through a two-dimensional system of control: a project line chain of command and a functional chain of command (Lawrence et al., 1982). Within the matrix, each chain of command keeps its traditional role and takes responsibility for goals as in the two earlier hierarchical forms of organization (Lawrence & Lorsch, 1967). Project managers retain responsibility for developing products, while functional managers concentrate on the organization's capability to make use of up-to-date technical knowledge. In order to complete a job, functional managers must address different objectives and priorities than project managers. The different objectives are based on functional managers' focus on long-term effectiveness, while project managers concentrate on more immediate accomplishments (Allen et al., 1988; Project Management Institute, 1997). The matrix organization attempts to combine the advantages of functional structures with product-oriented structures so as to create synergism by a shared responsibility between project and functional management. A balance between these often opposing forces in an organization was presumed to lead to an optimum balance between product completion and technical excellence (Katz & Allen, 1985). In matrix organizations, both lateral and hierarchical dimensions of matrices depend on one another and neither stands alone (Joyce, 1985). Organizations using matrix structures were expected to keep up with new technologies while obtaining savings in a more efficient assignment of human and physical resources.

Important issues that loom high in the management of R&D projects are those of uncertainty, ambiguity, and complexity (Pich et al., 2002). To survive, high-tech companies must cope with the effects these issues may produce. Burton & Obel (1998) recommend the matrix configuration for high uncertainty environments, because matrix management allows for a greater ease in loaning an employee to another project without making the change permanent. In any event, it is easier to accomplish work objectives in an organizational structure such as matrix, where task loads are shifting rapidly between departments.

While the matrix enjoyed widespread popularity in the 1970s, discord about the effectiveness of the concept surfaced in the 1980s. Shortcomings in the matrix form of organization became evident as functional and project managers were found to compete detrimentally for organizational resources (Peters & Waterman, 1984). Project managers seek to obtain resources to meet any unanticipated circumstance by either expanding existing capacities or contracting for services from external suppliers. In contrast, functional managers oppose indiscriminate accumulation of assets by a project; they usually reject attempts to outsource work because of possible underemployment of firm personnel. A project portfolio adds another set of disagreements when project managers compete against each other for the allocation of scarce resources (Platje et al., 1994; Payne, 1995). Moore (1977) argued that the flow of resources is

the basic force that identifies the dynamic nature of a system and Thamhain & Wilemon (1974) found that high intensity conflicts revolve around items such as scheduling, priorities, and manpower.

Critics of the matrix, however, describe an inherent propensity for conflict among managers, which substantially limits its effectiveness. Although conflicts may actually encourage more effective information exchange that can improve decision making (Stasser & Titus, 1985), this positive effect breaks down quickly when conflict becomes more intense (De Dreu & Weingart, 2003). Larson & Gobeli (1987) argued that even when conflict in the matrix was kept to a low level, shared decision making caused slow reaction times and made it difficult to evaluate responsibility. Moreover, the strife reduces job satisfaction for functional managers (Turner et al., 1998) and results in contradictory policies that lead to a misallocation of resources and reductions in organizational effectiveness (Martin, 1994; Cardullo, 1996). However, high intensity conflicts and an unbalanced power of influence are the most substantive failures of matrix implementation (Davis & Lawrence, 1977). High-tech companies, however, must survive in a dynamic environment and the matrix retains its popularity as the solution for rapidly changing marketplaces and technologies (Grinnell & Apple, 1975).

This paper surveys research carried out over a decade in which implementations of matrix forms seeking improved project portfolio performance have been investigated. This research has introduced new paradigms for matrix implementations due to the increased complexity of projects, especially those relative to uncertainty. A system dynamics model was developed and implemented for such complex high-tech environment, a milieu with high uncertainty in meeting project deadlines and with intensive competition over scarce resources.

2. THE LOW-TECH CASE

The first category in organizational classification is the low-tech case—an environment not involving scarce resources of unique specialization. Total shared resource capacity is not a constraint, because a shortage of internal resources can be reinforced through the import of external capacities that can be provided by subcontractors in a fairly rapid response time. In this environment the matrix forms can be classified into the following fundamental types (Laslo & Goldberg, 2008):

1. Project matrix, so-called 'profit and cost centres'.
2. Functional matrix, so-called 'megaproject'.

In project matrix forms power is given to project managers. The common configuration of these matrix forms is based on the following basic principles:

1. The project manager has full control over a project budget and is authorized to take independent make-buy decisions.
2. The functional unit manager allocates resource capacity without discrimination among projects (the same price, no project preferences, or project priorities).

The second principle is relevant for a high-tech case but not for a low-tech case, because in the latter environment each project manager is permitted to achieve full satisfaction of needed resources from external sources (outsourcing).

In functional matrix forms power is given to functional managers. The functional managers do not allocate resources to the projects, but rather, the resources are directly allocated to project activities, taking their criticality into consideration. The common configuration of these matrix forms is based on the following basic principles:

1. The functional manager allocates resources according to present or future internal capacity, and agrees to take external buy decisions only when this does not threaten the future employment of organizational resources.
2. The functional manager allocates internal resource capacity without discrimination (the same price, no preferences or priorities).

In the low-tech case, the principle of allocating internal resource capacity without discrimination is common to both project matrix and functional matrix forms; the difference between these fundamental forms derives only from the 'make internally' or 'buy externally' policy (see Table 1).

Table 1. Fundamental matrix forms associated with the low tech case

Make-buy Policy	Matrix Form
Full satisfaction of projects' needs	Project matrix form
Partial satisfaction of projects' needs	Functional matrix form

It is clear that project managers will prefer a matrix form where they have full control of the budget and where they are authorized to take independent make-buy decisions. Project matrix forms provide freedom to obtain all resources seen as needed to implement programs.

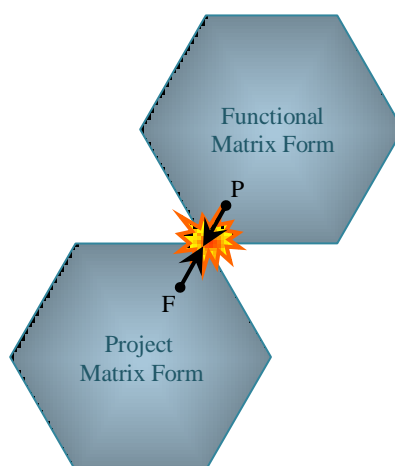
For the functional manager, the project matrix forms can be seen as a disaster. These matrix forms prevent reasonable planning for future employment of the organization's capacities. Functional managers seek functional matrix forms so they can control when and how projects are given additional resources, often on the basis of outsourcing.

The different preferences of the matrix forms in a low-tech environment are shown in Table 2.

Table 2. The low-tech case: Preferences of matrix forms

Matrix Form From the Aspect of ...	Project Matrix Form	Functional Matrix Form
The project manager (P)	The best matrix form	The worst matrix form
The functional manager (F)	The worst matrix form	The best matrix form

The traditional description of confrontations occurring within a matrix organization is shown in Figure 1.


Figure 1. The low-tech case: 1 front of confrontation

The implementation of a project matrix by an organization is never acceptable to functional managers (F) who pursue functional matrix forms. This aspiration by functional managers will be opposed by a coalition of project managers (P) involved with both favoured and unfavoured projects. In contrast, functional managers will do everything to prevent moves to a project matrix form.

This confrontation is intrinsic to the nature of the managerial positions. Davis & Lawrence (1978) suggest that because power struggles occur when managers share authority, organizations should seek ways to prevent conflict from reaching destructive heights.

3. THE HIGH-TECH CASE

Laslo & Goldberg (2008) consider the high-tech case as one where organizational technological specialization causes difficulties in achieving additional resource capacities in a rapid response time, although reinforcement by external capacities is legitimate. The allocated capacities of scarce resources

are constraints that determine progress in the implementation of a project. In this environment the matrix forms can be classified into three fundamental types:

- Project matrix.
- Balanced matrix, so-called 'directed priorities policy'.
- Functional matrix.

Project matrices are the same in both the high-tech and low-tech environments. Moreover, the basic principles of these matrix forms remain the same. In contrast to the low-tech situation, however, in the high-tech situation, resource allocation without discrimination becomes a real decision alternative. When the organization maintains a monopoly over scarce resources, it would have difficulty supplementing those resources through external purchase. In both low-tech and high-tech environments, functional matrix forms are based on the same principles. The balanced matrix form is unique to the high-tech environment. Where scarce resources are involved, an organization's readiness and ability to purchase those resources externally cannot satisfy the resource needs of the projects—external resource unavailability trumps both readiness and ability to pay. Limited capacities must be shared somehow between favoured and unfavoured projects.

In the balanced matrix form, greater power goes to favoured project managers and to functional managers who deal with unfavoured project managers. The configuration of these matrix forms is based on two principles:

1. The functional manager allocates organizational resource capacity according to directed priorities - usually to the favoured projects, while unfavoured projects have to manage with the remaining resources.
2. The make-buy policy is usually differential and determined by a project's priority.

With the virtual impossibility of a differential make-buy policy because of an inability to obtain further scarce resources, instead of two fundamental matrix forms involving differential project treatment, we define only one fundamental form. So, the high-tech case can be described through three fundamental matrix forms based on two dimensions: the make-buy policy and the priority policy (see Table 3).

Table 3. Fundamental matrix forms associated with the high-tech case

Priority Policy Make-buy Policy	Equal Treatment to All Projects (without priorities)	Different Treatment to Each Project (directed priorities)
Full satisfaction of projects' needs	Project matrix form	Balanced matrix form
Partial satisfaction of projects' needs	Functional matrix form	

A two dimensional definition of fundamental resource policies in the high-tech environment brings about a consideration of more complicated decision preferences (see Table 4).

Table 4. The high tech case: Preferences of matrix forms

Matrix Form From the Aspect of ...	Project Matrix Form	Balanced Matrix Form	Functional Matrix Form
The favoured project manager (H)	A fair matrix form	The best matrix form	The worst matrix form
The unfavoured project manager (L)	The best matrix form	The worst matrix form	A fair matrix form
The functional manager (F)	The worst matrix form	A fair matrix form	The best matrix form

In this case, competition between projects on resource allocations, especially concerning scarce resources, breaks the traditional coalition between project managers, and brings about unexpected agreement between functional managers and project managers.

In a high-tech situation, scarce resource capacities are constraints. These constraints reduce the attractiveness of project matrix forms among managers of favoured projects. A project matrix form offers unlimited resource capacities for normal resources, but competition occurs for scarce resources with unfavoured projects. A balanced matrix form creates an option for favoured projects to obtain scarce

resources. Therefore a balanced matrix form should be the preferred choice for favoured project managers. A functional matrix form, on the other hand, means favoured projects face a rationing of resources, and gives favoured project managers a good reason to reject such a matrix form.

Project matrix forms are the favourite matrix form for managers of unfavoured projects. This matrix form guarantees them a share of all resources, in contrast to a balanced matrix form that leaves unfavoured projects with a low probability of receiving scarce resources and could lead to their failure. Despite the fact that functional matrix forms also aim at rationing resources, unfavoured projects prefer them over balanced matrix forms, because they have a better chance of receiving resources.

The functional managers' objective, because it is directed at the optimized use of available resources, makes the functional matrix a most attractive matrix form. For the same reason, functional managers reject the project matrix, a form that prevents resource allocation planning. A balanced matrix form, however, can be a compromise for functional managers. Project managers, however, disagree on the worth of a balanced matrix form, because favoured projects are not limited by the need to allocate resources to internal development, while unfavoured projects, most of which are internal ventures, face difficulties as resources are pulled from them to be given to the favoured, mostly sponsored, projects.

According to Laslo & Goldberg (2008), the high-tech environment derives three confrontations within the matrix organization as shown in Figure 2.

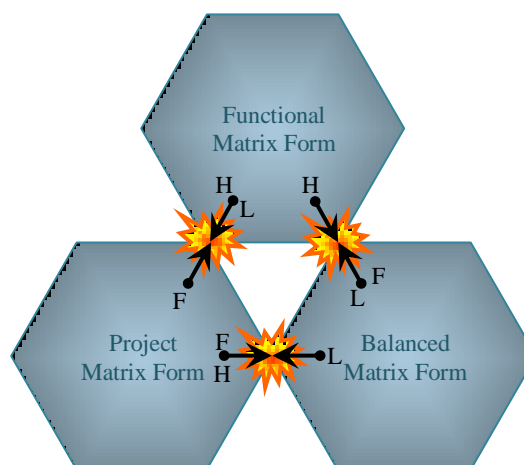


Figure 2: The high-tech case: 3 fronts of confrontation

All project managers resist functional matrix forms. When favoured project managers (H) seek a project matrix form, they are able to build a coalition with the unfavoured project managers (L) against the functional managers. But if favoured project managers try to improve their position even further by adopting a balanced matrix form, functional managers and unfavoured project managers may cooperate to oppose this move.

Functional managers, on the other hand, will do everything they can to prevent project matrix forms. When they attempt to achieve full control over buy decisions through a functional matrix form, however, the traditional coalition between the favoured and the unfavoured project managers oppose them. But if functional managers are ready to compromise, they can achieve an agreement with the favoured project managers on the adoption of a balanced matrix form, a step that will be opposed by unfavoured project managers.

Balanced matrix forms are the preferred policies for favoured projects, but a disaster for unfavoured projects. Managers of unfavoured projects can partner with functional managers if they agree to improve their position by moving toward the functional matrix form, a step that will be opposed by favoured project managers. The efforts of unfavoured project managers to go farther, and to obtain a project matrix form, will be confronted by an unexpected coalition of favoured project managers and functional managers.

4. THE SYSTEM DYNAMICS MODEL OF A PROJECT PORTFOLIO'S FLOW OF RESOURCES

A model describing a dynamic flow of resources in a project portfolio can be used to evaluate the impact of alternative matrix forms on the performances of the project portfolio, of its functional units, and of each of its individual projects. Under uncertainty, these expected performances are difficult to investigate empirically because all the variables are an integral part of a complex organizational system where it would be impossible to obtain an adequate variety of situations. A simulation allows a limitless number of comparisons, where a real organization would resist intervention because of its possible consequences. Hence, many more variables are controlled than would be possible in a study of real organizations.

Forrester's 'system dynamics' theory provides a means to understand the payoff outcomes of each player's actions in such a complex and uncertain system (Forrester, 1980). What makes using system dynamics different from other approaches to studying systems is the use of feedback loops. In its simplest sense, system dynamics focuses on information that is transmitted and returned throughout the progress of a process, and the system behaviours over time that result from those flows. The feedback loops create the nonlinearity found so frequently in complex dynamic problems. Running 'what if?' simulations to test certain matrix forms on such a model enables us to study reinforcing processes—feedback flows that generate exponential growth or collapse—and balancing processes—feedback flows that help a system maintain stability.

The probability of a project meeting a scheduled due date within a fixed budget cannot be estimated for R&D projects because of uncertainty about the resources and time needed to complete any one activity, as well as the extent to which freed resources can be used to expedite the work of other activities. In such a situation, giving full satisfaction to all assumed project requirements at the first stage of a project may actually bring about delays due to an inability to meet unexpected and unmet resource requirements at later stages because of constrained budget conditions. In contrast, projects with only partial satisfaction of requirements may, under crisis conditions, obtain additional resources in order to prevent delays. The system dynamics model as shown in Figure 3 enables the prediction of the matrix forms outcomes.

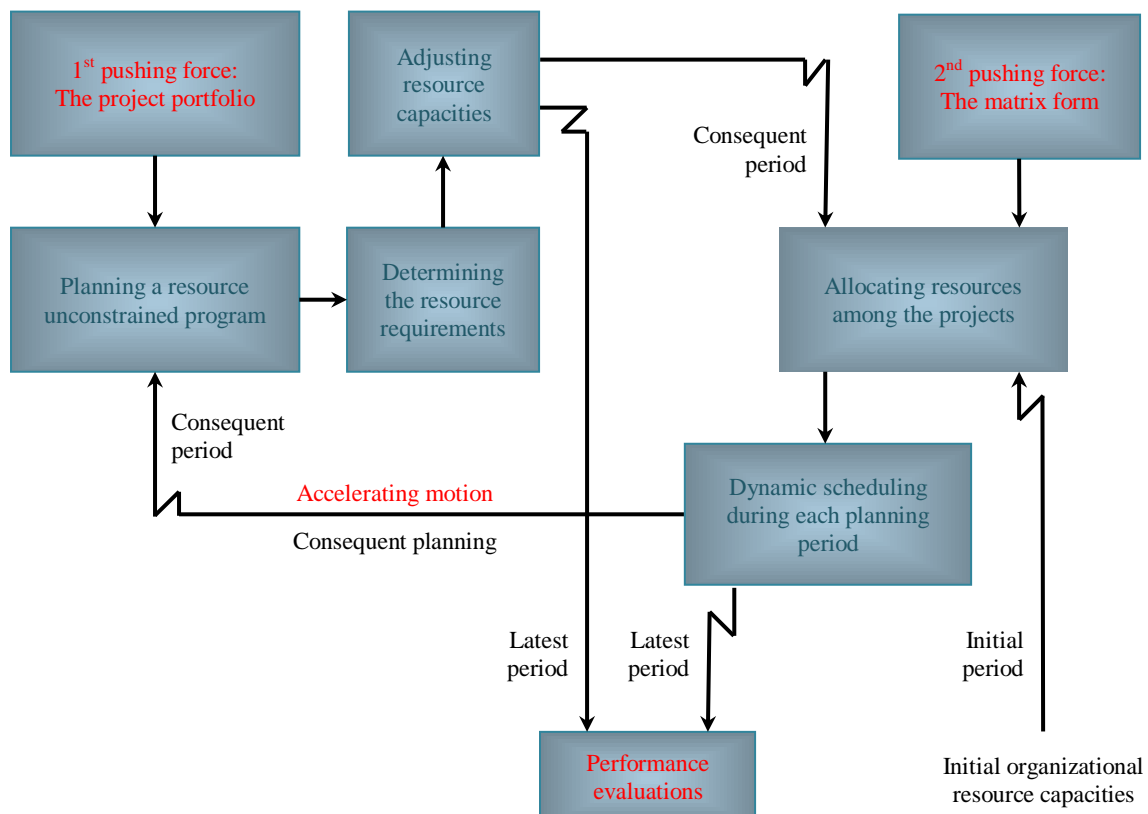


Figure 3: The system dynamics model of project portfolio's flow of resources

The first pushing force in this model is the project portfolio. The probability of project programs meeting timetables and not exceeding allocated budgets was found to be influenced by three characteristics: first, the need by projects for scarce resources; second, the extent to which activities needed personnel from different functional areas; and third, the degree of uncertainty regarding the time necessary to complete activities. Each of these three characteristics can be used as an indicator of the project portfolio's technological status. A high level of each characteristic indicates a technological environment, but also indicates a complicated scheduling process and instability of the flow of resources within the project portfolio. By applying binary attributes (low or high) to each characteristic, eight possible combinations define eight different project portfolio patterns from which projects can be sampled. These sampled projects enable us to investigate the performances of the different matrix forms within eight project portfolios with various typologies.

The second pushing force in this model is the matrix form. Assuming a 'homo economicus' model, system dynamics feedback loops for alternative matrix forms provide the following possible results: 1) the feedback loops might not contribute new information that could influence decisions regarding favourite matrix form, 2) the feedback loops might reveal that a preferred matrix form is not as advantageous as previously thought and therefore leads to neutrality, and 3) the impact of the feedback loops might even demonstrate that a previous position was wrong and reverse a participant's position about which matrix form to favour.

An objective function composed of one or more of a large number of objectives can be chosen for performance evaluations of the project portfolio, each of its projects, and each of its functional units. For the analysis of the impact of matrix forms on these performances, the following objectives were selected by Laslo & Goldberg (2001): 1) reduction of delay penalties, 2) of direct labour costs, 3) of idle labour costs, 4) of manpower expansion expenses, and 5) of losses from unnecessary outsourcing.

5. INSIGHTS PROVIDED BY THE IMPLEMENTATION OF THE SYSTEMS DYNAMIC MODEL

5.1. Adjusting the matrix form to organizational objectives

The readiness to change organizational structures is particularly important in an environment characterized by rapid changes in the nature of the competition, while at the same time offering new technological advantages. Upper management may choose to centralize decision making and provide greater resources to particular projects, give control over budget decisions to functional managers, or provide more freedom to individual projects to make use of similar resource allocations (Kim & Burton, 2002). In order to optimize matrix performance, the distribution of power among project and functional managers, which is reflected by the different matrix forms, must be changed continuously in line with the project portfolio's characteristics and objectives. The aim of the study of Laslo & Goldberg (2001) was to find when organizational and market conditions necessitate increases or reductions in the influence of project managers, i.e., conversion of the matrix form, in order to reach improved performance of the project portfolio and/or its units. The implementation of the system dynamics model provided simulated results from which we can draw the following conclusions:

- For the objective of reducing delay penalties as the level of all three project portfolio's characteristics increase from an initial level, it is necessary to increase the influence of project managers (converting functional matrix form into balanced form, or, balanced matrix form into project form). Similarly, decreases from initial levels of the characteristics encourage a decrease in the influence of project managers (converting project matrix form into balanced form, or balanced matrix form into functional form).
- For the objective of reducing favoured projects' labour direct cost, idle labour cost and total labour cost, the need by projects for scarce resources changes in the influence of project managers are not required, as the extent to which activities needed personnel from different functional areas increases from an initial level it is necessary to increase the influence of project managers (converting functional matrix form into balanced form, or, balanced matrix form into project form) and vice versa, and as the degree of uncertainty regarding the time necessary to complete activities increases from an initial level it is necessary to decrease the influence of project managers and vice versa.

- For the objective of reducing unfavoured projects' labour direct cost the need by projects for scarce resources and the degree of uncertainty regarding the time necessary to complete activities changes in the influence of project managers are not required, but as the extent to which activities needed personnel from different functional areas increases from an initial level it is necessary to decrease the influence of project managers and vice versa.
- For the objectives of reducing manpower expansion expenses and losses from unnecessary outsourcing changes in the influence of project managers are not required.

5.2. Looking for a consensus about the project portfolio's matrix form

Conflicts believed to be unavoidable are assumed to reduce the effective performance of matrix structures because project managers and functional managers struggle for greater control over the allocation of organizational resources. As a consequence, organizations do not unite around one matrix form and fail to adopt one of the matrix forms as a preferred organizational structure. A difficulty of predicting the full consequences of each matrix form in a dynamic environment has become a serious complicating factor in attempted pre-accepted formation. Disagreement among managers over matrix forms, however, may turn out to be unrealistic as the attainment of a favoured matrix form may actually reduce their performance. Laslo & Goldberg (2008) examined the possibility of unnecessary and unrealistic conflicts in the context of the favoured matrix form by calculating the expected net benefit to be obtained by each participant for each matrix form as they relate to various project portfolio's characteristics and objectives. The implementation of the system dynamics model provided simulated results from which we can draw the following conclusions:

- Consensus on the functional matrix form can be attained only when both favoured and unfavoured project managers' objective is the reduction of the direct labour costs (we should pay attention that in any case the functional managers' objectives are reductions of the idle labour costs, the manpower expansion expenses, and the losses from unnecessary outsourcing). Such consensus is attainable in each project portfolio pattern where the extent to which activities needed personnel from different functional areas is high, in an additional pattern where this characteristic is low, the need by projects for scarce resources is high and the degree of uncertainty regarding the time necessary to complete activities is low.
- Reduction of the number of conflicts in the context of matrix form can mostly be achieved in the other scenarios if the participants will be aware that some of the conflicts are in fact unrealistic, but in these scenarios consensus on the preferred matrix form seems to be unattainable.

5.3. Looking for an additional implementation of the balanced matrix form

Hendrix et al. (1998) found that a multi-project situation causes problems in the allocation of scarce resources, such as personnel, to a diversified project portfolio. They suggest flexible resource planning to take into account the availability of scarce resources. Laslo (2010) investigated the implementation of this suggestion in information technology project portfolios, where such resources are available, but very expensive. The idea of the integrated matrix form is implementation of a project matrix form on non-scarce resources and a functional matrix on scarce resources. For this purpose a sophisticated resource planning and scheduling search algorithm was developed. The simulated results of the integrated matrix form implementation, in comparison with those of the project matrix form implementation, showed the following:

- For the objective of reducing delay penalties the integrated matrix form seems to be significantly superior.
- For the objective of reducing total idle labour costs the integrated matrix form seems to be significantly superior.
- For the objective of reducing manpower expansion expenses the integrated matrix form seems to be significantly superior in the context of scarce resources but inferior in the context of non-scarce resources.

- For the objective of reducing losses from unnecessary outsourcing the integrated matrix form seems to be significantly inferior.

6. SUMMARY

Irrespective of the findings in the context of the matrix forms and their implementations in project portfolios, a simulation can never be the reality—it can only reflect it. These studies assumed 'homo economicus' participants and a management policy directed at the improvement of the project portfolio's performance. 'Noises' such as friendship or antagonism among participants may change the results. Nevertheless, these studies provide evidence for the problematic nature of assumptions about behaviours and conflicts in matrix structures, and call for further research.

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STRATEGIC PROJECT MANAGEMENT – PROJECT STRATEGY AND MEASUREMENT OF SUCCESS*

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Abstract: *The success of strategic project management is highly dependent on the definition and implementation of the project strategy and an adequate measurement of project success. The aim of the paper is to analyze the specifics of the project strategy and measuring project success in the execution of strategic projects. The paper explains the concept of strategic project management through the comparison of project management and strategic project management. Specificities of project strategy are observed through main project strategy elements: business perspective, objectives, product/service definition, competitive advantage, success and failure criteria, project definition and strategic focus. The project strategic success measurement is analyzed through project efficiency, benefit to the customer, benefit for the organization and preparing for the future.*

Key words: *project management, strategic project management, project strategy, project success, measurement of project success*

1. INTRODUCTION

The relevant research has shown (The Standish Group Reports, 2009) that a large number of organizations do not achieve the set goals in the execution of their projects, among them, the completion of the project in the predicted time period, within the budget and the agreed quality; on the other hand, a more serious problem seems that many of them fail to achieve business goals, while it is a commonplace that the desired results fail to be achieved in either group. The majority of organizations strive to improve the execution of their projects in a traditional way, e.g., through the employees' education, the work process improvement, introducing software support, etc. The focus upon these elements only results in a limitation as to how much the effectiveness and the efficiency of the project execution can be improved, especially from the aspect of the organization's achieving its goals. In order that a higher competitive advantage be achieved, the real improvements have to be closely linked to the strategic aspect of project management.

The development of the project management concept is today directed to the strategic aspects, hence project management now is approached in a way different from that in the past. This new attitude is related to the understanding of project management as part of the company's strategic activities (Williams & Parr, 2004). The relation between the project and the strategic managements is a logic one, however, the dilemmas and problems as to how they should be related are still present. This calls for a development of appropriate guides on the methods in which the organizations can harmonize the projects with strategies, as well as make the project managers and the project teams responsible not only for bringing a project to an end, but for ensuring that the project should achieve the organizational objectives for the purpose of which it was started.

2. STRATEGIC MANAGEMENT AND STRATEGIC PROJECT MANAGEMENT

The relationship between the strategic and the strategic project managements can be presented by way of a management pyramid (Figure 1.) that is especially present in the project oriented organizations. Looking from the top down, the top of the pyramid provides for the directions of an aggregate project and program management – the strategic management. It is on this level that the organization defines the comprehensive bases of its existence and business activities. Here the vision, the mission, the principles, the organizational goals and the strategic plan are defined. Through strategic planning the company and

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the individual business units define their path of action and identify the key objectives to be achieved. The strategic direction of a company is a basis for the selection of projects, such as the research projects, the new products and services development, the information technologies implementation projects, the business operations improvement projects, etc.

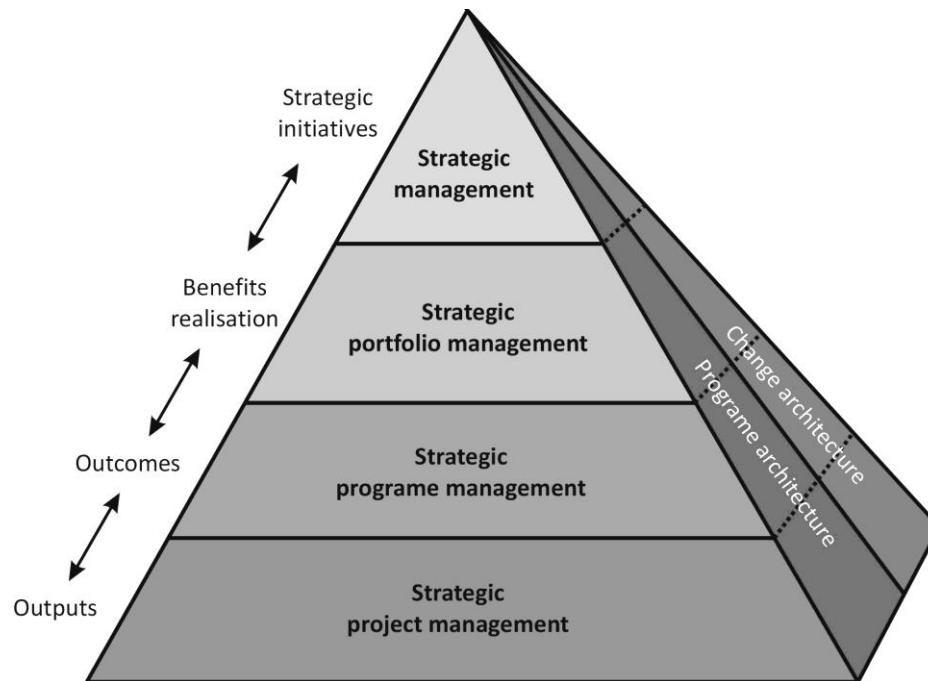


Figure 1. The relationship between the strategic and the project managements in the organization (Williams & Parr, 2004; modified)

The strategic portfolio management allows for the translation of organizational strategic goals into the programs and projects. On defining the strategic direction, it is necessary that the programs and the projects be selected and that the resources be allocated. The project and program selection includes the identification of opportunities, the estimate of organizational fitting, the cost analysis, the risk and benefit analysis, the portfolio forming and selection. The success of the project portfolio depends on the organizational readiness and support in the strategic portfolio management.

The majority of portfolio decisions are burdened by a time horizon, by a serious uncertainty and by a large number of variables that affect any program and any project. The most commonly used tools in the development of the business model to predict the potential value of the project are the impact diagram, the sensitivity analysis or the decision tree. A well defined decision process is the basis for developing an effective portfolio strategy. Defining a quality decision to be implemented in, e.g., research and development, where the result will not be fully known in years, is no easy task.

On passing the portfolio selection process each program and project is appointed an appropriate significance in relation to the organization as well as in relation to other programs and projects. The problem in the portfolio management, however, arises when the projects selected do not show a clear connection or a relation with the company's strategy. Generally, all the projects to be executed should be in accord with the strategy and philosophy of the organizational work and business activities. It is often that certain projects that are under way in the organization are not subjected to the portfolio selection process, but represent a group of projects that are realized independently of the portfolio, but still consume the limited resources of the company.

The project linking should be operationalized at the strategic management level. The links on this level, although rather complicated sometimes, are the key to a successful multiproject management in the organization. Each new project in the domain of processes, products or services should be interlinked with the previous programs and projects, or the programs and projects that are currently under way. Regardless of the extent to which the projects are autonomous as regards one another, on the company

level they are not independent. Their interrelation is evident in the disposal of the limited organizational resources, to the mutual aims, to the activities such as supplies, that are generally carried out for a number of projects. The projects that are conducted independently of the project portfolios are generally smaller projects with daily planning and priority identification. They are started as a response to certain urgent organizational needs, the reason being most commonly in relation to a certain risk and its consequences or to taking a certain opportunity.

The program and project management occupy the lowest levels. In the modern perception of the project oriented organization, we are dealing with strategic program management and strategic project management. The strategic program and project management are defined on the basis of the realization, by the stages and the activities related to the multiproject management in the organization.

All the elements of the pyramid must be synchronized towards a successful implementation of a multiproject management in the organization. The organization has to establish an unbiased mechanism in monitoring the programs and projects: measurement of returns on investments of an individual project/program, measuring a number of projects/programs within a project portfolio and a continual adjusting to the overall objectives of the organization. It is of great importance that there is a prior agreement as to an unbiased priority identifying. It is only after the company has defined its overall objectives and the project investment strategy that an optimal group of projects or a project mix can be created for the implementation of the company's strategy and achievement of organizational goals.

The strategic portfolio management, the strategic program management and strategic project management are shown to represent different levels of management in an organization. These forms of management vary in size and in the contents of management, however, they make a whole of the multiproject management in the organization. The program architecture comprises the establishment of mechanisms which serve to provide the program and project teams with a support throughout the procedures, methods and techniques necessary for them to be efficient in work. The change architecture focuses upon the human factor the change brings. It can be defined as a process of change strategy creation and implementation.

3. STRATEGIC PROJECT MANAGEMENT

The previous research that connected the strategic management and the program/project management was directed towards the elaboration of portfolio management. The research comprised the aspects of portfolio management such as the project selection, priority identification, harmonizing the projects within the portfolio, adjusting the project to the project strategy, strategic resource management and improving the strategic management of the functional areas and projects of the organization (Cooper, Edgett and Kleinschmidt, 1998; Dinsmore, 1999; Dye and Pennypacker, 1999; Petrović, 2003). The latest research, however, relates to adjusting the strategy on the project and the program levels of activities and creating an integrated adapted approach of program and project management to a business strategy (Cleland, 1999; Morris and Jamison, 2004; Shenhar, Milošević, Dvir and Thamhain, 2007).

The strategic project management is a new approach in project management, focused upon creating competitive advantage for the organization in the project execution. This approach is especially relevant for strategic projects initiated in order to create the company's future, all kinds of research and development projects among them. However, it is not related to this group of projects only.

The organizations of today can no longer leave the strategy in the care of the top managers, and leave the operational realization to be carried out by project managers. The projects will increasingly have to be managed as strategic activities. To realize these changes, the project managers and the project teams must have a formal planning and execution framework in accordance with the strategic approach. Table 1. presents the difference between the classic project management and the strategic project management.

Table 1. Project management and strategic project management (Shenhar, Milošević, Dvir, & Thamhain, 2007, modified)

	Project management	Strategic project management
Basic Paradigm	Projects are a collection of activities that need to be executed on time, budget, and requirements	Projects are strategic organizational processes that are initiated to achieve business goals

Focus	Efficiency	Effectiveness and efficiency
Perspective	Operational	Strategic and operational
Manager's Role	Getting the job done – on time, within budget, according to specifications	Getting the business results Winning in the market place
Project Management style	One size fits all	Adjustment approach
Project definition	Project scope, what needs to be done?	Product, competitive advantage, strategy, scope
Planning	Activities, schedule, budget	End results, success dimensions, activities
Project Reviews	Progress, status, milestones, budget	Customer needs, strategy, success dimensions, status
Human Side	Teams, conflict resolution	Meaning, motivation

4. PROJECT STRATEGY

The basic organizational goal is the added value creation for its stakeholders. The most important stakeholders are its owners, then people who work in the organization, and finally the clients and the customers who purchase the goods or the services from a certain organization. A successful organization creates value for each of the groups. The value creation for each of the groups of stakeholders is also a means of value creation for other groups that find their interest in the business operations.

The strategy is the basic guide of the overall value creation that is central to the organizational existence. The most important function of the strategy as part of the planned process is to develop a collective mind and transfer knowledge to managers that will be responsible for the strategy implementation. The project managers have to introduce the strategic project management in order to reproduce the strategic process within their projects and ensure that the project results be in accord with the strategy. The business strategy should provide for the key orientation of the project and is a foundation for the decision making in the course of the program and project realization.

The understanding of strategy as a management process and the role of the project manager in the process is related to the understanding of the difference between the business strategy or a strategic direction/path and the strategy that is executed or the obligatory strategy. The defined strategy means the attitude of the top management as to what an organization should do and what it will be doing. The strategy that is being executed is the one the organization really implements. They differ in that the middle level managers and the project managers have to translate the defined strategy into action. In this way certain elements are lost, however, others are gained in the process itself. There is always a gap between a defined strategy and the strategy that is executed, however, when the strategy process functions well, both strategies will help the company follow a consistent and successful path.

Bringing the strategic management and the project management into accord is a two-way process, where the adopted organizational business strategy affects the selection, preparation and execution of the project. On the other hand, the project execution has a feedback impact upon the organizational strategy. Every project may have its own specific strategy and that is the strategy that is being implemented. The project strategy is the method in which the project is planned to achieve the set objectives and business results.

The project strategy should have the following defined elements (Shenhar, et al., 2007, modified):

- Business perspective/background – The business perspective defines the reasons and the motivation for the project realization. Here, it is necessary that the product/service users, their needs and demands be defined, as well as the method the project to solve them.
- Objective – Here, it is necessary that the end goal of the project be defined, that is, the business goal and the long-term benefit to be achieved by the project completion.
- Product/service definition – The product/service definition comprises the description of the product or the service, their functional or technical characteristics, implementation and application costs, reliability, maintenance, compatibility, etc.

- Competitive advantage/value – The reasons are described as to why one will be willing to pay for the product or the service, why the product/service is superior to the alternative products/services, etc. On the other hand, it is necessary that the value be defined from the part of the organization – the long-term benefits the organization will enjoy and the way the product/service adapt to the long-term strategic objectives.
- Success and failure criteria – The criteria on the basis of which the project will be assessed should be defined, but the project limitations and the main anticipated risks, too.
- Project definition – This section defines what is necessary to be done on the project, but also what should not be done. The project type may also be defined according to certain characteristics (novelty, complexity, technology, uncertainty), which in turn defines the approach to project management. The project definition includes the appointing of the project team and the project manager that will execute the project, the execution time horizon and the necessary resources.
- Strategic focus – This is the last section defined in the project strategy, nevertheless, it is its main part. It defines the manner in which the project is planned to achieve the set goals and achieve business results. The strategic focus will include the guide that will highlight to the project participants the activities and the approach by which the desired objective will be made a reality. The strategic focus comprises such elements as the position to be attained by the project execution, the guide to behaviour and decision making, the work policy and the development of the processes that will lead to the planned results.

5. THE PROJECT STRATEGIC SUCCESS MEASUREMENT

The project strategic success measurement is one step above the classic project success measurement. On the basis of the research conducted by Shenhar, Dvir, Levy and Maltz (2001) four dimensions of project success are proposed:

- Project efficiency – According to the authors of the research, this is a short-term value that measures the project efficiency as regards the time, budgeted and the project requirements. The results for this dimension of the project are readily obtainable, the measuring and getting the result being possible at any moment along the project execution. Although success in this project dimension may give good results and show that the project is well conducted and that the work on the project was efficient, this does not mean that the project will yield good long-term results and bring benefits for the organization.
- Benefit to the customer – The second dimension of the project success is related to the customer. This dimension stresses the customer's requirements and the manner in which their set demand is met. It also measures the customer satisfaction with the product or service through the customer's readiness to return for some other project or some future services.
- Benefit for the organization – The benefit for the organization that carried out the project is reflected through the profit, through the amount of sales realized or services given, through the market share and through similar business results. The benefits for the organization can, however, vary as regards the type of the project carried out. In case of internal projects, such as improvement of the organization or of the work process, the benefit can be reflected in the shortening of working hours, in the improved quality of procedures or other direct benefits. In addition to the direct benefits, it is necessary that the indirect benefits for the organization should be measured. These are not easy to measure, however, they may be very important, therefore they should not be neglected.
- Preparing the future – The fourth dimension refers to measuring the project contribution to the arrangements for the organizations and technology infrastructure for the future. Here we measure the development of new markets, ideas, innovation, products, services, skills, technologies, the attained organizational flexibility, that is, anything that can bring competitive advantage in the future.

The results of the first dimension of the project success can be obtained during the project execution or immediately upon the completion of the project. The second dimension gives results in a short-time period after the results of the project are delivered to the customers and a short time during which the product is used (e.g., a number of months from the moment the product is first used). The third dimension can most commonly be measured after a period of time when the service is given or the product is sold has elapsed

(e.g., one to two years), while the fourth dimension of the project strategic success is possible to measure only upon a longer period of time (e.g., upon two or five years).

6. CONCLUSION

Although the majority of project managers and project teams recognize the importance of the relation between the harmonization of the organizational strategy and achieving organizational goals, these elements are, unfortunately, taken into consideration only at the beginning, while later, in the course of the project execution, the focus is on the operative approach. It is for this reason that a strategic harmonization of the project should be carried out, and this can be achieved by implementing the hierarchical form of management, including the management levels such as strategic management, strategic portfolio management, strategic program management and strategic project management. A new concept in this hierarchical framework is the strategic program and project management, where the stress is on its strategic focus. In accordance with the strategic framework of project management the method of measuring the project success is defined. This is no longer one-dimensional, but comprises several dimensions of project success that have to be taken into consideration.

The prevailing way of thinking in project execution focuses mainly upon the operational aspect as well as upon achieving efficiency in the project realization. The project success is typically regarded through such categories as the completion of the project in the defined time, within the projected budget and the project requirements. This is how the project managers take their job, so they do not think they should be engaged in dealing with the project effectiveness, nor with achieving business results. On the other hand, however, the truth is that projects are started for the very purpose of achieving certain business results. The most important objective in the project execution is, from the point of view of the organization, to achieve business results. Therefore, both the project manager and the project management in general have to focus upon this and try to find the ways to ensure that the business results of the organization are achieved.

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PROJECT PERFORMANCE MANAGEMENT USING IPMA PE MODEL¹

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Abstract: *Performance management has evolved a long way in terms of functional and procedural definition. Still there are not widely used and standardized concepts. This paper will present insights and an approach to project performance management based on internationally used and accepted model. The paper is primarily based on secondary research, but also brings authors' expertise and experience with PE model application in terms of project performance management. Paper will not go into deep presentation and explanation of the model, but rather it's application possibilities. Main result of the paper is to provide readers with an overview of a useful model that could be used as a powerful project management performance based tool. For practitioners from various industries this paper will provide a roadmap to a new way of project based performance management. As for scholars, this paper will be a starting point for further research in the area of strategy-to-project performance management.*

Keywords: *project, performance, management, excellence, IPMA*

1. INTRODUCTION

Performance and management are terms very widely used. However, performance management is still not very clearly defined discipline. If we go through literature and practise, we will certainly find a lot of different approaches to performance management and performances per se. Even though it's one of the youngest management disciplines, performance management has travelled long way and evolved substantially. First, it was only connected to some of the functional areas of management, while later on it has spread all over the organization from top to bottom and vice versa. In process way it evolved from performance indicators setting, through their measurement to full application of performance management.

Nowadays, everything is project. If one wants to determine and manage the performance of an organization, it would be very difficult to do it without project performance management. We may go even further and say that in contemporary world there is no other way of performance management than one going through projects.

Regarding project performances, there are quite a few approaches. However, they differ in their philosophy and methodology, so it's very difficult to establish unified, widely spread approach. IPMA PE model offers a solid possibility of unified performance management tool usage. This tool could enable standardized project performance management and hence comparison and benchmarking all over the world, regarding size, complexity, industry, people involved and other characteristics of the project.

2. PERFORMANCE MANAGEMENT

There is great confusion about meaning of term performance management. If you try to Google it, you will get countless different meanings and explanations. The confusion starts with the usage of different acronyms: BPM – Business Performance Management, CPM – Corporation Performance Management, EPM – Enterprise Performance Management, etc. All these acronyms has the same meaning and mean one thing - performance management (Cokins, 2009).

The further confusion comes from the fact that many people see performance management too narrowly and apply it to individual functions or departments. In that way we get marketing performance management or IT performance management (Cokins, 2009).

Historically, performance management was seen as one employer process and was used by human recourse department Today it is widely accepted as a performance management of the organization as a whole (Cokins, 2009).

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All this led to a paradox that recent performance management methodologies start with what performance management is not, instead of what performance management is (Cokins, 2009).

Most performance management definitions highlight the importance of having goals, objective and strategies clearly formulated at organizational and corporate level. Furthermore, the purpose of performance management is to archive organizational affectivity and to provide better results. The important aspect of performance management is developing strategies and their conversion into concrete action guidelines. Performance management is also about commitment and motivation for achieving company goals, and the communication plays important role in this process. Therefore, performance management is much ore than performance measurement (Verweire & Van Den Berghe, 2004). Performance assessment is not performance management, too. It is just one part of performance management. Performance management should be used as a meaningful tool that helps people and organizations to succeed (Bacal, 2012).

Some authors relate performance management to human resources function. Bacal defines performance management as continuous communication process between employer and its supervisor, with clear expectations and understanding about work that need to be done in the partnership. It represents a system with numerous components that need to be included into value creation in organization (Bacal, 2012).

Alternatively some say that business performances are measurements of growth and profitability of company through it's business endeavours and organizational and technical resources applications (Chen & Huang, 2012).

On the other hand, some others look at performance management much more widely. One of definitions is that performance management is a process that helps organization to formulate, implement and change its strategy in order to satisfy its stakeholders. In other words, it is comprehensive management process that shapes the road of continuous improvement through ensuring that everyone understands where organization stands and where it should be to satisfy shareholders needs (Verweire & Van Den Berghe, 2004).

One logically comes to a conclusion that performance management should deal with all manor functions in the organization, from strategic to operational level. Performance management is all about improvement, synchronised improvement in order to create value fro shareholders and owners. Performance management means converting plans into executions and solutions. It is a process of managing strategy of the organization (Cokins, 2009). The ultimate goal of performance management is to achieve sustainable organizational performance (Verweire & Van Den Berghe, 2004).

Performance management includes setting clear, common expectations and understanding about (Bacal, 2012):

- Essential function of work need to be done,
- Way in which the work of employees contribute to organizational goals,
- Concrete meaning of term “doing the job well”,
- Way in which employee and his supervisor work together to sustain, improve or upgrade current performances,
- Job performance measurement,
- Identification and elimination of barriers in achieving performances.

Performance management is not something that (Bacal, 2012):

- Managers do to employees,
- Force people to do better and harder,
- Is useful only when performances are bad,
- Is done by fulfilling forms ones in a year.

Performance management is beneficial for employees, management and organization and must be conducted in a collaborative and cooperative way. Performance management is a tool for precluding bad performances and for mutual work on performance improvement. Performance management is about talking and listening, learning and promoting (Bacal, 2012).

Potential benefits from performance management is in that performance management (Bacal, 2012):

- Reduces the need for managers to be involved in each activity,
- Saves time by helping employees to make decisions individually by providing them with necessary knowledge and understanding,
- Reduces misunderstandings about who is responsible for what, and thus saves time,
- Reduces frequency of situations in which manager do not have necessary information when he needs it,
- Reduces mistakes by identifying their causes,
- Increases involvement and motivation by providing context and meaning for employees,
- Provides feedback about work done,
- Provides feeling of empowerment to employees by giving them opportunity to make everyday decisions,
- Reveals ways of improving performances even when there is no current problem,
- Increases moral and productivity by providing understanding about how each job contributes to overall success.

Performance management is not a new methodology than everyone needs to learn; it tightly integrates business improvements and analytical methodologies that organizations are already familiar with. Performance management can be seen as an umbrella concept, since it integrates business and financial information into unique frame of support to planning and decision-making. This includes strategic mapping, balanced scorecard, cost management, budgeting, anticipating and planning. It inspires other key solutions such as supply chain management, risk management, human capital management systems, as lean management and Six Sigma. (Cokins, 2009)

Performance management is not compound of several unconnected parts that can be improved separately. It is a holistic model where all parts must be connected and combined in order to execute strategy of organization in meaningful and coherent way (Hope & Player, 2012).

Performance management includes (Hope & Player, 2012):

- Strategic planning,
- Value for shareholders and customers,
- Lean cost management,
- Performance measures,
- Performance evaluation.

Hope and Player connect performance management with strategy, but do not give the models of strategy execution. If we know that most successful way of strategy implementation is through various projects (Obradovic, Jovanovic, Petrovic, & Mihic, 2010), then the logical next step is certainly in the project performance direction.

3. PROJECT PERFORMANCE MANAGEMENT

If one wants to talk about project performance management, at the first place there is a need to establish what are project performances. They should be some sorts of measurement of project success. Project performance management significantly improves project success (Qureshi, Warraich, & Hijazi, 2009). Traditionally project is successful if it meets its objectives (in terms of quality), schedule and costs. These elements are often named project triangle. Atkinson (1999) named these three measures as the 'iron triangle'. It would be difficult and probably not accurate to prove that these criteria are not important, but it's more than clear to every project practitioner, that they are simply not enough.

Scholars and practitioners are seeking for more and more indicators of project success. Low and Chuan (2006) argue that the measure of project success can no longer be limited to the traditional indicators such as time, cost, and quality. Certain differentiations of success criteria are suggested by various authors trying to distinguish project success from project management success (Cookie-Davies, 2002) (Shenhar, 2004). This is very slippery area though. Could one have successful project management and unsuccessful project? This is very unlikely, because there is no good management if the result is bad. Vice versa is probably possible only by accident, so it also cannot be considered a rule.

Another interesting point in establishing project success criteria is a point of view. Who is entitled to state that the project (according to some criteria) was successful or not? Some authors vote for overall satisfaction of the project stakeholders (Bryde & Brown, 2005). Some point out internal factors such as project team (Belout & Gauvreau, 2004). Other authors point out the importance of client or customer satisfaction (Pinto & Slevin, 1988). Westerveld (2003) goes along with client's appreciation and project team appreciation, but expands the set with users, vendors (subcontractors) and other stakeholders, which gives strong resemblance with later definitions of Bryde and Brown .

4. IPMA PE MODEL

International Project Management Association (IPMA) is world's largest non-profit professional association of project practitioners. It started in 1965 as a discussion group of managers of international projects, previously known as "INTERNET". During time it grew into large international organization gathering more than 55 Member Associations from 54 countries worldwide. It defines the international principles of excellence in project management, representing the convictions and interests of project managers worldwide. IPMA brings together knowledge and experience and makes it accessible to the public (Obradovic, 2012).

As it's main objectives IPMA states:

- Development of a **standardised** understanding of project management
- Development of an **independent** field of knowledge
- Promotion of **competences** in project management in all fields of industry
- Promotion of an **international society** for project management

In order objectives to be reached numerous activities are performed throughout the year by thousands of IPMA individual and corporate members. One of the most growing endeavours within the organization is certainly annual IPMA Project Excellence Award that promotes best-managed projects in the world. IPMA PE Award:

- Annually awards project management prizes to project teams that achieve, and can prove, great feats in project management,
- Supports professional project management as a way to achieve greatness and
- Identifies projects that are qualified to be examples of excellent project management.

IPMA Project Excellence model was developed on well known EFQM model. Here are roots and history of PE model:

- **1980`s** – USA - Malcolm Baldrige Award TQM Award
- **1992** – Europe – EFQM Business Excellence Model, TQM European Foundation for Quality Management
- **1996** – Germany – GPM* EFQM Model re-designed to PEM
- **1997** – Germany GPM first Project Management Award for excellent Project Performance Project Excellence Model
- **2001** – IPMA First Training of IPMA PM Award Assessors
- **since 2002** – Presentations of IPMA International Project Excellence Award

Ever since 2002, international assessors, creating a baseline for best project management practice, are assessing projects all over the world. The assessments are performed in an unified way using PE model (Figure 1) which comprises of 9 criteria and 22 sub criteria. Each of sub criteria is enriched with lists of points of departure as informal guidelines in setting the assessment.

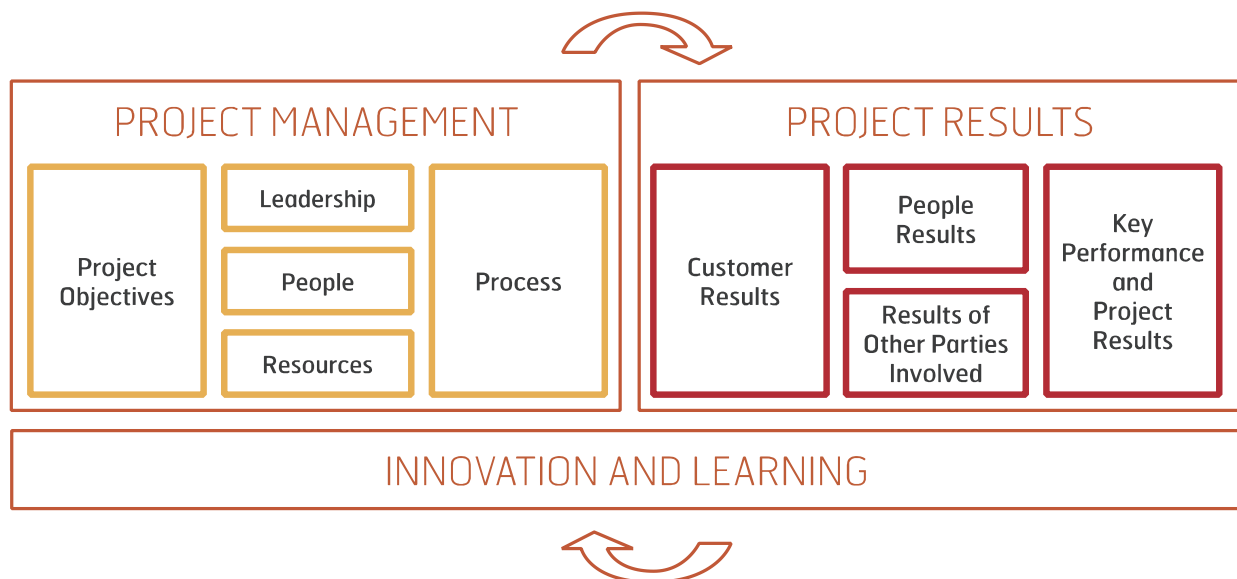


Figure 1. IPMA PE model

PE model looks into project performance taking into account two areas:

1. Project Management and
2. Project Results.

When measuring success of project management assessors take into account 5 criteria dealing mostly with how project was planned, steered and driven towards it's goal. The criteria taken into account here are: (setting of) project objectives, leadership, people, resources, and processes. A number of sub criteria are used to determine more specific measurements of given elements helping reaching common understanding of the criteria.

The second part of the model is dealing mostly with results. But as stated previously it is necessary to sort out the results and take into account various perspectives and perceptions. Results are measured from the point of view of: customer, people, other parties involved (various partners), and project itself (mostly technical outputs).

Most of people that are not familiar with the model in depth think of it as a tool used for a project 'beauty contest' and getting annual IPMA PE Award, However, benefits are far beyond that. Most important ones are:

- Project teams can **measure** where they stand on the way to great achievement.
- Teams work out their **strengths and improvement potential** of project work.
- Teams create possibilities for comparison with other project teams (**Project Benchmarking**).
- Organisations establish a **base for optimising** future project work.

At the beginning companies through independent assessment process tried to determine the performance of executed projects. But gaining an insight in the quality of the model, companies are nowadays using model from the day one in their project management in order to reach maximum efficiency but effectiveness also. They use it as a project management performance tool in order to plan, execute, control, and improve their projects. PE model is getting more and more used in the non-profit sector, where the competition and need for good project governance is also growing rapidly.

5. CONCLUSION

Various authors define performance management in various ways. Firstly, we must come to a common understanding what it is as a process. It is not setting of performance indicators nor it's pure measurement. It's far beyond.

Secondly, we must determine what are success measurement criteria. If, as in all management disciplines, the overall objective is gaining success, then we must know how to measure it. Definitions of

success and performance criteria go from purely human resources or financial aspects to overall strategic overviews. Surely success, hence the performance cannot be measured through one function but rather looking at a organizational business success as a whole. Therefore in organizational performance management we must go all the way from the strategic to operational level.

Having in mind that, one cannot talk about performance management, not taking into account performances of the projects as a primary tool for strategy implementation. Classic project management theories focus on hard components of every project: time, money and quality. Modern approaches, however, are trying to widen the horizons of project success elements. Today, focus is moving towards customer expectations and satisfaction, towards vendors, users and broader set of stakeholders. Some authors go even further saying that there is no successful project management without successful health and security management, or knowledge management within the project.

IPMA PE model, which is widely used, described in this paper, tries to embrace all modern approaches and to provide unique, yet unified way for measuring and managing project performances. It can be used as a tool for post project assessment, but more and more companies use it as a performance management approach which enables them to manage projects from strategic to operational level, from planning to closing phase, taking into account all relevant stakeholders and project functional areas. There is no contemporary performance management without project performance management.

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ANALYSIS OF COMMUNICATIONS ASPECTS TO VIRTUAL PROJECT MANAGEMENT*

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Abstract: *Communication is a key success factor of any project. An increasing number of virtual projects creates a need for better communication and collaboration among team members. Traditional ways of communicating fail to meet most of the requirements of virtual project environment. Therefore, new technologies are implemented in a way that can support transition to a virtual environment. This paper considers the basic characteristics of virtual teams and virtual project management with special emphasis on the role of communication processes in virtual environments. Definitions and characteristics of virtual teams and recommendations for establishing effective virtual communication are discussed in the first part of the paper. After that, communication tools in a virtual environment are presented. The ending part of the paper offers the analysis of the role of communications in knowledge transfer in virtual teams. Based on extensive theoretical background of the paper, its results can serve as a basis for the empirical research, which focuses on Serbia's territory and provides insight into major trends in the considered area.*

Keywords: *Communication, virtual project management, virtual teams, transfer of knowledge in virtual environment*

1. INTRODUCTION

Virtual project management is recognized as a new discipline of project management, i.e., a new manner of managing a project that owes its evolution primarily to the Internet and various software tools that facilitate the project execution. Virtual project management has its specific features, though. Here the team members differ in the manner they work, in the culture and even in their expectations, due to the country, the city, or the continent they come from. Project managers often collaborate with people they have never had any previous experience in working with, hence their task is to learn about the specific characteristics of their employees and define an appropriate method of work as well as an appropriate organizational culture. Virtual project management makes it rather difficult to the manager to get to know the team members well, as these are spatially dispersed, therefore the task of the manager as a creator of an atmosphere is often far from easy, and may even be impossible to accomplish.

What the members of a virtual project team rely on in accomplishing their task is certainly the technology, as well as various software tools that are meant to meet the needs of the virtual project management. The main task of any tool is to ensure an unobstructed communication among the team members given their geographical distance from one another and the complications this may cause. The purpose of these tools is to ensure that the team members collaborate in a virtual environment which is the only place they meet. These tools should also ensure that project managers manage the project more easily, which includes resource management as well as monitoring the project execution, among other things.

2. VIRTUAL PROJECT TEAMS – DEFINITIONS AND MAJOR TRENDS

The concept of a virtual team is not easy to describe, partly because various theoreticians attached importance to various aspects of the team. Parker (1994) describes the team as a group of people with a high degree of autonomy directed towards achieving a certain goal or accomplishing a certain task. Katzenbach and Smith (1994) describe the team as a small group of people with complementary skills, committed to a certain goal and approach for which they are mutually accountable. Generally, virtual teams surpass the distances, the time zones and any organizational boundaries. Delisle et al. (2001) describe a virtual team as a set of members oriented to task accomplishment, acting as a temporary group, divided by geographical or in time. A majority of organizations take a project team, and therefore a

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virtual project team, to be an executive part of the organization. This is especially characteristic of the organizations that adopted a project management approach.

Indications are that virtual project organizations will be the next level of organizational structure evolution. Mayer (1998) maintains that virtual organizations are models the companies will use in the future. Only several years later, this vision has become a reality for a large number of companies. A survey into project managers' salaries reveals that virtual teams and global projects surpass the boundaries of many a company, government or culture. The findings have shown that as many as 21% of respondents are engaged in the projects that include a number of countries, and that 15% of them work on projects including more than one continent (the Project Management Institute, 2001). One reason for this transformation is that customers, suppliers and employees are no longer located in the same city, but in different time zones and on different continents. It is fairly probable that in the next decade a majority of project managers will be engaged in virtual project teams for at least a part of their work time.

The culture of project management can be said to suffer important changes due to the development of virtual teams. It is interesting, however, that, while the virtual team concept is an important strategic tool for advanced organizations, little information is available on how this team should be maintained properly. The reasons a majority of companies decide in favour of a transition to virtual teams are the following:

- Financial (transport and property costs reduction);
- Human resources (finding the right person for the job regardless of the location he/she is, a balanced business and private life of the employed);
- Organizational (decentralized organization, regional representatives, innovation).

The trends contributing to an ever stronger demand for forming virtual teams are as follows (Goncalves, 2005., Stoehr, 2002):

- Globalization
- Strategic alliances
- Telecommunications
- Downsizing
- Trend of outsourcing

The above mentioned are strongly supported in the analyses conducted by Visitacion (2003) and the Cutter Consortium (2005) in which the following is given:

- 50% of new software projects are Web based;
- 20% of them are critical;
- 31% of an organization's IT budget is spent on Web projects; and
- 95% of these projects are to be accomplished "within a year."

A primary advantage of virtual teams is the selection of most educated and most adequate resources, as the project manager has access to a large database of resources. An additional advantage is in that the people at certain locations have access to sophisticated technologies required that the project is properly completed, not available at other locations. The result is that virtual teams allow for the engagement of adequate people and technologies, both at reasonable prices.

On the other hand, one weakness of virtual teams is that their members do not have so much chance to get promoted, due to a lack of informal communication with their seniors. A large number of problems in virtual teams result from the fact that the management does not have much trust in the team that is not under constant supervision. Certain people prefer personal contacts and will never feel confident and at ease working in a virtual team. Others are more flexible and are willing to work in a virtual team in order to improve and move on in their job.

According to Goncalves' research (2005), the basic tasks accomplished by virtual teams as a percentage of their participation in the project manager's working hours are as follows:

- Business relations and communication with clients (35%);
- Defining, planning and organization of the project (25%);
- Measuring progress and quality control (15%);
- Coordination and communication within the team (10%);
- Technical problems solving (10%); and
- Managing virtual working environment (5%).

The data show that the project manager pays considerably more attention to the communication with clients in comparison with the communication with team members and other stakeholders. This may lead to problems in communication, alienation among the team members, loss of team spirit and the synergy effect, which is one of the most important cohesive factors, regardless of the type of the team.

As well as any change in the organization, the implementation of virtual project management solutions brings, however, numerous challenges (Archibald, 2003). The first group of challenges refers to the capacity and competence of human resources in the organization to accept and implement the designed solutions, especially if these exceed the domain of their expertise (Burke, 2002, Gareis, 2003). A second group is related to fear, tradition or suppressed personal interests that may surface as a result of facing the change (Jovanovic et. al, 2007). A third group of challenges includes the work of virtual teams and discusses the problems in communication that result from dehumanization of work and alienation among the team members (Kimble, 2000; DeMarie, 2000; Ramachandran, 2005).

One of the biggest problems in virtual project management is the maturity of an organization to adopt and implement IT and e-PM solutions (Kloppenborg, 2002). Since project managers are professionals from various fields of expertise, often outside the IT sector, a clash may occur between the velocity in the development of e-PM support in the organization and the capacity of individuals to adopt and implement it in an adequate way (Petrovic et al., 2009). Therefore the importance of trainings in raising e-PM capacities of managers gains an ever increasing importance. The challenge is greater in that the technologies develop very fast, so it is possible that the acquired knowledge may become obsolete at an equally fast rate (Mihic, 2011).

3. ESTABLISHING EFFECTIVE VIRTUAL COMMUNICATION

Talking about the work of virtual teams, it is necessary to mention that communication among the team members becomes significantly aggravated, primarily due to physical distance characteristic of them. Since body language is part of everyday communication, the recipient of the message will not be in a position to understand it properly.

Birdwhistell claims that 65% of the meaning of a message is conveyed by non-verbal communication (Birdwhistell, 1970). Nowadays, certain authors maintain that this percentage is significantly higher. Fromkin and Rodman, for example, claim that as much as 90% of the meaning of a message is conveyed non-verbally (Fromkin and Rodman, 1983).

When a person reads an e-mail, they receive only a small part of the message they are to receive; consequently, chances are that misunderstanding among the team members may occur due to the very lack of personal interaction.

Similarly, informal communication is a major source of information. This type of communication is not present in virtual organizations. Members of the team do not have coffee together during the break, hence they cannot turn to their colleague to ask about his previous experience without using an e-mail or a telephone, which is far from being as efficient and as effective as in case of a traditional organization.

Research has shown that a small physical distance offer more opportunities to conduct communication (Allen, 1977), whereas long distance may endanger it. One research has found that people sitting at a distance of 40 metres from one another had a 5% chance to communicate, and only once a week. The percentage did not rise until the distance was reduced to 8 metres. It was then that the team members achieved a better collaboration and a better communication. This research highlights the challenges facing virtual teams in which personal communication is at best rare, and most often is impossible.

Similarly, fragmented communication may be rather harmful in virtual teams, primarily because classical communication generally relies upon non-verbal gestures which is most often absent in virtual teams (Guss, 1997).

Upon assembling a virtual team, the members of the team have to become aware that a standard interaction among people is rarely present in a virtual team (Table 1).

Table 1: Interpersonal interaction (✓-accessible, ×-mainly inaccessible)

	Traditional teams	Virtual teams
Data	✓	✓
Written procedures	✓	✓
Unwritten procedures	✓	×
Voice tonality	✓	×
Facial expressions	✓	×
Gestures	✓	×
Body language	✓	×
Social interaction	✓	×

This does not mean that people in a virtual team do not have personal contacts; it simply means that they find other, alternative methods of conducting communication. Characteristic of all teams is that a regular, i.e., traditional conversation will give a feeling of physical and emotional relationship among the team members. The members of a virtual team, however, need to communicate more frequently, in order that the people in the team should feel close, especially because a majority of interactions in a virtual team are not synchronized.

In other words, a face-to-face talk helps establish communication, since both parties in the conversation are in a position to offer feedback information as the conversation is under way. Furthermore, after the feedback information is analyzed, it is possible to introduce some changes if necessary. Literature reveals that words contribute to understanding a message by only 5%, the voice helps by 38%, whereas the facial expression is responsible for correct understanding by 55% (Meharabian, 1968).

Similarly, literature has it that the manner in which the message is sent is often more important than the content of the message itself. Hence, in order that a certain message is fully understood, it is necessary that the members of the team learn how to listen to their interlocutor actively. As regards the constraints of virtual teams, however, it is necessary that different methods of active listening should be developed.

While communication in classical conversation is generally controlled by the sender of the message, the communication in a virtual team is most frequently controlled by the recipient. This means that even if the message is sent, there is no guarantee that it is received. For example, when we telephone to a certain person, he/she may decide not to answer the phone, or to end the conversation in any moment he/she chooses. Similarly, if we send an e-mail to someone and we do not get the reply, we cannot be certain whether the reason for failing to get it is that this person has not received the message or that the person does not want to reply. In classical conversation it is really rare that the recipient of the message fails to hear the message, i.e., fails to answer.

In any type of conversation, especially in case of virtual teams, the recipient of the message has to accept the transfer of the message in order that he/she can read it at all. In this process of transfer certain complications, such as filtering of information or registering only certain portions of the message, may occur. Thus it is possible that certain members isolate themselves from the project team in that they will avoid supplying necessary information. On the other hand, some people believe that if they bombard others with information, they will contribute to the project's success, even if this information is not of great importance for the project. These are the people that focus upon the quantity, not the quality of communication.

Since communication in virtual teams is rather aggravated, the plans of communication and a certain sort of training would be of great help. The training should incorporate the following aspects:

- Use of important communication models and media
- Improving interpersonal communication skills
- Effective use of e-mails
- Methods for facilitating organization of meetings
- Importance of active listening
- Techniques for problem resolving in groups.

4. COMMUNICATION TOOLS IN VIRTUAL PROJECT MANAGEMENT

There are a number of tools that enable communication to be established when working in a virtual team. Some of these tools are the following: e-mail, forums, telephone, video conferences, chat, PM portals and face-to-face conversations. In addition to the listed tools of communication, there are fax, websites, instant messages, etc.

E-mail. As a communication tool, e-mail has several advantages, mainly due to its being non-synchronized by nature. On reading an e-mail, people have more time to think about how to reply, as well as about the contents of their message, especially if the message is sent in a foreign language. In such a case, they will have time to look into the dictionary and find the appropriate translation equivalents for certain words or phrases. The basic drawbacks of e-mail are the lack of verbal interaction among the team members and a slow feedback.

Forums. Their advantages are the same as in case of e-mail, and besides, the posts can be changed, some offer the opportunity of search, they are well structured, they offer the opportunity of revising the message and do not oblige anybody to reply to the posts. Similarly to e-mail, the major disadvantage is the lack of verbal interaction and a slow feedback.

Telephone. As a communication tool, telephone is mainly used in personal and direct communication. Its advantages are many in comparison with e-mail, when there is a need for a dialogue. Using the telephone as a communication tool may be difficult since during the conversation one has no knowledge of the interlocutor's visual signs, and besides, one may find it difficult to understand the interlocutor if he/she comes from a different speaking area.

Videoconferences. This type of communication may be effective in case of a number of people having a conversation. In comparison with the telephone, in videoconferencing everybody has an insight into what another one is saying. The drawback of this type of communication is that the transmission quality may be poor, which diminishes its usefulness and sometimes leads to frustrations. Videoconferences are mainly used when complex tasks, such as product development, are to be accomplished.

Chat. Chat is an informal type of communication, easy to use and useful in establishing better relations among the members of a virtual team. One advantage is also a prompt reply. On the other hand, there is a problem in using it, especially if people are slow in typing or do not have a full grasp of the communication language on a project.

Project management portals. The project management portals supply the centralization and coordination of project activities, which is a primary function of the Project Management Office. It is for this reason that in the last years the application of PM portals has been increasing in numerous companies that carry out various, complex and often geographically distant projects, i.e., possess a developed project organization, based on the implementation of the Project Management Office and on the application of temporary organizational structures (projects and programs) (Block, 2001).

Project management portals include Extranet or Intranet corporate portals. They represent developed user applications, completely integrated into the web environment. Their basic function is the centralization of all project information with an aim to work out and publish quality project documentation, project teams and their members' collaboration, sharing ideas and information related to the project, easier management and tracking of certain project aspects, such as risk, time, budget, resources etc.

The PM portal, integrated with scheduling applications, provides a powerful solution to the stakeholder's needs. Through a common interface, team members can submit reports on progress in a timely manner (accessible from anywhere that has Internet access), project managers can rapidly verify progress and update schedules, and all project participants can access the very latest status information in a controlled environment.

The basic advantages of virtual teams that coordinate their work via portals are the flexibility of access, the possibility of choice of the extent to which the stakeholders will be included into the work of the team, the creating the so-called knowledge tanks and establishing contacts going beyond the time and space limits. The disadvantages are generally reflected in the language and culture barriers (Jovanovic et. al, 2007). Problems related to words, accents or ways of expressing oneself are successfully solved by use

of electronic translators. These have proved to be a more efficient and less expensive means compared to language courses and training interpreters. The understanding of the message context is a much greater problem than knowledge of foreign languages. The dialogue between different cultural groups allows for mutual understanding, thereby coming to a consensus about a common frame of work that would be flexible enough to give credit to each member of the team.

Face-to-face conversation. This type of communication is considered to be a most powerful communication tool as it adds a personal note to a conversation. When we talk face-to-face with a person, we can clearly see our interlocutor's reaction to our words. It is also one way to establish closer personal relations. A possible disadvantage is that it may take a lot of time and money to have such a meeting or conversation.

5. COMMUNICATION AND TRANSFER OF KNOWLEDGE IN VIRTUAL TEAMS

The research on virtual teams conducted so far has mainly focused upon cross-functional virtual teams within one organization (Duarte and Tennant 1999; Johansen and O'Hara Devereaux, 1994) and are rather limited. These research works generally focused upon managing virtual teams in that the team members were motivated by their participation in management (Johansen and O'Hara Devereaux, 1994), then upon identifying an individual from the team with a group or the organization (Nemiro 2000), as well as upon building trust within the team (Javenpaa and Leidner, 1999).

Only a small portion of these research works deals with the exchange of knowledge within virtual teams, as well as with the type of knowledge that is exchanged, the manner in which the knowledge is shared and the effects that exchange has on the ultimate goals of the project.

The researches have shown that knowledge exchange within the team is significantly facilitated by an equal distribution of knowledge to all the team members, by having discussions on the existing knowledge and by not suppressing an informal knowledge exchange (Kraut, 1990). This research helped prove that an efficient communication via electronic media, collaboration and coordination are based on the fact that all the team members, at any point in time, have the knowledge necessary to understand the problem as well as the knowledge of the method of working in a virtual environment (Clark, 1996; Clark and Brennan, 1991, 1993; Davenport and Prusak, 1997; Krauss and Fussell 1990; Madhavan and Grover 1998; Marshal and Novick 1995).

In order that virtual teams should share mutual knowledge and understanding of the method(s) of work, it is necessary that the team members define the existing problems, norms and rules in advance. Very often, these rules and norms are known for the simple reason that those people worked together in the team before or that they worked in the same organization, production line, industry or field.

It frequently happens, however, that certain virtual teams lack this mutual knowledge because team members have never before worked together. In such cases it is necessary that this mutual knowledge be created. Some research have revealed that the best time for building a mutual knowledge tank is the period of initiating the project itself, when creativity is at its highest. This is the right moment to gather together all the team members so that they should exchange their ideas, experiences and knowledge; then responsibilities should be delegated and the members should start accomplishing their tasks (Johansen and O'Hara Devereaux, 1994). After the mutual knowledge has been created, each member of the team returns to their parent organizations in their respective countries, and they continue to collaborate using different communication tools.

Assembling the team and delegation of responsibilities and tasks among the members can be performed in case a certain task should be accomplished that has a limited range of possible solutions and an already well known decision making process. In case of an innovative type tasks, however, the methods used in creating mutual knowledge in routine tasks cannot be implemented. It is primarily because resolving the problem itself in routine tasks differs from that in innovative jobs. In case of creative tasks:

- Solutions require a synthesis of knowledge from specific fields;
- Solutions are found unpredictably (Safoutin and Thurston, 1993);
- Often the problems are not clearly defined, and are understood only when a solution has already been achieved;

- Task cannot be simply delegated to an individual, as all the team members contribute to the process in an unpredictable way (Hubka and Eder 1996).

Characteristics of innovative teams show that only one meeting of the members of a virtual team is insufficient to acquire mutual knowledge and understand the problems, processes or solutions. Frequently organized meetings in case of traditional teams allow for the development of new ideas and thus improve the mutual knowledge too. Too frequent meetings, however, may endanger the benefits the work in virtual team brings.

If the meetings of the virtual team should be held frequently, e.g., on a weekly basis, that would mean that the work is not so virtual after all. Hence certain authors maintain that decisions concerning highly innovative solutions have to be based on a virtual knowledge exchange, which largely differs from the traditional knowledge exchange in teams.

6. CONCLUSION AND FURTHER RESEARCH

An increasing number of companies embark on conducting projects in a virtual environment, as they become aware of the advantages such an approach offers. With a further development of technology, the communication in virtual teams will become both more effective and more efficient. Such an approach has broad prospects; in the near future an ever larger number of projects will be conducted employing virtual teams, and the importance of the persons managing the virtual communication will increase. Hence, the companies whose employees efficiently adapt to the dynamic development of modern technologies are certainly in an advanced position, therefore an increasing importance is expected to be assigned to education and trainings in the fields of communication management, virtual project management and project management software tools.

Theoretical analysis in this paper may lead to a conclusion that virtual teams will be the method in which the business will be conducted and projects will be executed in the future. It is through virtual teams that the best experts from all over the world can be engaged, which means that we need not be confined to only the best from our own region; also, the operations costs are significantly reduced, and, most important, the time required for the project to be completed is significantly shortened.

On the other hand, using virtual teams in work bears certain risks that are worth paying attention to and devoting enough time in order that they should be timely avoided. Here we primarily have in mind the members of the team that come from different cultures, the selection of communication technology, the language barriers and the method in which the knowledge is spread.

Fortunately, these shortcomings can be surpassed in that a competent person will be appointed to coordinate the team members and their communication. When the first problems in communication emerge, adequate measures have to be undertaken to resolve them. This is by no means an easy job, however, it is crucial in a successful execution of the project in a virtual environment. The person responsible for the coordination of the members and the communication among them has to be able to create such a relationship among the members that they all feel they are part of the team, that they work towards a common goal.

Further studies of these topics are related to empirical research that should analyze the major trends in the field of communication in virtual project management. Such research would be based on practice in Serbian organizations and have to analyze the key aspects of communication in the virtual environment, such as tools, procedures, ICT support, knowledge management, collaboration of project team members and management of cultural and sociological differences in the team. Thus an adequate basis for comparison will be created, and it will represent the baseline for organizations in improving the PM competences and establishing efficient human resource management in virtual teams.

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PROJECT APPROACH IN BUILDING OPERATIONAL AND FUNCTIONAL CAPACITIES IN THE DEFENCE SYSTEM

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Abstract: *This article analyses basic aspects and commitment of the project approach in building operational and functional capacities of the Serbian Armed Forces. The defence system and Serbian Armed Forces are very dynamic socio-technical systems that involve continuous transformation of elements of a strategic concept and doctrinal documents, legislation, organization, human and material resources, as well as ways of training commands and units. Therefore, planned and programmed implementation of defence preparations, through the building of operational and functional capacities is in the focus of experts and decision makers in the Ministry of Defence and Serbian Armed Forces...*

Keywords: *project approach, operational capabilities, defence system, Serbian Armed Forces²*

1. INTRODUCTION

Throughout history, the main achievements in the theory of management and organization are related to military activities. Since the existence of defence system and military, there was a need to manage such a complex and nationally important system. In the theoretical, doctrinal and practical regard approaches in management of operational capabilities building have changed and enriched with new knowledge and experiences.

Due to the nature and importance of the military organization, for a very long time new knowledge in the field of management, leadership and command were used as a basis for improving management processes in the domain of other state functions and in the domain of other activities. In complex social-technical systems, in recent history, there is growing need to develop and improve contents and activity areas of strategic management. Planning, as a function and process, is the most important content of strategic management, without which success in the domain of other functions is unthinkable. Necessary resources are defined by planning and programming of organizational changes, as a satisfactory compromise between the capacities of the state and operational needs.

Strategic management, as a concept already has clearly defined meaning, although there are different interpretations, as well as descriptions of relations of this concept to other lower categorical concepts. Some of these problems are of semantic nature, given that the various concepts are attributed to the same content, and vice versa, i.e. under the same term different contents are comprehended. Management could be defined as an activity aimed at achieving specific, predetermined goals.

Henri Fayol lined elements of management by a logical sequence of management functions, such as:³ planning, organizing, ordering, coordinating and controlling. He believed that all those functions are necessary, not only for successful conduct of business, but also in politics, religion, army and that they are universally applicable.

2. STRATEGIC PLANNING IN THE DEFENSE SYSTEM

Strategic planning which is supported by objective financing of costs and implemented through a programmed changes of system, in the process of harmonization of needs and possibilities, seems essential content of the strategic management of defence matters, including the reform process. In today's world of uncontrolled, rapid and difficult to predict changes of factors that determine the strategic defence planning, modernity and efficiency of strategic management are becoming increasingly important. In this sense, flexibility and adequate response in real time is coming increasingly to the fore.

²This paper presented some of the results of the research project: "Cost-effective source of new technologies and the concentration of defense through social changes and strategic orientations of Serbia in the 21st century (MNT III47029 RS)" funded by the Ministry of Education and Science of the Republic of Serbia.

³Henri Fayol as cited in Kootz, & Weinrich, 1988, Management, p.33.

From the standpoint of functional analysis, strategic management or strategic leadership⁴ of the defence system includes: strategic planning, commanding, organizing, coordination and control. So these are the basic control functions, which carry a strategic attribute, since they relate to the highest management body and essentially reflect to the whole system. Complex systems, especially the security and defence, need as more efficient strategic planning and leadership through guidance.

Often, one is automatically becoming a manager based on school degree and other qualifications, as well as taking a specific position in the organizational hierarchy, but for management needs much more than formal organizational position. Management generally, and effective management in particular, can never be completely learned up to the end. Special social conditions are necessary for management, as well as the essential skills of managers. Therefore, the phenomenon of leadership and success of leaders has always drawn the attention of not only scientists, but also the wider social public. Successful leaders emerge in different areas of life, starting from statesman, politicians, up to the generals.

At the time of modern civilization, technology and much more limited power of the individual to influence complex systems and processes, in the new conditions it is necessary to redefine the content and scope of the leadership concept. The leader is no longer the traditional leader, but the man in the shadow, which does not impose on co-workers from a position of formal authority, but build relationships with them as equal partners. From these relations in an organization depends its overall success.

3. OPERATIONAL CAPABILITIES FACTORS AS BACKGROUND OF THE PROJECT APPROACH

Strategic planning because of the significance of impact on the whole system and on other functions of strategic management is particularly important. Therefore, in theoretical and doctrinal areas of strategic planning, as well as in the realisation area of these functions, the national specificities are present. Thus, strategic planning is often referred as a way to manage changes, a method to allocate and create the future of the system envisaged in the context of environmental conditions, process or procedure for selecting the optimal path, a way of dealing with the situation and alike. All these approaches can be commented specifically from the aspect of scope and content of the term. Strategic planning can not be identified with any individually given content, but may be with the synthesis of all previously granted individual meanings. The whole content of the term "strategic planning" exhausts in the content of the basic function, which specifies for the highest level of management in the defence system.

Through strategic planning it is necessary to review and comprehensively analyse alternatives of the structural and functional system organization in terms of efficiency, effectiveness and economy. Because of the importance of strategic planning for the defence system, there are natural resistances to planned decisions that are prepared within that function. These resistances are generated from inside and outside the system, and often are coordinated. Their function is to prevent the adoption or implementation of strategic decisions. Strategic decisions are the result of strategic decision making, and therefore of strategic planning. According to Drucker, "Strategic planning does not deal with future decisions, but with the future of present decisions".⁵

Based on comparative analysis of the definitions of term of capabilities, there can be derived factors that determine them and the elements that meet the content of the term. Factors of capabilities are of external and internal character.⁶ Most important factors of capabilities are: doctrine, organization, cadres, armament and military equipment, training, education, infrastructure and interoperability. Each of these factors can be particularly operationalized and has a concrete expression for each combat system, through quantitative and qualitative properties. Their building can be programmed through a project approach for different periods of time.

⁴ At the present time, when more and more theoretical sources are used which contains the term "management", it is very difficult to restore the original term "leadership" in Serbian language. One can say that they are synonyms, because both terms have a foundation in management theory, respectively leadership theory.

⁵ Milosavljevic, 1999, Fundamentals of strategic management.

⁶ The factors are all of the active conditions, ie. all objects (things, processes, properties) which throughout their actions participate in producing a given phenomenon (regardless of whether they are necessary and sufficient). Markovic, 1981, Philosophical basis of science, p.639.

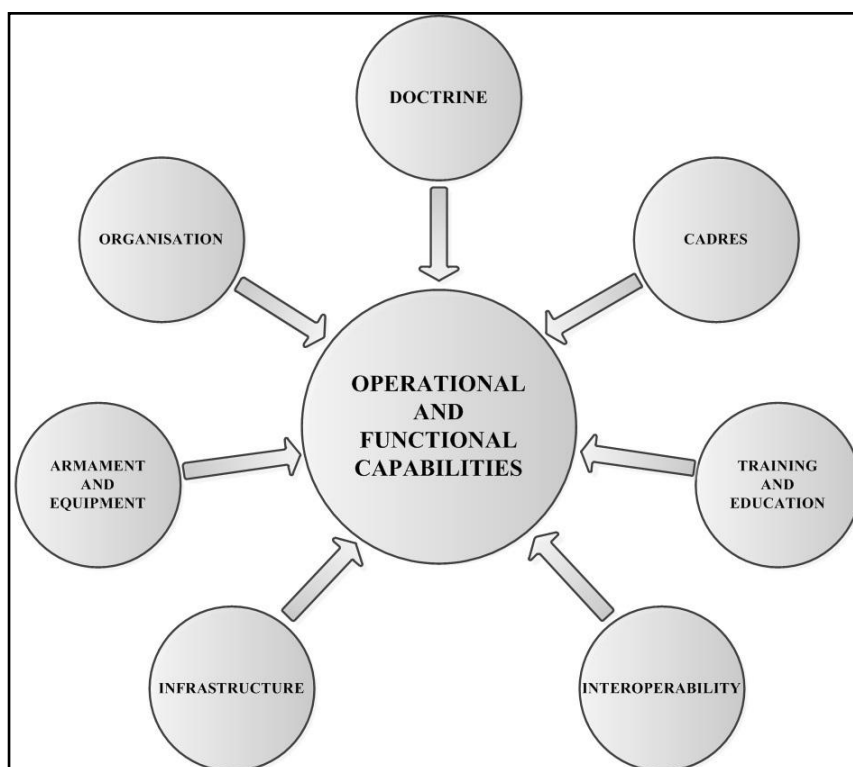


Figure 1: Operational and functional capabilities factors of the Serbian Armed Forces

Operational capabilities represent the ability of the army or its parts to achieve the desired effects in specified time and under the certain conditions and standards, through the conduct of operations. Operational capability, in relation to the criterion of belonging to the functions of combat operations, can be grouped into the following types: capability to command, capability to act and counteract and capability of security.

Individual types of operational capability should be analysed from the standpoint of factors that determine them, and evaluated and measured from the aspect of issues and elements that make their content.

4. MONITORING THE IMPLEMENTATION OF STRATEGIC DOCUMENTS, PLANS, PROGRAMS, PROJECTS

Monitoring the implementation of strategic documents, through the degree of realization of strategic objectives and issued strategic decisions is problem of every strategic management, particularly in complex, dynamic systems that are developing and acting in unpredictable strategic environment.

A representative example of such system is the military and defence system as a whole. The results of modern research confirm already acknowledged social regularity that many state institutions in the world, as well as managers of complex systems, leaders and commanders are satisfied with the adoption of a regulation, law, strategy or other act that regulates their activity, and that very little or insufficient attention is paid to their execution.

Experienced managers in particular emphasize that it is much easier to develop a solid strategic plan than to implement it and achieve the desired outcomes. The hardest part is the implementation of strategies and plans in large systems, which have great depth. What implementation strategies makes more difficult and time-demanding task than developing the strategy is a broad spectrum of management activities that should be taken care of, a wide range of methods, human resource management, persistence needed to launch and initiate various initiatives, a large number of complicated issues to solve, resistance to change that should be overcome, the difficulties in unifying the efforts of many different working groups in a compact functional unit.⁷

⁷ Thompson, Strickland III, & Gamble, 2008, Strategic management, p.317.

The research results confirmed that nearly 70-80 percent of the commitments in the strategies and other planning documents remain unfulfilled.⁸ This is particularly the case for the strategies and other general acts in which are defined strategic orientations, for whom does not appear institution explicitly responsible for implementation. So the strategies, when they are adopted, should be operationalized through action plans, plans, programs and projects, as well as to determine the mechanisms, instruments and techniques for the accurate measurement of achievement of the declared goals, objectives or strategic orientations.

Successful management of the implementation process of strategies, plans and programs require a series of continuous activities by managers, such as:

- monitoring changes in the strategic environment and their reflections on the strategies and plans;
- identification of problems and consideration of obstacles that are or may be found in the way of implementation of strategies, plans and programs;
- performing constructive pressure on the lower organizational levels to achieve good results;
- keeping the attention of the organization on need for operational execution and compliance with established deadlines;
- more exact measurement of the achievement level of stated objectives and execution of tasks;
- expression of an objective approach in rewarding and taking sanctions against responsible persons at all levels;
- implementing corrective actions to improve implementation of the strategy and achieve the desired results.

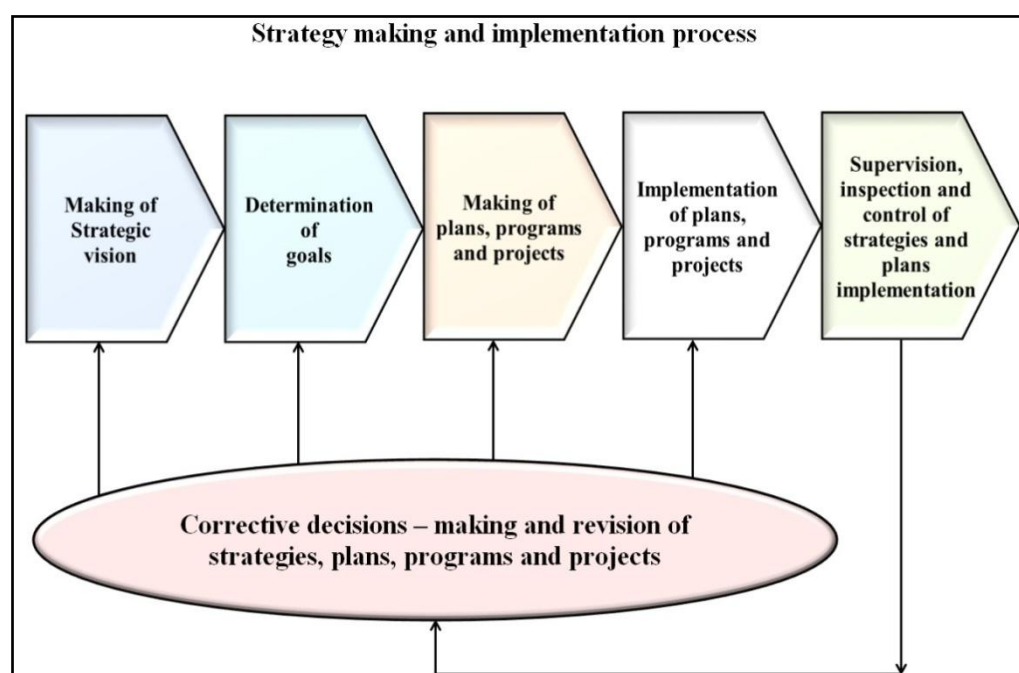


Figure 2: The process of developing and implementing strategies, plans, programs and projects

Implementation and enforcement strategy is a process with a lot of circular motion and recycling in order to harmonize and adapt the strategic visions, goals, strategies, capabilities, implementation approaches and culture, so they could match each other in the changed circumstances.⁹

Vision, goals and tasks in strategic documents are aimed at the preservation and building of operational and functional capabilities of the Armed Forces, commands and units to perform missions and tasks.

5. CONCLUSION

⁸ Ibid, pp.317-319

⁹ Ibid, p.319

The project approach involves the establishment of a comprehensive system of planning, programming, budgeting and execution. That system is an instrument of strategic management. Documents that are produced in this process usually have two parts, development and programming. The development includes: situation analysis, regarding external and internal environment, vision, mission, strategic development directions with medium-term priorities and strategic objectives, and selection of strategic options. Programming part, is implemented through a uniform system of medium-term planning and includes medium-term objectives, programs, projects and program activities, expected outcomes, performance indicators, sources of verification, as well as financial resources and sources of funding.

In order to, in provided and limited time and with provided human and financial resources, achieve the objectives that contribute to the realization of program where this project belongs, should contain information on:

- 1) Duration of the project with indicated beginning and expected end of the project
- 2) Expected results on an annual basis and upon completion of the project
- 3) Performance indicators on an annual basis and upon completion of the project
- 4) Sources of verification (who and with what dynamics follows the implementation of the project objectives)
- 5) Implementers and
- 6) Financial assets and financial resources.

The project approach in the building of operational and functional capabilities of the Serbian Armed Forces is in a function of transparency of civil-military relations and better understanding of the military profession and civilian decision-making authority in respect of budgetary spending and achievement the objectives and the required effects.

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FOUR ASPECTS OF PROGRAM MANAGEMENT WITH MULTIPLE PROJECTS IN RESIDENTIAL CONSTRUCTION INDUSTRY

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Abstract: *This article refers to the presence of four types of problems in managing a program of multiple projects (with the usual continuous review plan period) and stresses the specificity of residential construction industry: (1) program selection from the set of potential projects, (2) planning of approved projects with available resources (scheduling projects over time), (3) supervision of projects execution and re-planning when some disturbances occur or anticipate, and (4) terminating certain projects and repeating the process with a selection of new projects if unfinished projects still exist. The result of this research involves the formation of the budget with appropriate time dynamics so that available money has a decisive effect on the program liquidity, project deadlines and program duration. Assumed is the usage of the software and the creation of an adequate information system. Presented is the program planning for the construction of four residential buildings.*

Keywords: *management, program projects, apartments, budgeting, liquidity programs.*

1. INTRODUCTION

Many authors conduct research of the simultaneous management of multiple projects that compete for the common resources (see, for example <http://www.visitask.com/managing-multiple-projects.asp>, http://technicalpathways.com / Consulting / Managing_Multiple_Projects / managing_multiple_projects.html, Drobnjaković (2001), Nikolic (2002-2003)). In recent times increasingly is emphasized the portfolio management of projects, programs or projects (see, for example, Jovanovic et al. 2007). Every project is a set of appropriate activities aimed at realizing the set of goals (see, for example Kerzner, H. 2003) and the PMBOK edition 1998-2008). Standard Software for Project management (PM) is supporting the needs of practice, supported simultaneous management of multiple projects that compete for limited resources, long time before the expression of the theoretical interest in this area. For example, software CA-2 is supported SuperProject managing multiple projects since the 1990. We also presented a proper theoretical basis (Drobnjaković et al. 1995) and interpreted the use of software (Nikolic 1998). In the following years, other authors have published papers on the management of multiple projects at our various scientific conferences.

In this paper we present four types of problems for the corresponding phase of the program management of several projects in the construction of housing complex. We emphasize the provision of the program liquidity with the present dynamics of the flow of funds to cover project costs.

2. PROGRAM OF PROJECTS MANAGEMENT PROCESS IN RESIDENTIAL DEVELOPMENT

Unlike the management of one project with approved duration when considering the appropriate planning period, managing multiple projects often is characterized by continuous planning period. Generally, projects that are executed can be completed in different time periods, thus creating conditions for the introduction of new projects. Planning and construction of more housing units are subject to the general theory of management of several projects:

- (1) The program choice from the set of potential projects;
- (2) Planning of approved projects and their distribution in time;
- (3) Control the implementation of projects and re-planning when disorders occur or anticipate, and
- (4) Completion of some projects, analysis and repeating the process with a selection of new projects.

2.1. The selection of the projects program/portfolio

Project selection from the set of potential projects is carried out in accordance with the global objectives and constraints. It is justified to consider maximizing the value of the total amount of profit with the available (or planned) budget for all projects. It is important for residential buildings to consider their locations and all characteristics that are important for potential buyers.

We have shown analysis of four locations in different parts of the inner and outer part of our capital (Nikolic and Božilović (2009), Problem 52) with elements of unequal importance for the construction (land prices, construction costs, existing infrastructure, etc.), selling possibility of apartments and related facilities (customers' demand, sales prices, etc.). Multi-attribute analysis was applied (Analytical Hierarchy Process/AHP Method, Expert Choice software), with three levels of criteria (Table 1) for each location.

Table 1: Hierarchical structure of criteria of multi-attribute selection model for housing sites

F₁ – Microlocation F ₁₁ – Street building and the adjacent streets F ₁₂ – Preschool F ₁₃ – Primary School F ₁₄ – Health Center F ₁₅ – Supermarket F ₁₆ – Theatre F ₁₇ – Parks F ₁₈ – Recreational Facilities F ₁₈₁ – Playgrounds F ₁₈₂ – Swimming Pool F ₁₈₃ – River or Lake	F₂ – Macrolocation F ₂₁ – Distance from city center F ₂₂ – Public transport F ₂₂₁ – Metro F ₂₂₂ – Tram F ₂₂₃ – Trolley F ₂₂₄ – Bus F ₂₃ – Municipal road network F ₂₄ – Main Roads F₃ – Infrastructure F ₄ – Demand for housing F ₅ – Financial Aspects F ₅₁ – Costs [m.u./m ²] F ₅₂ – Profit [m.u./m ²] F ₆ – Potential new housing sites
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The introduction of appropriate weights for the significant criteria and sub-criteria (requirements for their maximization or minimization are recognizable from the very name) is determined the optimal multi-criteria ranking of the considered locations. Starting from the top of the list it is chosen only one location or locations with the sum of the costs not exceeding funds available for construction costs.

The issue of portfolio projects selection was elaborated in details Lourenco and Bana e Costa (2009). It was pointed on different approaches to this area around the world (including the application of Expert Choice) and proposed a multi-criteria decision support system called PROBE which is based on the so-called 'backpack task' and the 'benefit-to-cost ratio' model, which is essentially a binary problem with values for the variable 1 (the project is included in the portfolio) or 0 (otherwise). The significance of individual projects (ratio) is defined as the ratio of profits and costs. Generated are all possible combinations of projects and the corresponding total costs (based on a case that no project is chosen up to the selection of all projects). Selected are efficient or Pareto-optimal solutions, i.e. the portfolio with the corresponding total costs. The user can choose the best portfolio depending on the levels of costs.

2.2. Planning and scheduling of projects in time

Planning of approved projects is done in accordance to available resources for which these projects compete. In general, companies in housing construction can proceed in one of the following ways:

- Using only its own resources (machinery, labor, etc.)
- Hiring specialized contractors for each phase of work (one contractor for the certain work of an object or multiple objects), for the whole object or for more projects in their entirety;
- Combining the performance of selected works from its own resources with the allocation of some tasks to other subcontractors.

Introduction of the contractors or subcontractors poses a new problem of their selection. It is expected that they offer different work elements (duration, price, payment terms, etc.). We illustrated the selection of

contractors for the project using linear models with costs and duration criteria using the software WinQSB (Nikolic and Bozilovic (2009), Problem 39-43), which can be adapted to consider a number of projects.

Detailed projects planning determines the terms of their terminations and related costs for each project and the total costs for the whole program. It follows that the initial projects selection based on initial budget planned for all projects can be adjusted (case 1), i.e. must be corrected (case 2).

- 1) If the detailed plan results in lower total costs, it is necessary to examine whether the free financial funds can be used to choose new projects from already established rankings of potential projects. For previously selected and for new projects is necessary to repeat detailed planning process and determine whether new projects can be actually introduced and what the number of such new projects is.
- 2) If detailed planning of projects requires the greater total cost, there must be omitted earlier selected projects with lower priority so, the total cost of retained projects should not exceed the budget. The process of detailed planning of such projects is also necessary to repeat.

Project management is based on the rational use of available resources. The literature usually considers the limitations of resources, types of labor and machinery, which is supported by the standard PM software (such resource leveling is done by reducing the need within given limitations - available fund of working hours per day). However, from the standpoint of cost only, it is usually stated that it needs to be made a project plan in line with available budget. So, (Rajkov and Nikolic (1999)) proposed the extension of the standard project management methodology with consideration of cash flows (cash inflows, outflows and the cash balance). Božilović (2001) extends the consideration of financial resources to manage multiple projects and (Nikolic et al. (2002) illustrate the use of MS Project software application. Here, it follows an appropriate mathematical formulation of the problem.

Liquidity planning program for a given dynamics of forming the budget

In certain business practices of construction companies is often present the case that budget for the envisaged program of projects is not available in full at the beginning of the planning period of the program than, it is formed during its execution. It can be considered that there are three forms of budget establishing for the program:

- (1) The Company finances the program from its own funds through sales of their products from the previous programs (it is planned the expected dynamics of the financial inflows from the standpoint of terms and amounts of funds in each period).
- (2) The Company uses bank loans (contracted by the corresponding inflow dynamics of finance)
- (3) The Company combines its own funds and loans (it is derived the associated dynamics of financial inflows).

Appreciation of the budget formation dynamics influences the preparation of detailed project plans so that in the terms for payment of costs there is enough money. In other words, it is necessary to ensure the solvency of the program at any time period for the payment of costs. The problem boils down to the consideration of costs at the end of each month when is determined the scope of the work done and corresponding costs. After the payment of expenses in one month, the remaining funds in the next month and the cash balance is determined as the difference between the cumulative cash flow and cumulative outflows for expenses at the relevant time period for the payment of costs.

This problem can be described with appropriate general mathematical model. Let j denotes the ordinal number of the appropriate project and considered is the set of n projects which consists of a set of indices J , $j \in J = \{1, \dots, n\}$. Denote t , as the units of time (months), the duration of the term is T and the completion of the program is T_p , so, $t \in T = \{1, \dots, T_p\}$. Each project corresponds to the term's start and a line diagram with the necessary logical dependencies and technological activities so their positions in the time determine the term of the project. Certain dependencies may be present between some projects or parts of projects. For a considered term's variant for the beginning of projects exist corresponding overlaps in time for work on various projects. With the cost $C_j(t)$ of the j -th project in t -th month determined is the cost of the program in that month. It is further necessary to observe the period Θ_t , from the beginning of the program and concluding with t -th month, marking the individual months with τ ,

$\tau \in \Theta(t) = \{1, \dots, t\}$, $t \in T$. Based on the inputs of money $C^{inp}(\tau)$ in some months τ determined is cumulative $C_{cum}^{inp}(t) = \sum_{\tau \in \Theta(t)} C^{inp}(\tau)$ for the appropriate month $t \in T$, which is needed to compare with the cumulative costs, i.e. the output of money $C_{cum}^{out}(t) = \sum_{\tau \in \Theta(t)} C(\tau)$ in the same month. Further, it can be considered the period T of the program execution including the periods T_j for individual projects when they have endings Tp_j and performed in time units $t_j \in T_j = \{t_{j,1}, \dots, Tp_j\}$, $j \in J$. Obviously, it is true that $T = \bigcup_{j \in J} T_j$ (the duration of the program execution is the union of individual projects periods) and $Tp = \max_{j \in J} Tp_j$ (program completion is determined by the project with the latest completion). Optimization program can be defined with the following multi-criteria linear programming model:

$$\text{minimize } Tp \quad (1)$$

$$\text{minimize } Tp_j; \forall j \in J \quad (2)$$

s.t.

$$\sum_{\tau \in \Theta(t)} C^{in}(\tau) - \sum_{\tau \in \Theta(t)} C(\tau) \geq 0; \forall t \in T \quad (3)$$

where: the function criterion (1) minimizes the duration of the program, with (2) minimized is the duration of individual projects j , while conditions (3) ensure the program liquidity in each month t .

The number of criteria is equal to the number of projects increased by 1. However, it is necessary to point out the following aspects that are present in practice:

- Can be considered one-criterion problem of minimizing only the program duration (1) and respecting the conditions (3).
- Criteria (2) can be introduced for all projects or only for selected projects. Specifically, projects commonly define appropriate priorities and require the shortening of its duration. In doing so, it can be proceeded in one of the following ways:
 - the highest priority is set for the program duration (1) and lower priorities to other appropriate projects;
 - the highest priority is set for one project, the next priority for the program and a lower priorities for the remaining projects;
 - higher priorities are set for specific projects, followed by the next priority for the program and then a lower priorities for remaining projects;
 - higher priorities for projects and the lowest priority for the program.
- Model (1)-(3) must respect amounts available for other types of resources (primarily machinery and labor) when the company runs the program with its own resources. The illustrative example shows that MS Project software solves the problem defined by the implementation of an interactive designed process, 'analyst – software'.
- If a program is assigned to subcontractors, it is necessary that they accept the solution of the model (1)-(3). It means that it is necessary to harmonize the solution with subcontractors, what is possible, bearing in mind that multi-criteria model can be determined by corresponding Pareto-optimal solutions.

Two Pareto-optimal or efficient solutions x^1 and x^2 can be simply defined with characteristics that x^1 is more favorable for at least one criterion than x^2 and worse than at least one of the remaining criteria. Conversely, x^2 is more favorable than x^1 for at least one criterion and worse for at least one of remaining criteria. If x^1 is better at least in one criterion than x^2 and not worse for any other criteria, then x^1 dominates over x^2 and x^2 should be rejected as an ineffective solution which is not Pareto-optimal (see, for example, Ehrgott (2000), Nikolić and Borović (1996)). Solutions of the multi-criteria model by definition is a set of Pareto-optimal solutions among which one is chosen for implementation. It is often not possible to determine all such solutions or it is not rationally to do. Because, it should be generated a selected

subset of efficient solutions for analysis when the decision maker can choose one plan which, he believes, is the most appropriate in the given circumstances for the company business. If there are subcontractors for some work, it is needed that they accept the plan. With such plan, called 'the basic plan 1' or 'the initial base plan', can be started the execution of the program.

2.3. Control of projects execution and re-planning when disorders occurred or predicted

In this phase should be determined monthly the construction work accomplished on the projects and compared with the current basic plan what is supported by the standard PM software. If there is a correspondence between accomplished and planned elements, provided that they were not made or anticipated changes of the program plan elements, it should be continued with the program implementation at the current base level. Otherwise, it is necessary to correct the current base plan and determine the new basic plan for the continuation of the program. Based on incurred or anticipated changes, the program model is solved as the earlier base plan or a new model with required elements is used. Thereby, a new basic program plan is specified for the continuation of its implementation and controls should be conducted at the end of next month. Possible changes in the elements for the continuation of the program are:

- i) Change of available resources, manpower and machinery;
- ii) Change of the cash flow dynamics;
- iii) Change of the program and projects priorities.

2.4. Completion of some projects, analysis and repeating new projects selection process

Having drawn up a plan for an earlier program and started its implementation, the construction company can plan their business in two ways:

- a) Planning to start the next program after finishing the current program.
- b) The beginning of the next program is planned before the end of the current program. In addition:
 - Some of projects have been completed (or at least one was completed) and others have varying degrees of completion, or
 - There are no completed projects and all are partially completed (with appropriate degrees of completeness).

In both cases, it is preferable to make analyses of the program implementation success and drawing conclusions for better management of future programs. The case a) has two discontinuous planning periods and the possible time interval between the completion of the first program and start of another program. For b), there is a continuous planning period with appropriate overlapping of the first and second project execution periods. Standard PM packages support these approaches.

3. SOFTWARE SUPPORT OF PROGRAM MANAGEMENT OF SEVERAL PROJECTS

Program management of several projects which is presented is not appropriate to be carried out using manual procedures, except in very simple cases. It is necessary to use appropriate software packages. Below is shown the application of the MS Project in solving the model (1)-(3), which is extended with the limitations for two types of process machinery.

4. AN ILLUSTRATIVE EXAMPLE

Let assume that exist the program plans to build $n = 4$ identical housing facilities, which are considered as separate projects (Proj-1 to Proj-4). Each project has seven stages of works with a total of 206 activities and requires involvement of 247 types of resources: 7 types of working machines (M_1 to M_7), 26 categories of workers (W_1 to W_{26}) and 216 types of materials. All projects compete for the same resources. The analysis might be necessary to restrict the numbers for some of available machines and possibly for some workers, while the materials are available in required quantities. Program planning using MS Project software consists of the following stages.

Stage 0. Defined is the beginning of the program on 2.4.12 (the first Monday of the month of April), which determines the beginning of the Proj-1. It is believed that is appropriate for any future project to start after

having finished approximately 50% of the first phase of work (earthwork) of the previous project, so there are adopted terms of every first Monday in the following month: 7.5.12 for Proj-2, 4.6.12 for Proj-3 and 2.7.12 for Proj-4. Each project has a cost amounted to €494,822 and the total cost of €1,979,287. Without resource limitations, each project has a minimum duration of 165 days (Figure 1) and the corresponding terms of endings, according to the durations of 165 days.

Task Usage	i	Priority	Task Name	Duration	Start	Finish	Cost	Details	Gtr 3, 2012				Gtr 4, 2012			Gtr 1, 2013		
									Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
	0		500	Program-1	230 d?	2.4.12	15.2.13	1,979,287	Cost	487,586	505,967	423,389	216,479	13,428	10,904	5,867	3,199	378
	1		4	Proj-1	165 d?	2.4.12	16.11.12	494,822	Cost	208,042	2,236	4,827	2,601	2,742	416			
	2		3	Proj-2	165 d?	7.5.12	21.12.12	494,822	Cost	235,450	208,144	2,175	4,098	3,533	2,788	528		
	3		2	Proj-3	165 d?	4.6.12	18.1.13	494,822	Cost	44,094	229,651	208,243	1,874	4,760	3,030	2,667	491	
	4		1	Proj-4	165 d?	2.7.12	15.2.13	494,822	Cost		65,937	208,143	207,906	2,394	4,670	2,672	2,708	378

Figure 1: The initial plan and program costs (Task Usage report from MS Project) without limiting resources, the minimum durations of the projects and program were 165 and 230 days respectively

Minimization of maximum demands for selected resources with minimum program and projects durations

The analysis of the plan without resource limitations determines the daily needs for program resources and also the maximum daily requirements for machines and workers for the period of program execution. It is reasonable to determine the minimum value for the maximum amount of major machines and workers of the program (minimum possible values for the maximum daily requirements), while maintaining the minimum duration of the project. Such optimal solution should be called 'real optimal solution' for minimum program and projects durations. If it is important to consider only machines, the need is maximum up to [1, 3, 1, 5, 2 and 1] machine M_1 to M_6 per day. Introducing project priorities in the order of their names and asking for lower values of maximum daily requirement of machines, in the Resource Leveling process software defines the optimal maximum numbers of [1, 3, 1, 3, 1, 1] machine per day. Starting and completion projects dates are not changed (keeping the duration of the program), but some non-critical activities of Proj-3 and Proj-4 with lower priorities were shifted. In this way are changed expenses for corresponding months on the Proj-3 (□ 5.915€ for Jun '12, +5.871€ for Jul i +44€ for August) and Proj-4 (□ 21.674€ for Jul, □ 3.024€ for Aug and +2.699€ for Sep). This also changes the program costs from Jun to Sep: □ 5.915€, □ 15.803€, □ 2.981€ and +24.699€ By analogy, can be also made the optimization of important categories of workers but this is not presented here.

Table 1: The initial program and cost plan, illiquidity for 3 months

	Costs					Cumulat. Cost	Input of Money	Cumulat. of Input	Liquidity
	Proj-1	Proj-2	Proj-3	Proj-4	Program				
Start	2.4.12	7.5.12	4.6.12	2.7.12	2.4.12				
Finish	16.11.12	9.1.13	19.2.13	12.4.13	12.4.13				
Dur (day)	165	178	187	205	270				
Months									
Apr '12	55.017				55.017	55.017	250.000	250.000	194.983
May '12	218.927	20.381			239.308	294.325	250.000	500.000	205.675
Jun '12	208.042	59.659	20.467		288.169	582.494	250.000	750.000	167.506
Jul '12	2.236	339.285	36.060	20.636	398.217	980.711	250.000	1.000.000	19.289
Aug '12	4.827	63.781	170.110	36.097	274.815	1.255.526	250.000	1.250.000	-5.526
Sep '12	2.601	1.906	255.376	13.147	273.030	1.528.556	250.000	1.500.000	-28.556
Okt '12	2.742	4.859	2.052	329.086	338.740	1.867.296	250.000	1.750.000	-117.296
Nov '12	416	2.415	4.556	83.768	91.154	1.958.450	250.000	2.000.000	41.550
Dec '12		2.295	2.951	2.121	7.367	1.965.817		2.000.000	34.183
Jan '13		228	2.784	4.911	7.922	1.973.739		2.000.000	26.261
Feb '13			453	2.170	2.624	1.976.363		2.000.000	23.637
Mar '13				2.533	2.533	1.978.896		2.000.000	21.104
Apr '13				341	341	1.979.237		2.000.000	20.763

If you reduce the number of machines M_2 from 3 to 2 and M_4 from 3 to 2, the leveling of all types of machines determines their minimum values for the maximum daily requirements [1, 2, 1, 2, 1 and 1] of the next time periods (Table 1): 165 days for Proj-1, 178 days for Proj-2, 187 days for Proj-3, 205 days for Proj-4 and 270 days for the program. It is noticeable that the Proj-1, with the highest priority, retains the minimum duration, while other projects extend their durations (decreasing project priorities increase their durations). It can be followed how significant differences occurred in the monthly program and projects costs comparing to the previous solution.

Consideration of program liquidity

Let assume that is planned the program cash inflow of €250,000 each month in the period from Apr '12 to Nov '12 (Table 1) and it is necessary to ensure the liquidity in every month.

Stage 1. Analysis of the previous program plan (Table 1) determines the insolvency or negative cash balance in three consecutive months: – €5,526 for Aug '12, – €28,556 for May and – €117,296 for Oct.

Stage 2. Avoiding the insolvency or achieving the liquidity can be accomplished by moving the work from the month where exists illiquidity to the following months. Two following approaches can be combined:

- (1) From theoretical aspects it is necessary to find out whether non-critical activities were performed in the illiquid months and move such activities (define binding terms for their earliest beginnings), taking into account the available resources (resource leveling carried out using the software). In this way, it is tried not to prolong the projects and program durations and to achieve the lower their extensions.
- (2) In practice, can be applied a simpler procedure, suitable for analysts with less experience in using the software: testing the plan variations by moving the beginnings of projects with lower priorities and doing the resource leveling.

Using the procedure (2) and moving the beginning of the Proj-4 for one month forward to the date 6-8-12, specifies the plan which could not be predicted in advance. In fact, the program and all projects maintain earlier durations. In this way is achieved: the liquidity of €30,741 for August '12, insolvencies of – € 26,886 in Sep and –€117,068 for Oct and liquidity in other months.

Table 2: Plan for the achieving liquidity in each month

	Costs					Cumulat. Cost	Input of Money	Cumulat. of Input	Liquidity
	Proj-1	Proj-2	Proj-3	Proj-4	Program				
Start	2.4.12	7.5.12	4.6.12	3.9.12	2.4.12				
Finish	16.11.12	9.1.13	19.2.13	19.4.13	19.4.13				
Dur (day)	165	178	187	165	275				
Months									
Apr '12	55.017				55.017	55.017	250.000	250.000	194.983
May '12	218.927	20.381			239.308	294.325	250.000	500.000	205.675
Jun '12	208.042	59.659	20.467		288.168	582.493	250.000	750.000	167.507
Jul '12	2.236	339.285	36.060		377.581	960.074	250.000	1.000.000	39.926
Aug '12	4.827	63.781	170.110		238.718	1.198.792	250.000	1.250.000	51.208
Sep '12	2.601	1.906	255.376	32.264	292.147	1.490.939	250.000	1.500.000	9.061
Oct '12	2.742	4.859	2.052	241.493	251.146	1.742.085	250.000	1.750.000	7.915
Nov '12	416	2.415	4.556	208.231	215.618	1.957.703	250.000	2.000.000	42.297
Dec '12		2.295	2.951	2.079	7.325	1.965.028		2.000.000	34.972
Jan '13		228	2.784	4.647	7.659	1.972.687		2.000.000	27.313
Feb '13			453	2.859	3.312	1.975.999		2.000.000	24.001
Mar '13				2.709	2.709	1.978.708		2.000.000	21.292
Apr '13				528	528	1.979.236		2.000.000	20.764

Stage 3. By placing the beginning of the Proj-4 on 27-8-12, it is reduced the duration of Proj-1 from 205 days to its minimum duration of 165 days. Retained are the previous durations of all other projects and programs. It results in illiquidity of - €6,110 in Sep '12 and liquidity in other months.

Stage 4. The beginning of Proj-4 on 3-9-12 determines the liquidity in all months (Table 2). Retained are the durations for all projects, but the later start of Proj-4 extends the duration of the program from 270 days to 275 days. Considering that the program liquidity is achieved, this plan may be regarded as acceptable.

5. CONCLUSION

The paper stresses the specificities of managing the program with several projects in the residential construction industry comparing to the general case of the program with multiple projects: (1) selecting the program from the set of potential projects, (2) planning of the approved projects based on available resources (scheduling the projects in time), (3) supervision of projects and re-planning if disturbances occur or anticipate, and (4) terminating certain projects and repeating the process with a selection of new projects if unfinished projects exist.

Described are two different approaches for the selection of potential projects for the program with available budget (using Expert Choice software and the PROBE systems for decision making support while selecting the portfolio of projects). Research was particularly focused on the next phase: the formation of the budget with adequate time dynamics and determining the project plan which ensures the liquidity in the terms of payments of costs. A corresponding general mathematical model is defined to minimize the durations of the program and individual projects which was successfully tested using the MS Project software for planning of the construction of four residential buildings. For the given dynamic of budget formation for the program funding, it is pointed out on two approaches and their combination for the achievement of liquidity at the end of each month when determining the cost of work performed to be paid: (1) moving non-critical project activities or to achieve the lowest project extensions, and (2) moving the beginnings of the projects. The goal is not to prolong the lives of the projects (consequently, the program duration) and to achieve as small as possible extensions. Presented is another approach to the discussed limitations of the available number of working machines, which can be extended to the limitations for significant or all categories of workers.

Further research is necessary to dedicate to the possible forms of funding programs and associated cash flow dynamics, especially for the use of bank loans.

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CONTRIBUTION TO CONVENTION INDUSTRY DEVELOPMENT USING A MULTIPROJECT MANAGEMENT CONCEPT

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Abstract: *The purpose of the paper is to point out positive effects of applying a multiproject management concept in an event management organization on its development and the growth of the entire convention industry. The idea is to illustrate the above-mentioned effects first by defining the basic aspects of multiproject management and event management, and then by analyzing the way in which the multiproject management concept could be implemented in event management, through both theory and case study. Methods used in the paper include induction and deduction, comparison, analysis and synthesis, and the case study analysis. Having in mind that the case study presented in the paper uses the example of an event management agency from Belgrade, Serbia, underdeveloped convention industry in Serbia and regional countries will be addressed to a lesser extent.*

Keywords: *convention industry, event management, multiproject management, selection, resource allocation*

1. INTRODUCTION

During the crisis period in ex SFRY, from 1992 to 1995, the economic capacity of the region was significantly affected and one of the results of a bad economic situation was the absence of modern management methods and techniques in doing business, including project management. Means of doing business in Serbia and the region began to prosper and develop in the mid-nineties with creation of quality higher education management programs, and even more after the revolution in October 2000, with the arrival of numerous foreign investors and various EU supporting funds that demanded the use of modern methods in managing projects in order for funds to be granted. (Cicmil, Djordjevic, & Zivanovic, 2009)

Event Management, in its current form, is a relatively young business. The need for systematic approach in organizing an event, including thorough planning and detailed financial procedures exists because any serious event demands substantial resources, managed properly and also as one of the main objectives of the business has become earning profit. Any profit-oriented business demands a formal framework and once established numerous event managing organizations were formed leading to significant reductions of time needed for organizing an event and a rapid growth of convention industry by creating many new jobs. However, nowadays, especially referring to Southeastern Europe, the outdated approach in event management is obvious and inconsistent with rapid development of the convention industry and a growing need for events. Not enough time is devoted to planning. Realistic schedule and resource allocation do not exist, nor the reliable budgets to guide the organization of event in an efficient manner. Also, as event management agencies are relatively small businesses with very limited resources often managing a great number of major or minor events during one calendar year, many activities logically overlap and require more resources than the company is able to provide, as well as advanced managerial methods. The need for improvements exists and a possible answer lies in the application of the multiproject management concept. By implementing the concept of project-oriented enterprise as a frame for management system, supported by an adequate organization, team work and project culture, it is possible to significantly improve business results, provided that modern project management tools and techniques are used. (Jovanovic, Mihic, & Petrovic, 2007)

2. MULTIPROJECT MANAGEMENT

Multiproject management concept (MMC) is increasingly used as an integral part of many organizations with tendency of being widely accepted managerial form of each business entity. Multiproject management represents coordinated management of a project portfolio in order to achieve certain set of business objectives. (Reiss, 2004) Its intention is to improve the efficiency of resource utilization in an organization, assuming resources to be limited. Multiproject management includes both analyses of existing resources within organization as their distribution among projects that the organization is managing. (Görög, 2011) By using available resources efficiently an organization creates favorable

environment for achieving its strategic goals as well as its short-term, operational ones. Projects managed may be differently dependent or totally independent.

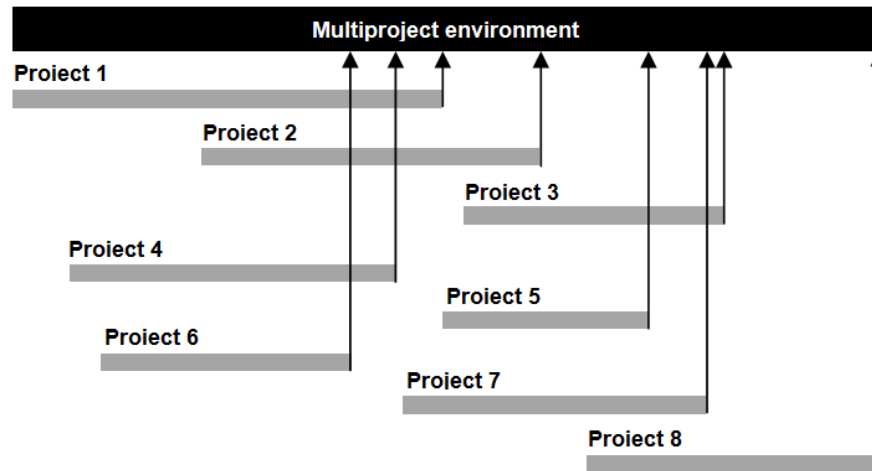


Figure 1: Graphical illustration of projects within multiproject environment

Source: Pennypacker JS, Dye LD. *Managing Multiple Projects - Planning, Scheduling, and Allocating Resources for Competitive Advantage*. Marcel Dekker Inc., USA; 2002.

The purpose of applying concepts of project or MM in an organization is to create a competitive business strategy that will position the organization on global market through more efficient manner of doing business. (Srivannaboon, 2006) Efficient multiproject management, beside good knowledge of the relative value of projects, risks associated with each of them, resources current state and statuses and the availability for new projects, involves making right and strong decisions of what projects will be managed, when and how, if they are taken into consideration, based on the understanding of each project's potential and value it can bring to the organization. Two main aspects of multiproject management are **selection and prioritization of projects** and **analysis and allocation of available resources**, aimed at creating efficient portfolio schedule, as well as reliable financial plans.

2.1. Selection and prioritization of projects

The selection process includes assessment of all possible projects and selection of most suitable, in accordance with certain critical parameters, of greatest importance to the organization. Some of the most fundamental are: (Jung & Lim, 2007)

- Compliance of projects with objectives and mission of the organization that manages the portfolio
- The obvious contribution to the strategic goals of the organization
- Project duration – the goal is to create an ideal mix of short-term and long-term projects
- Impact on organization's financial statements – financial aspects of a project
- Project impact on available resources – both quantitative and qualitative need for resources

The selection process also includes the assessment of the optimal number of projects to manage considering the available resources, as well as the creation of high-quality portfolio. When the optimal number of projects is selected, they are prioritized.

For calculating priorities it is necessary to establish adequate calculation model, dependable both on the basic characteristics of the managing company and of all projects. The general calculation model consists of four basic components: (Rod & Levin, 2006)

1. Criteria to be used – objective so that projects cannot be shifted in order to ensure favorites
2. Range of values for each criterion
3. Measure unit and a description for each value in the range
4. The importance or weight of the criterion – weight of the criterion is a measure of value of certain criterion in comparison with others, therefore it is important not only to assign the value to each project based on certain criterion but also to compare the weight of criterion with weights of others; a project given the highest value for the criterion of greatest importance is considered to be of top priority

AHP is a mathematical process designed to assist the user in defining priorities as well as in decision-making processes using both qualitative and quantitative approach. (Rod & Levin, 2006) AHP makes decision making easier by taking the prioritizing process to a comparative one-on-one system of different parameters reducing all given results into one. The reasons why AHP use is logical when managing multiple projects is because it does not force a consensus, although the same may occur, and also because all criteria is compared with one another, forcing objectivity in decision making. (Strang, 2011) Over time, as technology advanced, various software tools using AHP were created such as Expert Choice. (Rod & Levin, 2006)

2.2. Project scheduling and resource allocation

When allocating resources in multiproject environment, organizations must take into account that resources must be distributed efficiently among projects with different priorities, resource requirements and accompanying risks. The system must be dynamic enough so that there is a possibility of introducing new projects and re-allocating resources if necessary. There are five steps for creating an effective plan for portfolio management: (Pennypacker & Dye, 2002)

- Preparation of time-fixed projects schedule - due to little or no flexibility these projects require to be given priority as delays are not allowed
- Identification and distribution of necessary resources for each time-fixed project and its activities
- Determine resources left available for other projects - This can be determined by constructing a resource time availability network, showing how much free time each of the remaining resources has and the total amount of free time.
- Allocation of least available resources - to optimize allocation of resources, resources are ranged and allocated from least available to most available
- Determination of final schedule

Creation of portfolio schedule can also be considered a definition or analysis of a critical path. There are three main objectives of creating an efficient schedule all assuming that the cost of completing an activity is based on time required for execution and resources engaged. (Vanhoucke, Vereecke, & Gemmel, 2005)

1. Minimizing cost of carrying out projects with respect to given deadlines
2. Conduct activities for the shortest possible time without exceeding given budget
3. Complete all projects within portfolio as soon as possible, within a given budget, making the optimal use of available resources

3. EVENT MANAGEMENT (EM)

Possibly the most accepted definition describes event management as complex social undertake characterized by sophisticated planning, fixed implementation date and numerous stakeholders. (Van der Wagen, 2007). EM involves assessment, definition, acquisition, allocation, management, control and analysis of time, cost and resources in order to achieve certain goals using tools for planning, organizing, implementing, monitoring and evaluating event design, activities and production. (Raj & Musgrave, 2009) Simply put, event management presents planning and producing an event no matter of what type. (Allen, 2009)

Participants in EM are all those with an interest in it, not necessarily of financial nature and the main are: **organizers** (institutions creating the project and providing financial support to it, with or without sponsorship assistance), **associations** (professional formations within a particular sector providing to its members networking, communication and support) **committees** (grouped representatives from institution organizing the event and those supporting it), **suppliers and contractors** (provide services and competencies that organization managing event doesn't have because of its limited size) and the **organization managing event**. (Bowdin, Allen, O'Toole, Harris, & McDonnell, 2006)

Organizations managing event present organized groups of professionals whose expertise is to plan and implement an event for ceratain fee or income percentage, usually of small size. (Van der Wagen, 2007) PCO (Professional Congress Organizer) Agency provides complete organization service for conferences, seminars and other events, mostly of commercial nature, for its clients, event organizers. (Kongresni turizam, 2007) DMC (Destination Management Company) agency is concerned with incentives and related events. (Kongresni turizam, 2007)

4. APPLICATION OF MULTIRPROJECT MANAGEMENT CONCEPT (MMC) IN EM

Each planned event is actually a project and thus areas managed are the same - scope, content, time, human resources, cost, risk, communication and demand. (Toole & Mikolaitis, 2002) Each area is managed dependable on the nature and size of the event and whether the same was already organized or not. The paper addresses management of time and resources. EM organization can also manage one larger project or program, such as the Olympics, which, due to its large volume, can be divided into a number of almost separate projects. In both mentioned cases there's room for applying MMC.

What is specific for EM is the overlapping of project phases, which leaves agency with phases of resources being more or less occupied. Phases in which agency organizing the event occupies fewer resources are ideal for working on getting new jobs.

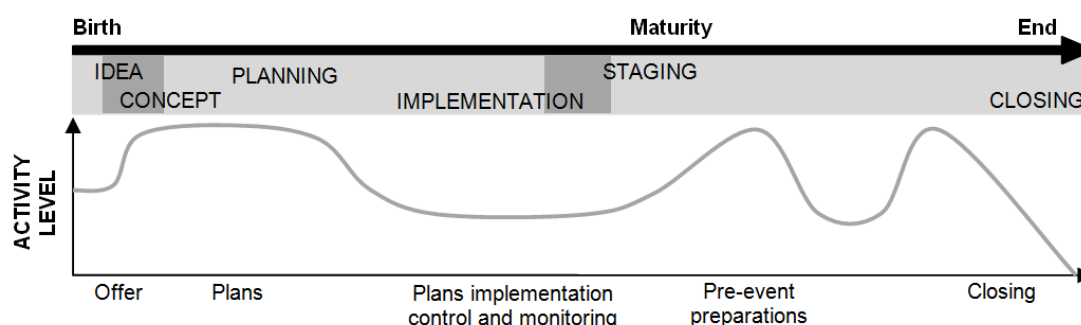


Figure 2: Event Life Cycle

Source: Toole, W. O., & Mikolaitis, P. (2002). *Corporate Event Project Management* (p. 305). John Wiley & Sons, Inc., New York, USA.

On figure 2 overlapping phases and the amount of activity at all times are shown. As planning for EM is the most important phase, activity is lowest in phases of controlling and monitoring of plans implementation. The implementation phase takes a significant amount of time though and provides an ideal opportunity for the agency to involve in getting a new job and maintain its business liquid enabling further development and growth.

The use of multiproject management methods and techniques in organizing an event will be shown through relevant theory and a case study. A case study presents activities of the agency from Belgrade, BBN Congress Management, between September 2010 and December 2011, when five events were simultaneously organized.

BBN Congress Management Ltd. founded in 1989 in Belgrade is among first private agencies registered for the professional conference organization. Currently the agency hires four permanent staff members and has many regular and reliable external associates.

BBNCM 2010/2011Portfolio: (BBN Congress Management, 2011)

- **ICED** is an international conference held biannually in Serbia for many years. Investments in the organization are great, but the importance of the conference and the long-standing tradition attracting over 800 participants and 50 exhibitors, imply a very high income, great profits and significant opportunity to gain contacts and potential clients. Even though resource requirements, costs and time needed aren't low this event for BBN is always a top priority.
- **EE&RES** Fair Study Tour - BBN as a unique partner for Serbia is contracted to organize a group from Serbia to visit the event that annually brings together over 300 exhibitors. Investments are low and considering that over 50 participants from Serbia regularly visits the fair for the fee of over 50 Euros per person revenues are quite significant, which places EE and RES among top priorities. Both time and resource requirements are extremely low.
- **RESEP** conference is a joint project of BBN Congress Management and organizers, so the company is particularly committed in managing this event. The event is financially supported by the Serbian government and government agencies, so with relatively low investments event earns high income.

- **CEM** is a small but significant annual conference that brings together approximately 100 experts from around the world. Revenues are not significant, although there is profit, but investments aren't high and the event provides important international contacts of high profile experts in the field of energy.
- **THERM** Company 10th Anniversary – BBN CM managed all pre-celebration, on-site and post-celebration activities. BBN's fee is fixed and defined, there's no income, since it is a celebration, the costs are very high and all these features place the event at the bottom of the priority list, and the last in line for allocating resources.

Modern businesses being opened, complex and changeable provoke instability and create need for organizational forms flexible enough to adapt to a multiproject environment and enough solid to unite the basic managerial processes. (Jovanovic et al., 2007) The most suitable organizational form for agencies engaged in multiproject management is a matrix structure.

For each event within BBN CM, one resource is appointed as manager while also performing regular responsibilities in its field of specialization. All other resources are also participating in the organization of the same event, in their fields of specialization. Thus, each person within agency has a dual role and is engaged in the preparation and execution of all events organized by the company.

4.1. Selection and prioritization of events

Every agency organizing events usually focuses on one particular group of events the reason being that when selecting agency takes into account its previous experiences, knowledge, contacts, available resources, regular staff and their characteristics, existing cooperation with suppliers etc. (Conway, 2009) For a success of an event it is necessary that all these components are consistent with the event type. When selecting an event not only mentioned internal factors are important but also many external ones such are: (Conway, 2009)

- The end goal of the event
- Characteristics of the organizers - organizational structure and its strategic goals, staff qualifications, available resources, business history
- The circumstances in which the event is organized
- Potential participants

BBN gives priority to corporate events, in the field of energy, international or regional and profit-oriented.

Internal factors are used for ranking selected events and developing schedule of activities. Since events typically have a specified time in which they should be held one of the criteria for setting priorities is certainly urgency. Other criteria are closely related to criteria used when selecting projects. For the event management agency it is important that the event is profitable, that the agency has necessary resources for its completion, necessary liquidity to cover the costs of implementation before income is realized, which normally begins after relatively higher percentage of costs has already occurred, and finally every event is an opportunity for the agency to get new contacts and clients. Numerous other criteria are possible. The Agency itself defines the criteria important to her and that will bring to it events for achievement of business objectives, as well as the methodology to be used.

BBN example given within paper uses the AHP implemented within Expert Choice. Top criteria BBN uses are time required for implementation, expected revenues and costs and resource requirements.

When prioritizing with Expert Choice, first given criteria is ranked, by scoring them with a value from 0 to 1, so that the sum of all assigned values is 1. Then each event is assigned certain value in relation to each criterion, following the above mention scoring system. The synthesis of all calculated results is made and events are given their priority value and thus a rank. The next step is to produce a solid schedule following given priorities.

Since BBN is a small agency with very limited resources and capacity to organize only several events in one year, revenues of the event are regarded as the most important criterion while costs are second as they determine whether profits will be possible and also if agency will be capable of bearing the weight of the event, determined by the altitude of its costs. Events with revenues expected to be high are given the highest score and those with cost expected to be high the lowest. Costs are good if low, but not at the

expense of desired quality and disrespect of client's requests. High revenues mean higher earnings for BBN as it often operates on percentage of total revenues. Resources, as agency regularly hires only four people, are third, but not the most important, as there is a possibility of hiring additional resources, dependable on revenues and other costs. Finally, time, certainly very important criterion, as it shows for how long available resources will be occupied. It is preferable that event resource requirements are lower so as the time needed for event to be realized. Lower resource requirements and reduced period of time needed reduce costs.



Figure 1: BBN Priority Criteria Ranked

In order to give value to events for all criteria used, BBNCM relies on historical data, except for THERM celebration, where all necessary data are submitted by the company. Historical data used are the number of participants in previous years, realized costs and revenues, number and profiles of people involved in the organization before. Data used for the study tour are based on pre-organized tours and by the event organizer.

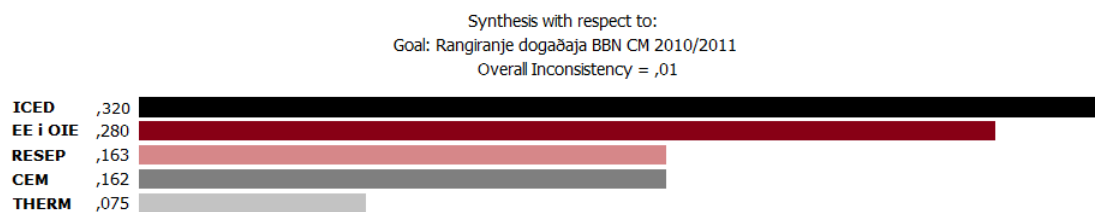


Figure 2: BBNCM Portfolio 2010/2011 Events Ranked

For reasons explained before, ICED is, as expected, first at the priority list, study tour the second, RESEP and CEM almost the same and THERM occupying the last place.

4.2. Event scheduling and resource allocation

Earnings for an event are directly related to the ability of the company to manage time effectively. (Goldblatt, 2005) Events are time-limited projects. For most events, due date is predefined and cannot be changed during planning and implementation processes, so all the activities preceding the event, must be completed on time. Agencies that organize many events, with numerous overlapping phases, must manage time efficiently and distribute resources accordingly. Parkinson's rule says that a task can be completed only within time planned for its implementation. (Goldblatt, 2005) If this is not the case, chances are that they generally will not be realized at all.

In order to understand scheduling multiple events first it is necessary to understand how to schedule one. There are five steps, shown on the figure given below. (Tum, Norton, & Wright, 2006)

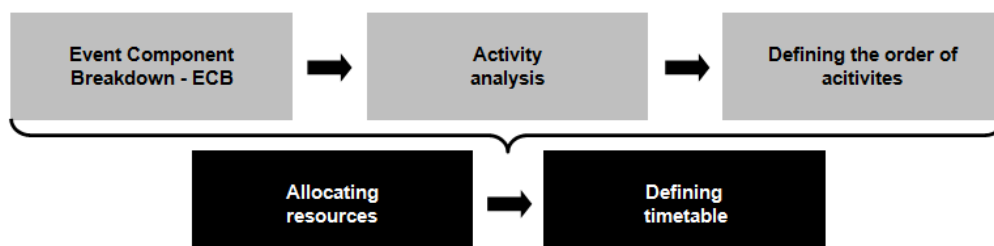


Figure 3: Scheduling an Event

Source: Tum, J., Norton, P., & Wright, J. N. (2006). *Management of Event Operations*. Management (p. 304). Elsevier Ltd., Oxford, UK.

ECB is similar to PBS (Product Breakdown Structure). The event is divided into units which can be managed independently, each directly related to defined event objectives. ECB guides management and also gives stakeholders some insight into the entire process. (Tum et al., 2006)

Activity Analysis - a more detailed stratification of the event, intended for assistance in defining resource requirements – type and amount of resources needed, is there a need for additional resources, needed suppliers, the role of the organizer, etc. This phase is also assisting in drafting budget.

Determining the order of activities - This step can be viewed as a critical path analysis. (Tum et al., 2006) Given the fixed date of an event, bottom-up approach is applied by examining interdependences among activities.

Time schedule and resource allocation – When all activities needed to be done for successful realization of events are defined, determined resources are allocated and based on resource availability, time for performing each activity is defined, as well as for the entire project. Given the budget and resource limitations it is important for resource utilization to be optimized and efficient.

When it comes to multiple events environment the procedure for resource allocation and scheduling is the same except that the agency must take into account the needs of other events managed simultaneously. Resources are distributed among events based on their pre-defined priorities, as with project management. The broader the portfolio of events is and more diversified those events are more complex is the need for resources. Even though, the most important resources in event management are people. Optimized use of resources when speaking of events assumes no idle time, minimum amount of time spent in meetings with clients and time spent that way used efficiently. Event management is also specific for its wide use of insufficiently experienced resources such are volunteers and temporary staff. It is necessary that less qualified resources are allocated intelligently, on less demanding jobs and under supervision.

Once the activities are entered in MS Project BBNCM calendar is defined with all vacations and extra working hours (during conferences). After defining the calendar, dependency connections are defined between activities (start-start, finish-finish, etc) and then to each activity appropriate resources are assigned. First responsibilities are assigned to employees of the Agency. Problem of preoccupied resources is sorted out with thorough examination of exact hours needed to do a certain job. Even though one day is assigned for certain task, it does not mean that the resource will be engaged for the total of 8 hours. Certain activities are spread on several days in order for few less occupying but relatively urgent jobs to be done. For several urgent jobs requiring no special skills, for example packing promotional leaflets in envelopes, part-time resources are hired in phases of great occupancy of regular resources.

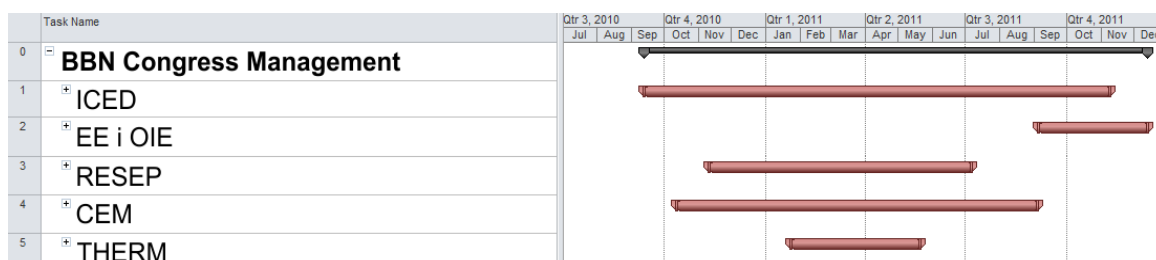


Figure 6: BBNCM 2010/2011 Portfolio Gantt chart

Positive effects of multiproject management concept application in BBNCM: The whole portfolio takes 321 days. For the organization of ICED conference 295 days are needed. Two other conferences being smaller in scope require less time, CEM 222 days and the RESEP 156. EE&RES takes only 76 days and THERM 85. Although there are only few critical activities, others are of lower flexibility given that one follows another and all together lead to realization of a conference that cannot be rescheduled. The entire portfolio would normally take around 800 days, superficially speaking, so by applying the MMC the rough estimate of the amount of time needed is reduced for around 500 days. Normally the agency would not be able to accept this amount of job, so by applying MMC, it was able to accept more events than it

would normally be possible. Simultaneous organization would be possible by hiring many additional resources, or with existing resources working extra hours, so by detailed planning the expense of both situations is avoided. As all activities were performed in due dates, with high quality service, realized profits, except in the case of THERM, expectations of all clients and participants were met, even exceeded.

4.3. Managing risk in EM

An important part of multiproject environment is to pay attention to possible risks that may create problems with defined event plans. Risks aren't 100% avoidable but by applying principles of multiproject management – predict risk, possibility of occurrence and possible answers - the possibility of occurring can be reduced at a minimum.

As it can be seen from previous paragraph, the greater the event the earlier planning processes begin. As ICED is a conference of 800 attendees, it is necessary for the venue to be extremely spacious, and as in Serbia there aren't many possibilities for events of these magnitude, it is important that an adequate venue is pre-reserved even before closing the contract with the organizer. BBN usually makes a pre-reservation of venue a year and a half before the event and couple of months before closing contract with the organizer. Also, another important aspect for every event is never being 100% certain of the number of participants that will register and sponsors that will be drawn. In order to avoid high expenses with insufficient revenues to cover them, numerous steps are taken. It is important to recognize all possible reasons for this occurrence and avoid them, and if impossible, reduce expenses where possible – cheaper attendee's bags, conference proceedings on a CD, not printed, cheaper gala dinner menu, less social activities included in registration fee, require foreign participants to apply in advance for which lectures will they attend in order to limit simultaneous interpretation costs, etc.

4.4. Implementation and reporting (event closing)

Implementation of the events referred to as event coordination represents integrated realization of various activities in order to meet all operational and logistical requirements of events based on a defined set of plans made previously. Operational requirements are those elements that must be carried out before the event and logistical requirements represent activities to be carried out on-site. After each significant event different reports are made of informational and promotional character intended for organizers, present and future participants, sponsors and others. Closing and financial reports are intended for government authorities and organizers of the conference. There are reports produced during implementation for internal use, and event organizers.

5. CONCLUSION

Convention industry is a modern life product and includes a number of different institutions joining efforts in improving event organization and making realization of event objectives possible, such are hotels, tourist organizations, venues, exhibition halls, service providers (catering, technicians, printing), etc. In the past decade the amount of business travels increased 53% compared to previous years and there's a belief that until 2020 the share of international conference tourism will rise up to 45% in total tourism income. (SEE Business Travel & Meetings, 2010)

Numerous PCO associations exist worldwide. IAPCO - The International Association of Professional Congress Organisers is the best known and of widest recognition, accepted as a leading authority and universal standard of quality. (IAPCO, 2009) The fact is that within IAPCO no members from Serbia exist, except Sava Center, while also the number of members from other countries of the region is very limited. (IAPCO, 2009) The reason is that only few agencies possess the capacity to manage organization of major international events, whose organization is one of the preconditions for joining IAPCO.

Given the good conditions of the region to become a European destination for conference tourism such as location, value for money, growing infrastructure, unexplored beauties, in addition to the large profits convention industry can make and improved international reputation, it is useful to invest in development of all aspects of this industry, including among others, event management agencies. (SEE Business Travel & Meetings, 2010)

Organizations with systematic and serious approach to event management positively affect development of the entire meetings industry, although not being the only precondition. When efficient in their operations it enables them to create room for more events, even though not yet being sufficiently developed and employing a limited number of personnel. By managing more events, the organization allows itself to grow and develop and it becomes more professional and sophisticated.

Based on data provided by ICCA (International Congress and Convention Association), in recent years, Serbia and Belgrade have made a remarkable leap in the list of countries ranked by the number of meetings organized in country by international associations and organizations reaching 43 place in 2010, among 95 countries, with 46 international events. (ICCA, 2012) From 2001-2003 Serbia hadn't even been qualified for entering the list, due to below 5 international events organized.

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KEY DIMENSIONS IN PROJECT PORTFOLIO MANAGEMENT USING A WEB-BASED APPROACH*

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Abstract: *In this paper, we discuss the implementation of an organized framework for selecting projects using a web-based approach. Project portfolio selection is a crucial decision in many organizations, which must make informed decisions on investment, where appropriate distribution of investment is complex due to varying levels of risk, resource requirements, and interaction among proposed projects. A “project portfolio” is usually defined as a centralized collection of projects managed jointly to enhance advantages to the organization or to minimize risk. From a technical point of view, within Project Server 2010, a portfolio of projects should be defined as a set of projects that share the same cost or resource constraints. This paper aims to present a model for evaluating the effectiveness of the project portfolio, the processes within the project portfolio, and the Project Web Access as a tool for implementing project portfolio management using a web-based approach. Furthermore, this paper presents results obtained by experts in the field, as well as future directions for the implementation of project portfolio management using a web-based approach.*

Keywords: *Project portfolio, Project Web Access, framework, selection, web-based approach.*

1. INTRODUCTION

This paper briefly sets out the challenges and problems facing the current project management practices, using web based approach for project portfolio planning, implementation and controlling. Projects today are far more complex than ever before. They involve larger capital investments, embraces several disciplines, widely dispersed project participants, a lot of stakeholders, tighter schedules, specific quality standards, etc. These factors coupled with high-speed developments in Information and Communication Technology have influenced project management practices to take a new turn taking advantage of newly developed management tools and new technology. Project portfolio management (PPM) is a set of processes used to support a business in conducting the mix of projects, which best fit the organisation's various needs. This set of processes includes the selection of projects an organisation conducts, maintaining the selected projects in portfolios, and periodically reviewing the mix of projects, to check whether the selection still supports the main business goals. Some of the drivers that create new trends in project management are: 1. Globalisation of the marketplace; many industries are facing a lot of pressure due to this factor. Tariff barriers are virtually falling and labour has become more mobile. 2. The economical forces; this factor may significantly affect the client organisation and subsequently can impact the initial objectives of their projects. 3. Increases in project complexity; project complexity has increased due to extent of scope and fragmented parties around the world having to communicate with one another for efficient project execution. The complexity of the projects is reflected by the large number of specialists who contribute to the decision-making process. 4. The need to achieve faster results with the given resources; this factor places severe time pressures on the entire project team. 5. Rapid changes to project scope to expand benefits; some scope changes take place very rapidly before even realising the benefits of the changes 6. New procurement practices; the emergence of new procurement practices changes the way the team members are interrelated. 7. Client sophistication; this has become a major driver for productivity improvements in construction.

2. RELATED WORK

The idea of a balanced portfolio is based on modern portfolio theory by Markowitz (1952). This theory has been adapted by strategic management literature in the 1970s, where different approaches were introduced by several management consultancies. Applied to project management the desired

* The paper is a result of research within the framework of Project No.179081, named: “Researching contemporary tendencies of strategic management using specialized management disciplines in function of competitiveness of Serbian economy”, which is supported by the Ministry of Education and Science of the Republic of Serbia

combination of projects is a balanced portfolio that enables a firm to achieve its objectives without being exposed to unreasonable risk. According to project management literature, a portfolio has to be balanced along a range of dimensions to provide the best value to the organization. (Meskendahl, 2010)

Linton described how Lucent Technologies have used data envelopment analysis (DEA) to rank the relative efficiency or attractiveness of their large portfolio of R&D projects based upon a comparison of established, company-standard sets of input and output measures common to all projects. He specifies measures of: product life cycle, intellectual property lifecycle, and required investment, while the corresponding output set consists of a three-figure estimate of the potential financial returns as measured by its net present value - pessimistic, most likely, and optimistic. Linton demonstrated that by evaluating Lucent's R&D projects using DEA, it becomes a relatively straightforward task to stratify portfolios of potential projects into three fundamental groupings: superior projects that can be readily accepted for implementation; inferior projects that should be immediately rejected from further consideration; and an intermediate project grouping needing additional management oversight and assessment before any final accept/reject decision. (Linton, Morabito, & Yeomans, 2007) Cooper prepared research with 35 leading firms in various industries and found the following key problems:

- The portfolio of funded projects does not reflect the business strategy. There are disconnects between spending breakdowns on projects and the strategic priorities of the business.
- The quality of R&D portfolio is poor. The success rates of funded projects are inadequate.
- The Go=Kill decision points are weak. Funded projects tend to take on a life of their own.
- There is a lack of R&D focus. Most firms confess to having too many projects for the limited resources available.
- Some firms admitted to having too many trivial projects, i.e. modifications, updates and extensions, but too few projects to yield major breakthroughs and competitive advantage. (Chien, 2002)

Beaujon suggests a mathematical formulation of an optimization model designed to select projects for inclusion in an R&D portfolio, subject to a wide variety of constraints (e.g., capital, headcount, strategic intent, etc). The model is similar to others that have previously appeared in the literature and is in the form of a mixed integer programming problem known as the knapsack problem. Beaujon suggests that the problem might best be formulated as a non-linear programming problem, but that there is a need for further research to determine an appropriate expression for the value of a partially funded project. In light of that gap in the current body of knowledge and for practical reasons, the linear programming (LP) relaxation of this model is preferred. (Beaujon, Mari, & McDonald, 2001)

In each budget cycle, the enterprise invests a certain percentage of the total R&D budget in each stage. Within each stage, the budget may be further invested into technical area programs. Second, the enterprise invests funding in specific R&D projects. This may occur at several different times during a budget cycle. Fundamental to the project selection problem is the ability to attach value to each project. To do this, one must be able to estimate its costs, its contribution to free cash flow after deployment, and the probability of its successful completion. Traditional approaches to R&D use discounted cash flow methods to compute a net present value (NPV) for a proposed project. A positive NPV means favorable consideration for funding. (Bodner & Rouse, 2007)

3. FRAMEWORK FOR PROJECT PORTFOLIO ANALYSIS

The following listing describes the goals which an optimization approach for the project selection problem should support: 1. Consider and limit the available resources/budget per timeframe; 2. Support "must-select" restrictions; 3. Take synergy effects into account; 4. Take logical relationships into account; 5. Maximize the overall strategic alignment value; 6. Support balancing of risk, project categories and return time; 7. Maximize potential portfolio return; 8. Provide possibility to define project starting timeframes. (Kremmel, Kubalík, & Biffl, 2011) Portfolio optimization is a process in project portfolio management that creates the best mix of projects, out of all potential candidates. Selection of projects, and optimization of projects can be conducted either manually or automatically. Manual approaches to select projects are for example the Analytic Hierarchy Process (AHP), Q-Sort, scoring models, and portfolio matrices. Commonly used manual approaches are based on some sort of direct comparison and ranking of the alternatives based on project data and individual preferences. We suggest eight steps for project portfolio selection using a web-based approach for selecting projects:

1. Data collection for the portfolio and the interpretation of these data
2. Prioritization of projects and programs
3. Determination of the optimal project mix that is consistent with the goals of the organization and coordination of the portfolio of projects, such coordinate projects to mix long and short term factors, the risk versus reward, research versus development, and so on.
4. Providing information and recommendations at all levels of the organization
5. Monitoring the implementation of projects and project portfolio performance analysis
6. Comparative analysis is performed for new opportunities compared to the existing portfolio of projects
7. The inclusion of new projects in the portfolio
8. The continued increase in knowledge base and evaluation of business benefits after the implementation of projects

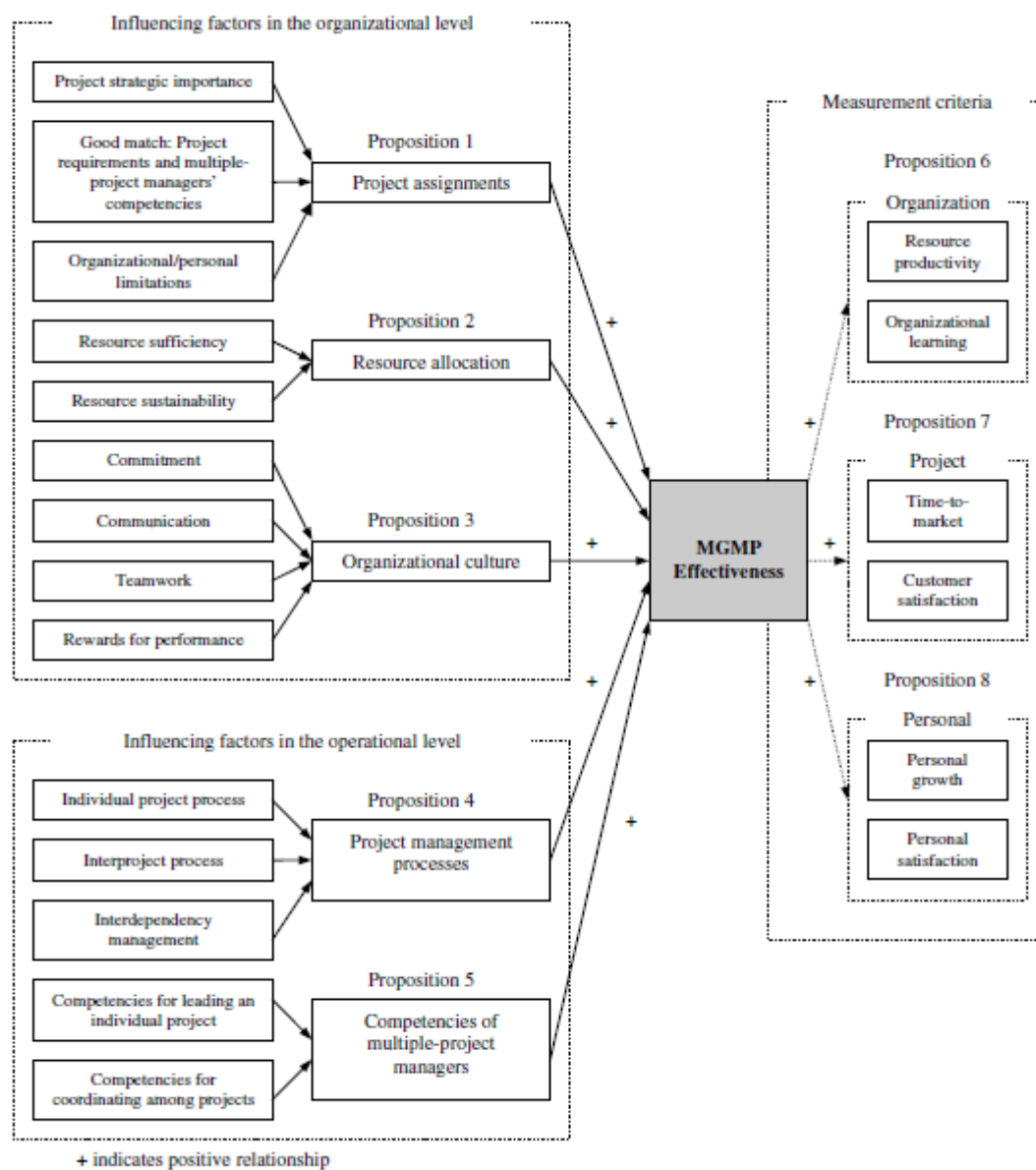


Figure 1: A framework underlying the effectiveness in the management of a group of multiple projects (Patanakul & Milosevic, 2009)

Proposition 1. The greater the consideration of project strategic importance, the good match between project requirements and competencies of multiple-project managers, and the organizational/personal limitations during project assignments, the greater the effectiveness in the management of a group of

multiple projects. Proposition 2. The greater the resource sufficiency and sustainability, the greater the effectiveness in the management of a group of multiple projects. Proposition 3. The greater the organizational culture cultivates commitment, communication, teamwork, and rewards for performance, the greater the effectiveness in the management of a group of multiple projects will be. Proposition 4. The greater the systematic management of individual project process, interproject process, and project interdependency, the greater the effectiveness in the management of a group of multiple projects. Proposition 5. The greater the multiple-project managers' ability to lead each individual project and to coordinate among projects, the greater the effectiveness in the management of a group of multiple projects. Proposition 6. The greater the effectiveness in the management of a group of multiple projects, the greater the resource productivity and organizational learning. Proposition 7. The greater the effectiveness in the management of a group of multiple projects, the greater the achievement of time-to-market and customer satisfaction. Proposition 8. The greater the effectiveness in the management of a group of multiple projects, the greater the personal growth and satisfaction. (Patanakul & Milosevic, 2009)

The success of a project portfolio management system is multidimensional consisting of the three dimensions of (1) process effectiveness, (2) portfolio success, and (3) portfolio-related corporate success, which will be affected by changes in the PPM system consecutively.

Table1: A multidimensional success framework for project portfolio management (Jonas, 2010)

Dimension
Effectiveness of the management process
Information quality
Allocation quality
Cooperation quality
Portfolio success
Average project success
Use of synergies
Strategic fit
Portfolio balance
Project portfolio-related corporate success
Business success
Preparing for the future

4. FROM IDENTIFICATION TO PROJECT SELECTION

In accordance with the product definition process, product portfolio identification involves a multistage process among customers, marketing folks, and designers. Portfolio problems often involve a set of characteristics, for example, risk and return of financial portfolios, or different kinds of benefits to be achieved by project portfolios. Portfolio problems with a set of criteria are often approached using compensatory methods. For example, additive aggregation and multiplicative aggregation of the local ratio preferences of each alternative into an overall preference are frequently used in multi-criteria decision making models. However, there are several practical situations in which non-compensatory approaches based on outranking relations seem more appropriate. This is the case if the decision maker has a preference structure which by nature is non-compensatory, or is unable or unwilling to establish trade-offs required to specify the parameters for compensatory methods. Such situations have been reported in several applications. Comparisons of the use of outranking procedure with multiattribute utility theory have been done for example in contexts such as risk analysis of natural gas pipelines and the selection of outsourcing contracts. (Vetschera & Teixeira de Almeida, 2012)

The front-end of new product development has caught the attention of researchers and companies. Some of the reasons for this interest stem from its strong impact on the success of new product development and its ineffectiveness when compared to other parts of the new product development process. Also, the front-end creates a link between business goals and the new product development process which makes it an important connection to achieve successful innovations. The activities of the front-end of new product development precede product design, determining product opportunities in terms of strategic goals, market needs and technological solutions. These, in turn, lead to product concepts and to projects to deliver these concepts. (Oliveira & Henrique, 2010)

Modern portfolio theory is a theory of finance which attempts to maximize portfolio expected return for a given amount of portfolio risk, or equivalently minimize risk for a given level of expected return. Return is measured by the expected value or mean of the probability distribution of payoffs for the stock or asset being considered. Risk is measured by the variance or standard deviation associated with that payoff distribution. The very reasonable assumption that investors and decision makers prefer less risk to more risk, all other things held constant. Unlike the decision maker who may characterize risk as that portion of the uncertainty that has “downside”, the standard deviation measure does not differentiate between “downside” and “upside” uncertainty. In this context, portfolio analysis based on standard deviation (as described by Markowitz) considers extremely high and low returns equally undesirable. As a further benefit, integrating portfolio management and the preference analysis approach enables the firm to incorporate their financial risk tolerance into the portfolio analysis and portfolio selection process. This step is generally intuitive to the decision maker who has an abundance of knowledge about the individual characteristics of the assets in the portfolio—and what financial risks he faces. (Walls, 2004)

Because of various uncertain aspects and circumstances involved in resources, technology, environment and competition, the decision of selecting new product development project can be regarded as a fuzzy multi-criteria group decision problem. By using the fuzzy method, the management would be able to make adequate decision based on incomplete and imprecise information under various kinds of pressure. Traditional quantitative methods such as mathematical programming and economic models require information of the target market, financial prediction, resources availability and decision timing, which are all unreliable and imprecise; consequently, the decision made would be in great suspicion. The classical logic focuses on duality of yes or no, and most discrete events are solved using traditional means. Therefore, the value of outcome can only be classified as zero and one (binary programming). Obviously, when an event is with value of outcome between zero and one, the duality cannot be applied. Event of this kind is called continuous event and can be solved by fuzzy theory, which measures the relationship between element and set using membership function, and the result is the degree of membership. (Wei & Chang, 2011)

5. PROJECT WEB ACCESS AND PORTFOLIO SELECTION

Portfolio Analysis within Project Server is treated as a separate technical module, with its own data tables within the Project Server databases. Project Web Access is the interface (web page) to the user, providing information about projects and portfolios. Each analysis is created as a separate data entity within the Project Server database. There are a very large set of possible constraints, which can be invoked through constraint equations. A guarantee that each project, if selected, will not start twice during the planning horizon:

- Maximum expenditures will not exceed specified amounts in each of a set of time periods,
- Other resource demands, such as personnel or facility requirements, must not exceed the amount available in each time period,
- All of the projects selected must be completed within the planning horizon,
- Precursor projects must be completed before successor projects start,
- Certain projects are mandatory and must be scheduled,
- Only one of several mutually exclusive projects can be chosen. (Ghasemzadeh & Archer, 2000)

The same project may exist in multiple portfolio analyses simultaneously. This is important when reviewing some of the user questions that have already appeared in the newsgroups on the topic. For instance, one of the frequent questions observed has been “How do I report on the priority of each project within the analysis?” The priority will not appear in any of the project tables. Instead, the priority is flagged to each project on a scenario by scenario basis, and is stored in the analysis tables. One project may have multiple priorities, each one in a separate analysis. In Project Server 2010, the first step in preparing to analyze projects within the Portfolio Analysis module is to define and rank the specific business drivers that will be used to assess the strategic value of the Project and programs. Second step is to perform pairwise analysis on the driver set to identify relative priorities. In pairwise analysis, the drivers are not assigned objective values, but are instead compared with other drivers to develop a relative ranking. Thus, the drivers must be compared to each other to develop a prioritization matrix. Typically, an organization would implement a driver prioritization for each portfolio of projects defined.

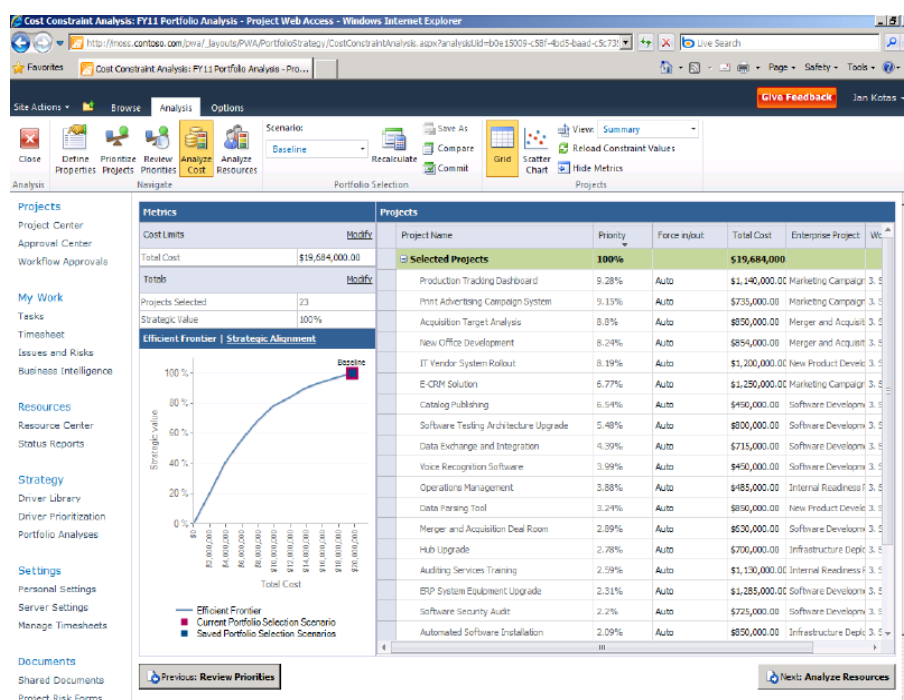


Figure 2: Project Web Access – Cost Constraint Analysis view (Enterprise Project Management Solution Guide, 2009)

6. IMPLICATIONS ON DECISION MAKING

The objective of this paper is to have a better understanding of the elements that contribute to the impact of a Project Web Access and project performances. The study results are discussed in terms of direct and indirect effects on PMIS project success. To ease the discussion, the elements are grouped in three dimensions: technical (PMIS quality and quality of information), managerial (PMIS use and impact on project manager), and organizational (PMIS impact on project success. First, it is worth noting that a reverse or “feedback” relationship is possible between individual impacts of a PMIS and its use. As project managers perceive the PMIS to be beneficial to them, it is likely that they will increase their use of the system. Second, other dimensions of project management, related to the organizational environment, evidently play a role in explaining project performance; thus the managers’ authority on project activities, their involvement in project design, and their accountability in meeting project objectives are potential success factors other than the PMIS. Third, another interesting aspect to consider is the possible reluctance of project managers to report “bad news” on a project, and the subsequent effect it could have on the accuracy of project reports and on the assessment of project success. Future studies of PMIS success could evaluate project success or performance from the client’s perspective, that is, evaluate if the impacts of the PMIS on project outcomes provide an adequate solution to the client’s problem, bring true advantages to the organization in terms of quality of product/services offered, greater output volume, quicker delivery, and better strategic positioning, and provide tangible benefits such as increased sales and revenues. (Raymond & Bergeron, 2008)

A summary of changes in the IT project context that change the demands made upon project managers, and a more extended description of changes in project management and the mindset they exemplify. The first change is the increased strategic and operational importance of IT projects. They are no longer confined to the back-office. Their success has a direct connection to the success of the business. Consequently, projects are more exposed to changes in the competitive environment. This contextual change implies that during a project’s life more change is likely to occur and will therefore require adaptation to the project plan. Second, speed of change arising from intensified competition requires businesses to respond faster. Time becomes more critical for projects that affect business outcomes, for example through expediting or delaying product launches. This implies compressed project schedules and more agile methods because of the demand for shorter lead times to delivery. Third, clients increasingly see IT as an investment from which they seek a return comparable to that for other investments. In seeking value for money, clients press project managers to achieve better ROI. These pressures

encourage a greater focus on value and a willingness to innovate in order to meet otherwise unachievable demands. Fourth, clients are seen to have matured in their understanding of IT projects. This maturity reveals itself in a greater understanding of the complex issues that confront IT projects and, therefore, a deep skepticism about the ability of IT departments and suppliers alone to deliver value. (Sauer & Horner Reich, 2009)

There is also growing acknowledgement of the critical role of the project manager and a willingness to treat the project manager as a key player. This is particularly apparent among IT services companies but is also apparent in organizations that retain in-house project management. (Sauer & Horner Reich, 2009) This encourages project managers to invest in their own future and that of their organization by experimenting with new project management practices and focusing on personal development. In short, expectations of projects are more ambitious, the job has got tougher, and the requirement for delivery is tighter in terms of business value as well as cost and schedule. Together these drivers require project managers to explore new ways of thinking. We refer to the combination of these principles and qualities as the new mindset:

- Focus on ultimate value.
- Deep personal identification with project goals.
- Investment in trust.
- Devolved, collective responsibility.
- Willingness to continually adapt.
- People development.
- Learning orientation.
- Creativity and innovation.
- Proactive view.

Our research model links PMIS information quality to decision making quality. Project and information overload are considered to influence PMIS information quality, while satisfaction with and use of PMIS, together with PMIS information quality, influence the quality of decision making. PMIS have become “comprehensive systems that support the entire life-cycle of projects, project programs, and project portfolios”. They can support project managers in their planning, organizing, control, reporting and decision making tasks, while evaluating and reporting at the same time. Studies have shown that there are several important factors that encourage project managers to use PMIS. First, whether or not project managers will use PMIS strongly depends on the quality of the information generated by the PMIS. Second, project managers are more eager to use an information system if it provides them with the appropriate level of detail in relation to their needs. Third, it is important that the information generated is free of complexity, easy to understand and easy for project managers to share with the project team's members. Fourth, PMIS facilitates continuous monitoring of progress. We point out some important features.

- Information overload has a negative impact on the PMIS information quality in a multi project environment.
- Greater PMIS information quality is associated with more adequate decision making in a multi project environment.
- Greater PMIS information quality is associated with greater satisfaction of the project manager with PMIS in a multi project environment.
- Greater satisfaction of the project manager with PMIS is associated with intensified use of PMIS information in a multi project environment.
- Intensified use of PMIS information has a positive impact on the quality of decision making in a multi project environment. (Caniëls & Bakens, 2012)

7. CONCLUSION

The selection of projects in which an organization invests its resources is an important strategic function. Inevitably, it involves the tradeoff of many competing constraints: basic research, customer driven research, budgetary considerations, workforce skills, etc. First of all, the details that differ between organizations include some common goals: the harmonization project mix between basic and applied research, encouraging creativity while trying to achieve the objectives, linking research and development with internal and end-users, measure out research and development in terms of importance the organization itself. Challenges in an attempt to achieve these objectives include: conducting research and

a long period of development functions, and specialized research and development skills that limit the transferability from one project to another. The proposed framework guides the construction of measuring scales of the various portfolio attributes and facilitates possibly required tradeoffs among the portfolio attributes. The contribution of this framework resides in creating the taxonomy that describes the different functional relationships between the portfolio attributes and the contributing project attributes. Nevertheless, the development of appropriate methodologies for constructing measuring scales of the various portfolio attributes, to certain extent, is problem-specific and indeed another research topic. It is useful to derive results from the implementation in more specific situations that should lead to the identification of the limitations of this framework and the circumstances in which this framework can be applied. Further research is also needed to develop various instruments to assess the required inputs for evaluating alternative portfolios. The instruments should be improved so as to maximize the reliability and validity. Dealing explicitly with the project interrelation will encourage communication and interaction of different project teams. A generic taxonomy of interrelationships is needed to deal with different types of project interrelations in portfolios. In addition, to fill the gap between theoretical development and empirical applications, portfolio selection approaches for selecting projects should also be able to serve a mechanism for asking questions, collecting information, sharing opinions, and facilitating interdepartmental communication. That is, an effective R&D management system to assist the decision makers in prioritizing projects and managing an optimal portfolio of R&D projects is needed. Until the proposed framework is tested for the practical utility, this research offers merely novel ways of thinking about R&D portfolio selection issues.

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DIFFERENT PERSPECTIVES OF PROJECT SUCESS*

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Abstract: *Project success has been widely discussed in the project management literature. Great number of research papers deal with dimensions of project success, measuring matrix and factors that influence project success. Traditionally, project success criteria are defined as time, cost and quality. It is difficult for various authors to reach a consensus about project success criteria, but many studies have expanded project success criteria into other aspects, including stakeholders satisfaction, organizational objectives, future potential to organization, etc. This paper offers a presentation of three different perspectives (mostly accepted in literature and applied in project practice) for measuring project success. The first of them is based on stakeholder analysis, concerning different perceptions of different interested parties of project success. The second one looks into project life-cycle phases and the “owners” of these phases in order to define key performance indicators and assess project results. The third one is a value-centred proposal for assessing project success with defined two key concepts: the net project execution cost (NPEC) and the net product operation value (NPOV), as well as a developed scheme for measuring project success based on them. The paper also provides a summarising review of main characteristics of those three concepts, with their advantages and disadvantages. Different perspectives of project success indicated that as there are different needs and different goals of any given project, success measurement should also be tailored for each project.*

Keywords: *project, project success, stakeholders, project life-cycle, value-centred approach.*

1. INTRODUCTION

Project success/failure is multifaceted and hard to measure. It is usually measured according to the previously set objectives and indicators or comparing the situation before the implementation of a project to the situation after the project. (Olsson et al., 2010). Assessment of the success and efficiency of the completed project is very important, particularly to develop “lessons learned” that can help in management of future projects. The focus of most studies of project success is on dimensions of project success and factors influencing project success.

A useful starting point for considering the project success and the importance of its measuring is making the distinction between project performance and project performance management. Performance represents project’s results, while project performance management represents a usage of performance measurement results to:

- achieve positive change in organizational climate and business processes,
- level resources,
- inform top management about the need for a change of strategic objectives and
- achieve effects of the systematically stored experience of the project (lessons learned) that is transmitted through the organization, creating new knowledge as a basis for continuous improvement.

Prior to the 1980s it was common to focus exclusively on project performance, which was defined narrowly as meeting cost and time and quality objectives. Researches during 1990s aimed at investigate project success dimensions has led to common agreement that project success is multidimensional and that different people measure project success in different ways at different times. (Bryde, 2003) Developments in the project management discipline suggest that new models of project performance need to reflect the “multi-dimensional/multiple-stakeholder/quality of process as well as product for defining success. (Bryde, 2005)

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Cookie-Davies (2002) pointed out a difference between project success and project management success. Project is successful if overall objectives are achieved, yet project management success is measured against the widespread and traditional measures of performance - cost, time, and quality. A project can be viewed as "successful" despite poor project management and vice versa. For example, a project might be delivered late and over budget, yet it might lead to an increase in the capability of the organization to better manage future projects. Project management cannot succeed unless the project manager is willing to employ the system approach to project management by analyzing those variables to success or failure. (Kerzner H, 2003)

Cookie-Davies (2002) also highlights the difference between the success criteria and success factors. Success factors contribute to achieving success on a project, identifying what is necessary to meet desired deliverables. On the other hand, success criteria are the measures by which the success or failure of a project will be judged. Factors constituting the success criteria, presenting internal measures or metrics that can be reviewed on a periodic basis throughout the life cycle of the project (Kerzner, 2003) are known as key performance indicators or KPIs. Key performance indicators are the compilations of data measures (either by quantitative or qualitative data) used to assess the performance of the project. (Toor & Ogunlana, 2010)

2. STAKEHOLDER'S INFLUENCE ON PROJECT SUCCESS

During the last two decades of previous century, researches have been pointed out that success criteria of project evolve new dimensions. Traditional view of project success was meeting time (schedule), cost (budget) and specification (quality), but the „iron triangle“ was criticized in by many for many reasons (Shenhar et al. 2001) (Gardiner & Stewart, 2000) Evaluation of project success, by the dissimilar interested parties (stakeholders), in different times, can be done in diverse ways. According to PMBOK project success criteria shall include the golden triangle and satisfaction of key project stakeholders. Many researchers came to the conclusion that project is considered successful only if it meets their quality criteria.

Although project stakeholders have been defined in numerous ways, the most common definitions view project stakeholders broadly as any group or individual who can affect or is affected by the project. In PMBOK, stakeholders are defined as individuals and organizations that are actively involved in the project or whose interest may be affected as a result of project execution or project completion. (PMI, 2004) It is widely agreed that a project has many stakeholders, whose interest may be related or in conflict. Considering increasing influence of stakeholders, a new focus in the project management literature is on the development of models that apply the theory of the interested parties, their classification and their inclusion to the project environment. (Qureshi et al., 2009) Stakeholder theory provides a solid standing point for identifying, classifying and categorizing stakeholders and understanding their behavior in order to better manage them, and to define key performance indicators as measures that are used to assess the project performance.

Crucial stakeholders are internal stakeholders - members of the project team, other employees in the organization, top management in the organization (who usually support the project). It is very important for internal stakeholder to be aware of how project success is defined, and what are key performance indicators. This highlights the importance of communication quality between team members and other employees in the organization, the method of knowledge transfer, and delegation of responsibilities. Anbari et al. (2008) pointed that organization structure reflects the type of organizational culture that holds away and also tackling information flow, knowledge transfer and overall organizational culture. Choice of a project organization structure should consider the above balance between all stakeholders. (Figure 1).

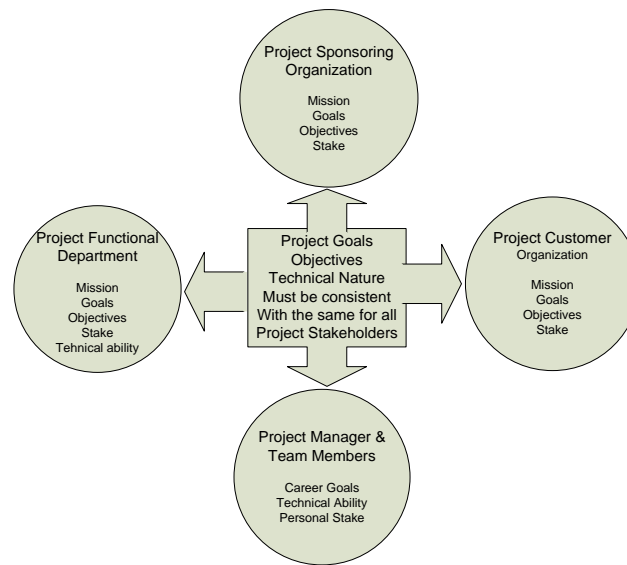


Figure 1. Projects and stakeholders interests (Anbari et al., 2008)

3. PROJECT SUCCESS PERCEPTION TROUGH PROJECT LIFE-CYCLE PHASES

When considering project success criteria, it is essential to be clear of how we defined project. Do we use a product oriented definition, according to wich “*a project is a temporary endeavor undertaken to create a unique product or service*” (PMI, 2004 p. 5); or objective oriented definition in wich project is conducted to deliver beneficial objectives of change? Depending of definition key performance indicator can be differently defined.

Beside that, Yu et al. (2005) looking at the key performance indicators in relation to the phases of the project life cycle. Every project has certain phases of development known as life-cycle phases. A clear understanding of these phases permits managers to better control resources to achieve project sucess. The teoretical definitions of the life-cycle phases of a system can be applied to a project. These phases include: conceptual, planning, testing, implementation, closure. (Kerzner, 2003)

Some organizations have established policies that standardize all projects with a single life-cycle, while others allow the project management team to chose the most appropriate life cycle for the project.

Project life cycle can be very general or very detailed (Figure 2). One of the common characteristics for most project life cycle is that cost and staffing levels are low at the start, peak during the intermediate phases, and drop rapidly as the project draws to a conclusion. (PMI, 2004)

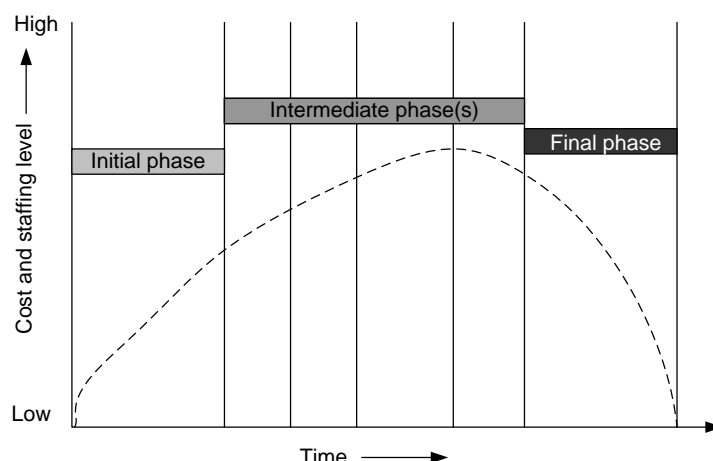


Figure 2. Project life-cycle (PMI, 2004)

When people work in an project-oriented organization or in environment where program and portfolio management practices are used, they need to understand how project success is defined and how it is measured, particularly in terms of the project and product life cycles, because project success is aggregated in program or portfolio success. Looking at the basic life cycle stages, we can see the difference in what the "owner" stage (shown in Table 1).

Table 1. Project/Product lifecycle stages and milestones (Yu et al., 2005)

	Project lifecycle	Product lifecycle	Owner/Actions
Stage 1	Project conception	Product feasibility	The client organisation, assisted by specialists
Milestone 1	Project commitment	High level product requirement produced	The client commits to the project and appoints a project team
Stage 2	Project execution	Design, development or acquisition	The project team (the prime contractor assisted by subcontractors)
Milestone 2	Project closure	Product created	The project team delivers the created product to the client
Stage 3	N/A	Product operation	The client organisation, possibly transferred to a customer/user

In relation to the "owners" key performance indicators can be defined. This approach is using product-oriented definition. As shown in Table 1, the project team might be considered to own Stage 2 (stage 2 has been referred to as the project in the "micro" sense). On the other hand, client owns Stages 1 and 3 directly.

The ownership changes are associated with project milestones. Each milestone is marked by actions performed by the owner of the previous stage. At Milestone 1 after Stage 1, the client commits to the project and appoints a project team. The ownership for the Stage 2 is passed on to the project team. At Milestone 2 after project execution (Stage 2), the project team delivers the created product to the client. The project is completed but the product lifecycle usually continues. The client has the ownership to operate or dispose (for example sell).

4. VALUE-CENTRED PROPOSAL FOR ASSESSING PROJECT SUCCESS

A typical project can be viewed as an investment. As such, the project consumes resources during execution phase. All benefits from the project are materialized in stage of product operation. It is very useful to separate project cost and product value to reflect the project/product life cycle reality. Value-centred proposal for assessing project success is defining two key concepts: the net project execution cost (NPEC) and the net product operation value (NPOV), and presenting scheme for measuring project success based on them. Net project execution cost - NPEC is defined as difference between the cost that has client minus benefits accrued to the client during project execution. If C_{project} means all project costs and B_{project} means all benefits realized in the project execution, we have

$$NPEC = C_{\text{project}} - B_{\text{project}} \quad (1)$$

Net product operation value NPOV captures all the benefits a client derives from the created product during product operation ($B_{\text{operation}}$) minus any associated operational cost ($C_{\text{operation}}$):

$$NPOV = B_{\text{operation}} - C_{\text{operation}} \quad (2)$$

NPOV may include less tangible benefits (strategic benefits, competitive advantages, etc.) and less tangible costs (e.g. negative externalities), and it is limited to product operation only. The separation of project execution and product operation is important in providing a meaningful measurement of the project in the “micro” sense. (Yu et al., 2005)

If C_o is the estimated value of NPEC, and V_o is the estimated value NPOV, the project will be acceptable for the client if $C_o < V_o$, and vice versa.

5. CONCLUSION

Traditional approach shows that a general framework can be used as a guide to measure the success of a project at macro and micro levels. Iron triangle (on time, under budget, according to specifications) has been widely accepted criteria during last couple of decades, but it was also criticized. As we can see from previous sections of this paper, different perspectives of project success indicated that as there are different needs and different goals of any given project, success measurement should also be tailored for each project.

As Table 2 shows each of those perspective has some advantages, that make them suitable for some type of projects, yet they have some disadvantages.

Value-centered approach does not consider different perspective of different stakeholder, but this approach gives a matrix to measure project success, which is the main distinction comparing to other approaches presented here. Stakeholder analysis takes into account different interests of different parties involved in a project and their perceptions of project success, but it is not giving an answer on how to measure project performance and how to assess project results. Using project life-cycle concept to evaluate project success is something between those two. In some way it considers stakeholders, not all of them, but the most important one (client and project team including contractor assisted by subcontractors) looking at main phases of project life-cycle and its „owners“.

Those perspectives can be seen as complementing rather than as mutually exclusive. Project success perception through life-cycle phases can be extended including other stakeholder analysis. In addition to the client and project team other interested parties (stakeholders) should be considered when defining key performance indicators. Looking at the value-centred approach, if there are many interested parties (stakeholders) to enjoy the effects of the project, it should not be a problem as long as the effects are uniformly distributed; otherwise their interest must be considered. Many projects create a series of external effects (positive or negative) that affect third parties who are not directly involved in the project. That initiated the need for calculation of all cost and benefit from their point of view and consideration of their interest for making realistic assessment of project success.

Table 2. Main characteristics of different perspectives of project success

	Stakeholder's analysis	Project life-cycle	Value centred approach
Link with project definition		✓	
Developed the scheme for measuring project success			✓
Considering organizational structure and organizational culture,	✓		
Adopting the single cost-value dimension for assessing project success			✓
Defining project stages and its owners to		✓	

examine project success criteria			
Considering information flow and knowledge creation	✓		
Considering different perceptions of project success of different interested parties	✓	✓ / -	

Assessment of project success should be a vital part of project management, as it presents a significant contribution to project management improvement, and a great source of knowledge for future projects.

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MANAGING GLOBALLY DISTRIBUTED INNOVATION PROJECTS: CULTURAL DIFFERENCES AND CONFLICT RESOLUTION (REFLECTION ON PROJECTS EXPERIENCE)

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Abstract: *This paper identifies the impact that cultural differences have on conflict resolution in globally distributed innovation projects. The aim of the research is to discover potential relationships between different conflict management strategies and diverse cultures. The main hypothesis is that cultural differences are being expressed in project teams during conflict situations. The paper consists of two main parts. After the literature review, the results of Thomas-Killman test for all project team members (including eight countries: Australia, China, Malta, Philippines, Mexico, Columbia, India, Indonesia) are presented and then compared with the results from previous researches in this area. As a conclusion, a reflection is offered on how cultural differences affected the conflict resolution in IKEA UK and WAUDBY's design projects.*

Keywords: *innovation projects, global design, cultural differences, conflict resolution strategies*

1. INTRODUCTION

Rapid changes that have happened during the last twenty years, mainly as a part of the globalisation process, lead to the increased cultural diversity in companies. Besides, the development of information and communication technologies created a platform for working virtually in distributed project teams which members can be spread all over the world. There is more and more global projects launched every day and there are many factors that influence the complexity of these projects. One of the key issues is cultural diversity.

Different cultures have different systems of valuing what is acceptable and what is unacceptable behavior. This means that nations have diverse standards which can cause significant gaps between project team members. The fact that differences among multicultural project team members are more emphasized makes more space for conflict situations. Even though there is a lot of well known conflict resolution strategies, application of any of them should be considered with taking into account cultural differences that may exist among team members. Cultural differences may, and probably will affect the conflict overcoming process.

The purpose of this research is to examine how cultural differences affect conflict resolving processes, how different national cultures approach conflicts and which resolution strategies are the most widespread. The flow of the paper is as follows. Firstly, a short literature review of culture, conflict management and conflict resolution strategies is presented. This is followed by presenting the Thomas-Killman test-based research methodology used for discovering conflict resolution strategies among team members of two global innovation projects. In total, ten members from eight different countries were examined. The results are then compared with some of the previous researches in this area in order to check how individual profiles of team members fit into their national culture's profiles. Finally, the reflection of the results on project teams' performance is presented.

First project conducted in IKEA's UK branch was aimed at the design and development of a new, innovative package for a specific product line of wine glasses and was performed by University of Strathclyde from United Kingdom in cooperation with Tongji University from China and Swinburne University from Australia. The aim of the second project was design of an innovative faucet. This global design project was executed by University of Strathclyde in cooperation with University of Malta.

One of the limitations of the study is that it included only one or two national representatives which may not have typical profiles as the majority of the population in a country. Personality can have a strong influence to conflict management which is why it can be very hard to make a strict distinction between cultural and personal aspect of conflict resolution approach. Furthermore, the validation of the results from previous research that are used for comparative analysis has not been done. Besides, in order to have more reliable results more people should have been tested. However, the opinion of an author is that, for

the purpose of this paper in which the reflection of the experience obtained from the two above-mentioned projects should be shown, the conducted survey is completely appropriate.

2. CULTURE

The etymology of the word *culture* can be found in Latin word *colere* which can be described as *to cultivate*. Over the time, many definitions of culture emerged. One of the most well-known definitions, given by the most important author in this field, states that culture is *the collective programming (thinking, feeling and acting) of the mind which distinguishes the members of one group or category of people from another* (Hofstede, 2001). In addition, Hofstede also defined three levels of culture: individual, collective and universal. Taking into account the fact that almost all the aspects of his work were cited many times and the purpose of this research, no deep analysis of his work will be presented. Beside Hofstede, many authors contributed to this field of study. Trompenaars was, for example, examining different dimensions of culture including: universalism vs. particularism, individualism vs. communitarianism, specificity vs. diffusion, affective vs. neutral, achieved status vs. ascribed status, internal vs. external control and sequential time vs. synchronous time (Trompenaars, Hampden-Turner, 1997). On the other hand, Hall (1996) was trying to analyze culture through three different variables: time, context and space. In his work, he was mainly focused on discovering the differences between monochronic and polychronic cultures.

No matter whose work or which research one takes as a base, one thing should be always kept on mind: different cultures should be respected, but in the same time, it should not be allowed that they become a barrier for any kind of communication or cooperation. According to (Lather et al. 2010) all the people on the planet are fundamentally the same, but it is the culture that makes the differences among them. By forming their own culture in order to meet different needs, wishes and objectives, people are actually distinguishing themselves from other groups of people. Those cultural differences are especially emphasized in the multi-cultural environment. Working in an international project team for example, brings many challenges and overcoming the cultural differences is one of the key issues. This does not mean that one should give up his cultural background, but that cultural differences should not be the obstacle for team performance and goals fulfillment.

Being aware of cultural characteristics of numerous countries allows us to better comprehend the way that people from different parts of the world think, behave, feel and what their expectations are. This is specifically important for effective cooperation in multinational project teams. Different studies trying to point out main influences that culture has on project teams' performance were conducted. Samarah et al. (2002) pointed out main links between culture, conflict resolution and project team performance. Similar research about culture and conflict management styles of project managers was presented in (Mohammed, White, 2008). Research about main differences between individualism and collectivism and the impact they have on team cohesion can be found in (Freeman, Bordia, 2001). Furthermore, there are lot of studies investigating the relations between particular countries and different aspects of project management performance. For example, (Fletcher, Olekalns, 2005) pointed out key differences among Asia-Pacific region, while Mohammed and White (2008) were focused on India. Ulu and Lalonde (2007) conducted a research in order to find out differences between Turkey and Canada. Another important research that examined more than six thousand people from around twenty countries is presented in (Herk, et al. 2011).

Culture influences the majority of mental models of individuals (Hofstede, 2001 cited in Samarah et al. 2002). These models can be attitudes, personality, perceptions, beliefs etc. and they all affect the way we behave. Thus, the group efforts, interaction of members among teams and the level of success of a project team are partially determined by the behavior of the team members. If there is a divergence in behavior caused by different mental models, conflicts may occur. At this level, culture affects the way team members will perceive the conflict situation (Chan, 2010) but at the same time it will affect the way individuals would like to handle with the existing situation. There are many different approaches to conflicts and all at once various strategies which can be used for their resolution. The successful resolution lies in proper direction by project managers or team leaders. This is the point when conflict management starts playing the most important role. Therefore, the next few paragraphs will discuss more deeply key issues in conflict management as well as some of the key strategies for conflict resolution.

3. CULTURAL DIFFERENCES AND CONFLICT MANAGEMENT

There is a wide range of factors that affect the performance of the distributed project teams. The performance of a global team can be contingent upon time differences, collaborative technology used, project schedule, expected deliverables, but at the same time the homogeneity (heterogeneity) of the team in terms of the culture can significantly affect teamwork success. Moreover, cultural diversity can be the source of conflict situations. The explanation for this phenomenon was given by many authors from different disciplines. For instance, a group of psychologists including Watson et al. (1994) observed that culture exhibit various patterns of group interactions. This is why a culture can be considered as an obvious source of differences in the way humans behave. And conflicts are nothing but another trigger of a particular behavior.

Ting-Toomey (1985) defined conflicts as a *form of intense interpersonal and/or intrapersonal dissonance between two or more interdependent parties based on incompatible goals, needs, desires, values, beliefs, and/or attitudes*. It is interesting that, some other authors like Rahim and Magner (1995) used the same word – dissonance (within or between social entities), to describe the essence of conflicts. Generally speaking, any kind of clash between two or more persons or groups can be considered as a conflict. Transferred to the project management terminology, any kind of a disagreement between project team members which cannot be quickly overcome without interrupting the flow of the project should be considered as a conflict.

Conflicts have become inseparable part and parcels of our lives (Brahnam, 2005) and we are able to experience conflicts on a daily basis. The same author pointed out that conflicts are inevitable component of the human activity. According to Brett (2000) conflicts are unavoidable in all cultures, but over the time, every culture developed a different way of managing them. At the same time, the globalization process increased the number of interactions between people (Kaushal, Kwantes, 2006), which is why there is more space for conflicts to occur. Therefore, it is very important to understand the cultural differences in conflict management (Watson et al. 1994; Brett, 2000; Montoya-Weiss et al. 2001; Samarah et al. 2002; Brahnam et al. 2005; Mohamed et al. 2008; Thomas, Killman, 2010).

Different researches on the way cultural variations affect the conflict resolution strategies, of which some have already been referred to in this paper, have been conducted and the common conclusion is that there are significant differences in the use of strategies for conflict resolving. The question that naturally arises is, which conflict resolution approaches actually exist? Again, different authors have presented these approaches in several ways, but all of these can be summarized in five main conflict resolution approaches presented in (Thomas, Kilmann, 2007). These include avoidance, accommodation, competition, collaboration and compromise. Wood and Bell (2008) presented these approaches in a following graph.

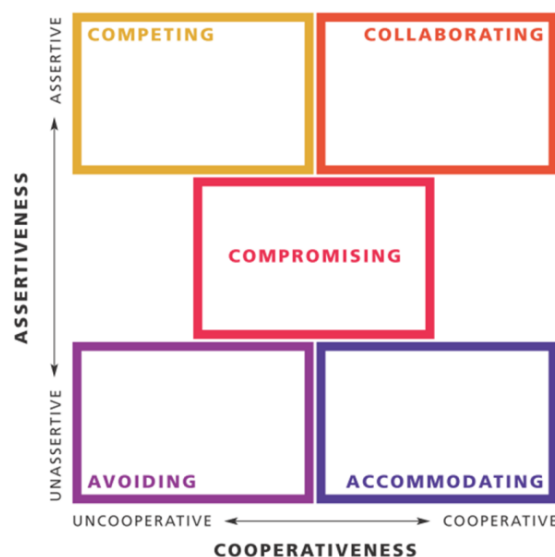


Figure 1. Conflict Management Approaches (Thomas, Kilmann, 2007; Wood, Bell, 2008)

Avoidance is the approach that does not include actual dealing with the conflict. Instead of facing the conflict situation, there is the intentional avoidance of other members in the group while the project goes on as nothing is interrupting its flow. On the other hand, *accommodation* means higher concerns about the others' needs than the own needs of an individual. Completely opposite approach is *competition*, during which no concerns for the other team members is expressed. More interactive approach is *collaboration*, which means integration of needs and interests of all parties that are involved in the conflict situation. Often recommended as the best approach (but not for all situations) is *compromise* which occurs when the solution which addresses the interests of all members is found. For each of these approaches, Tsai and Chi (2009) have defined appropriate conflict resolution strategies which are, together with the main concerns, presented in the table below.

Table 1. Five Conflict Handling Strategies (Adapted from Tsai, Chi, 2009)

Behavioral Approaches	Strategic Attitudes	Concerns	
		Personal Goals	Disputant Relationships
Avoidance	Withdrawal	Low	Low
Accommodation	Soothing	Low	High
Competition	Forcing	High	Low
Collaboration	Problem solving	High	High
Compromise	Sharing	Moderate	Moderate

The selection of an appropriate conflict resolution strategy that matches the existing conflict situation is recognized as one of the key factors for determining the quality of the outcome resolving the conflict (Lawrence & Lorsch, 1969; Ramirez, 2010). The fact that cultural differences have to be taken into account makes the problem even more complex.

4. RESEARCH METHODOLOGY

As already mentioned in the introduction, the aim of this research is to examine if the cultural differences among Swinburne-Tongji and Malta project team members had an impact to conflict resolution strategies during the global design projects. The aim of the first project was development of an innovative cardboard package for the IKEA Hederling wine glass. For that purpose, a distributed project team made of students from three universities namely Strathclyde University from Glasgow, Swinburne University from Australia and Tongji University from China, was formed. Eight project team members were from six different countries: Australia, China, Mexico, Philippines, Indonesia and Serbia. The second project which aim was the design of an innovative faucet was performed in cooperation with University of Malta, and among five team members, four different nationalities including Malta, India, Columbia and Serbia were present.

In order to analyze cultural diversity in project teams and the impact it has on conflict resolution, a survey was performed on all team members from the two projects (excluding the author of the paper). This means that, in total, eight countries were covered with the research. The survey was based on the Thomas-Kilmann Conflict Mode Instrument (Thomas, Kilmann, 2010) which is a test-based tool for assessing individual behavior in conflict situations. According to answers obtained from the questionnaire, the Thomas-Kilmann score was calculated for each team member. This score allowed relating the test results with the most common conflict resolution strategies used by a particular team member. Furthermore, each team member was considered as a representative of its national culture. After this phase, a deep research about the similar previous studies was conducted in order to identify which conflict resolution strategies are the most common in the countries from which the team members came from. Finally, the national average figures from previous studies were compared with the scores of every team member in order to identify how much each of the team members' profiles fits into its national profile in terms of conflict management.

4.1. Thomas-Kilmann Conflict Mode Instrument

Thomas-Kilmann Conflict Mode Instrument (TKI) is a questionnaire-based tool that consists of thirty matched statements designed to identify conflict management behavior of an individual. The statements in the questionnaire are based on five different conflict approaches, already presented in Figure 1. The x-

axis presents cooperativeness, which is the extent to which the individual attempts to satisfy other's concerns (Thomas, Kilmann, 2010). On the other hand, y-axis presents assertiveness, which is the extent to which the individual attempts to satisfy his/her own concerns (Thomas, Kilmann, 2010). These two axes allow definition of the five specific approaches of dealing with conflicts. The pattern for calculating individual TKI scores allows us to identify which conflict resolution strategies are dominating in once behavior. In the final stage, the TKI scores are transferred into percentages which represent the distribution between the five basic conflict resolution approaches.

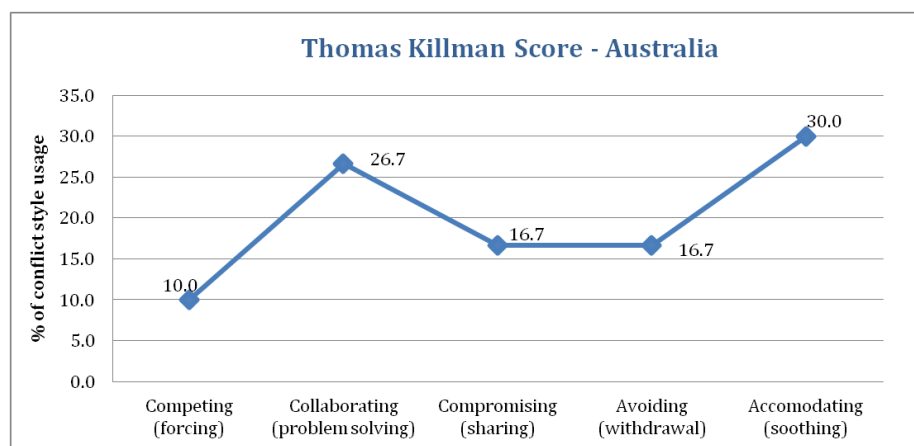
4.2. Comparative analysis

After calculating individual TKI scores, these were compared with the results found in few similar researches that were conducted during the last decade. All of these studies were performed on the samples of various sizes and contain average data for different countries. India's team member TKI score was compared with figures found in (Mohammed et al. 2008). For the analysis about Australia and China, relevant data from (Fletcher, Olekalns, 2005) were taken. In addition, the same research was used for data comparison about Philippines, but due to the fact that no detailed data for that country were available, Pacific region was taken as a referent. Figures from (Herk et al. 2011) were used for analysis about Mexico and Indonesia profiles, and the figures for France were compared with Malta team members because no particular data for Malta exist. Finally, no available data for Columbia was found, which is why the country is exempted from the comparative analysis.

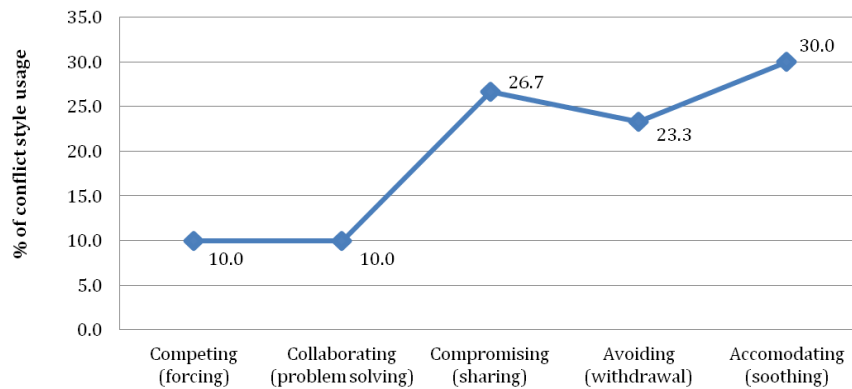
In the end, a brief discussion about the influence that cultural differences had on conflict resolution in teams during the global design projects is presented.

5. RESULTS

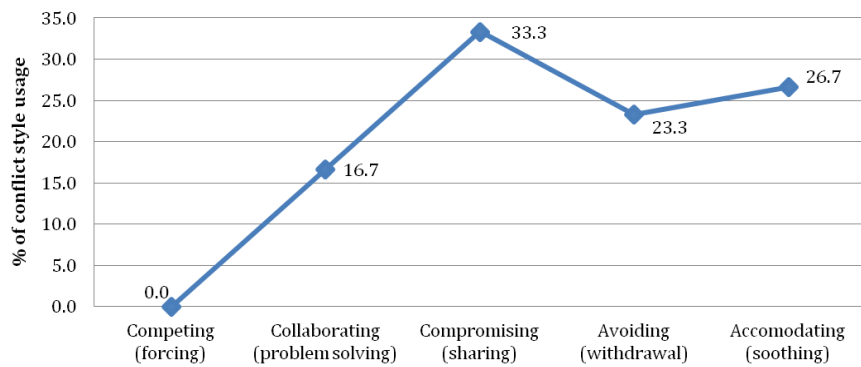
First of all, the graphs showing the distribution of conflict resolution approaches between the five existing, for each of the team members from eight nationalities examined in the research, are shown.



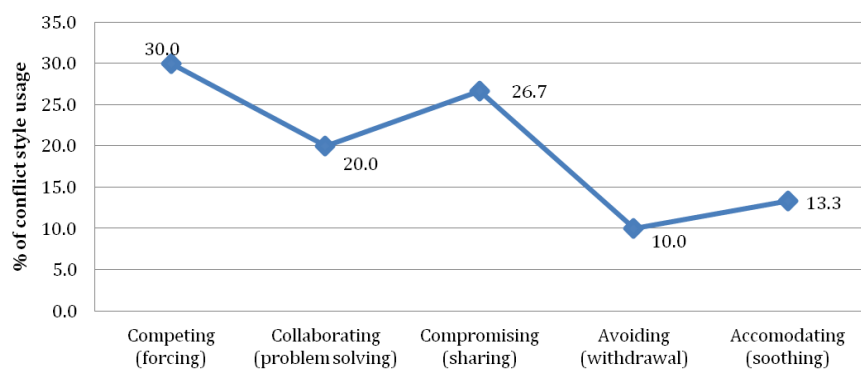
Thomas Killman Score - China



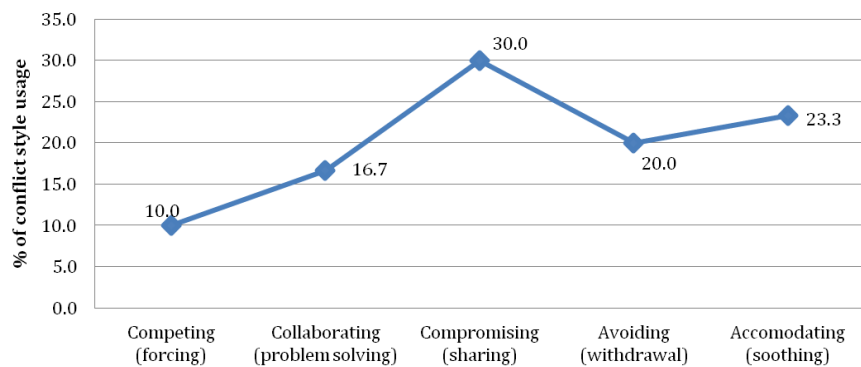
Thomas Killman Score - Malta



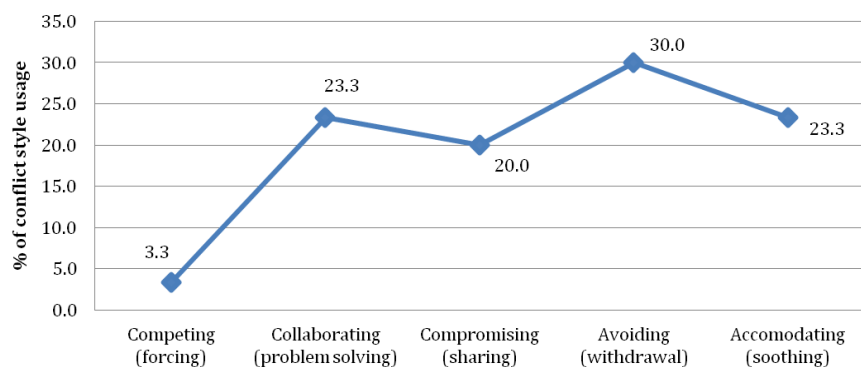
Thomas Killman Score - Columbia



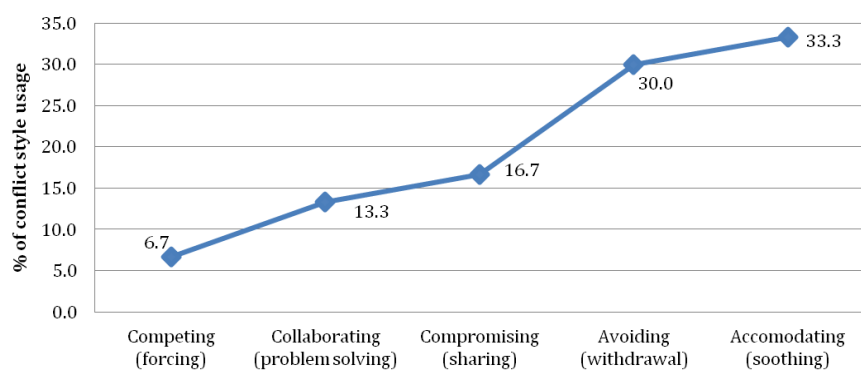
Thomas Killman Score - Philippines



Thomas Killman Score - India



Thomas Killman Score - Indonesia



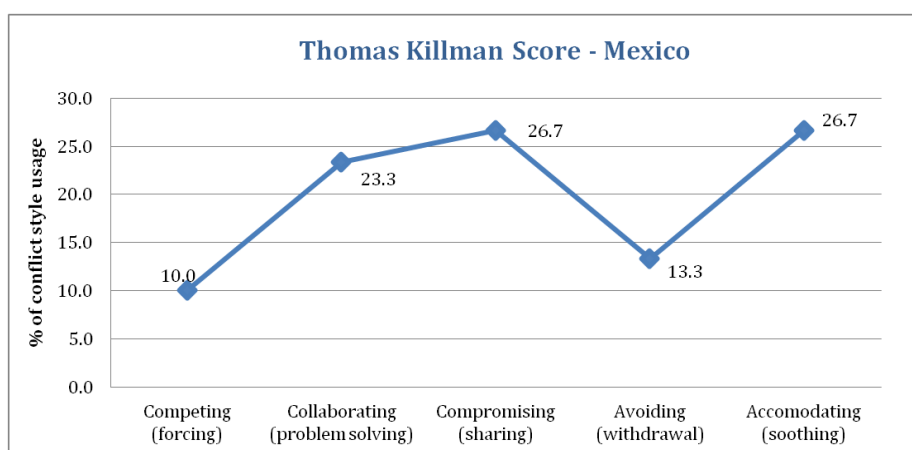


Figure 2. Individual TKI profiles of team members

If referring to the Figure 3 below which compares individual TKI profiles of team members it can be concluded that the overall trend shows prominent usage of the compromising approach among almost all of the team members. The highest score for this approach is achieved by Maltese team members, who use this conflict resolution strategy in more than one third of all conflict situations. The second mostly used approach is soothing, especially emphasized in the case of Indonesian team member. Collaborating as a conflict management approach is to similar extent used by all countries and the score varies between 10% and 20%. Together with accommodating this is the most common approach among Australian team members. The highest score for avoiding approach (30%) was achieved by Indonesian and Indian team members. Furthermore, it is interesting to notice that Columbian team member uses competing as a conflict resolution approach significantly more often than the other team members. Moreover, in case of that team member, it is the dominant conflict management approach.

Graph summarizing the gathered data from all team members is presented below.

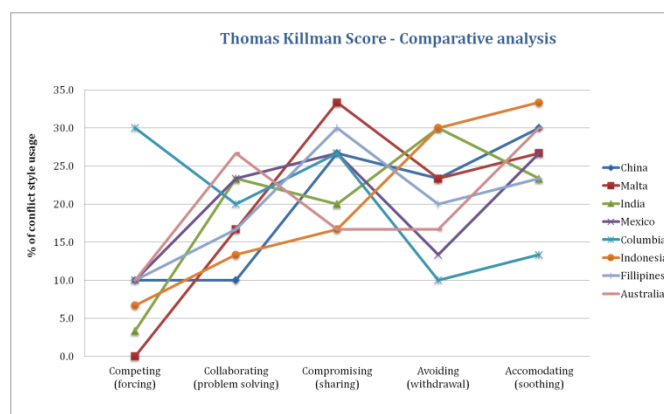


Figure 3. Comparative analysis of TKI profiles of team members

It is quite obvious that there are big differences between conflict resolution approaches within the team members. However, this analysis still does not give us much clue about whether cultural differences have impact on choosing a particular conflict management strategy, because certain behavior can also be caused by personal and social factors. In order to deeply analyze potential influence of cultural diversity on conflict management, the results obtained from team members are compared with the results from previous studies (which used much bigger sample). This will help us to identify how much each of the team members' profiles fits into its national profile in terms of conflict management.

Table 2 showed below allows comparison between data obtained from team members with the appropriate national averages from few previous studies about the most common conflict resolution strategies used by different countries.

Table 2. Comparative analysis

Country	Source of data	Sample	Competing (forcing)	Collaborating (problem solving)	Compromising (sharing)	Avoiding (withdrawal)	Accommodating (soothing)
AUSTRALIA	Swinburne University	2	10.0%	26.6%	16.6%	16.6%	30.0%
	Fletcher, Olekalns (2005)	378 undergraduate 2-year students	5.6%	15.8%	22.2%	19.3%	37.1%
CHINA	Tongji University	2	10.0%	10.0%	26.6%	23.3%	30.0%
	Fletcher, Olekalns (2005)	378 undergraduate 2-year students	9.2%	11.7%	34.2%	20.1%	24.8%
MALTA	University of Malta	2	0.0%	16.7%	33.3%	23.3%	26.7%
	Herk et al. (2011) (Data for France)	6000 people from different countries	3.3%	34.2%	16.6%	22.7%	23.2%
COLUMBIA	Strathclyde University	1	30.0%	20.0%	26.6%	10.0%	13.4%
	No relevant studies for comparison	/	/	/	/	/	/
PHILIPPINES	Strathclyde University	1	10.0%	16.7%	30.0%	20.0%	23.3%
	Fletcher, Olekalns (2005) (Pacific region)	378 undergraduate 2-year students	5.6%	15.8%	22.2%	19.3%	37.1%
INDIA	Strathclyde University	1	3.4%	23.3%	20.0%	30.0%	23.3%
	Mohammed et al. (2008)	150 Project Managers from multinational telecom organizations	7.14%	17.86%	19.64%	32.68%	22.68%
INDONESIA	Strathclyde University	1	6.7%	13.3%	16.7%	30.0%	33.3%
	Herk et al. (2011)	6000 people from different countries	15.1%	4.5%	29.6%	11.4%	39.4%
MEXICO	Strathclyde University	1	10.0%	23.3%	26.7%	13.3%	26.7%
	Herk et al. (2011)	6000 people from different countries	11.0%	24.0%	15.0%	7.9%	42.1%

In case of Australian team members, only slight differences between individual and national profile can be found. Accommodating is the most common used conflict resolution approached with around one third of all conflict situations. The bigger gap is only recognized in the case of collaborating approach. According to two Australian team members it is used in around 27% of conflict situation, while the national average is a bit lower (15.8 %). Similarly as with Australian, Chinese team members fit into its national profile, with

variations that are not exceeding more than 5%. However, accommodation as a conflict resolution approach is slightly more often used by the two team members than the national average is. At the same time, compromising is somewhat less used – 27%, compared to a national average of 34%. Maltese team members showed results that significantly differ from their national average. According to the Herk et al. (2011) the most frequently used conflict resolution strategy in Malta is collaborating with 34.2%, while in the case of two Maltese students mostly used is accommodation with 26.7%, followed by the avoiding that is used in 23.3% of all conflict situations. Maltese team members never use competing as a conflict resolution strategy and the average figures for the country are also very low – around 3%.

Some gaps between Philippine team members and their national averages are also noticeable. The mostly used conflict resolution strategy in Philippines according to Fletcher and Olekalns (2005) is accommodating, while the team member's profile shows the domination of compromising. There are almost no differences in figures for the other three approaches. The distribution of usage frequency of conflict resolution strategies by the India team member almost perfectly fits into the national TKI profile. Minor differences can only be recognizes in case of collaborating, which is in the case of India team member for around 5% lower than the national average. The biggest differences are found in case of Indonesia, as the team member profile is completely different from the national. Individual results show that the most frequently used conflict resolution approaches are accommodating (33.3%) and avoiding (30%). On the other hand the national average for avoiding is around 11%. Differences in percentages can be found in other approaches too. Similarly, disproportion in results regarding the Mexico is also significant. Research results that can be found in (Herk et al. 2011) say that the most commonly used strategy is accommodating with 42.1%, while the individual score of a Mexican team member shows almost equal usage of three conflict resolution approaches: compromising and accommodating (26.7%) and collaborating (23.3%). Comparison for Columbia cannot be done due to the fact that no figures about national averages are available.

6. DISCUSSION AND REFLECTION ON PRACTICAL PROJECT EXPERIENCE

Even though not many conflict situations during the global design projects occurred, there were few circumstances which confirmed the conflict resolution profiles from the team members.

For example, during the material selection phase of the asynchronous Swinburne-Tongji project, there was a significant problem between Australian and Chinese students. Team members could not agree about the type of cardboard that should be used for the final package development, and during the two days they completely interrupted the flow of the project. Both sides had complaints about the others, but no dialog, in order to overcome different opinions, could be established. Finally, after realizing that the conflict can cause the failure of the project two sides decided to start collaborating. Due to the impact of the third part – University of Strathlyde, Australians and Chinese students started paying much more attention on others' proposals. During the next few days they were open for discussion and finally the cardboard type was chosen. This was an obvious example of the collaborating conflict resolution strategy, because both teams started working on a problem solution while taking into account what the other side thought. At the same time, Australians used the accommodation strategy too, because they became more concerned about the others' needs than the own needs of an individual. Taking into account the previous scenario, we can say that this conflict situation confirmed research results because accommodating in case of Australian, and compromising in case of China, are in the two mostly used conflict management approaches.

During the synchronous global design project, another conflict situation happened. It occurred during the idea selection phase when the consensus about the design proposal that is going to be chosen, could not be reached. However, after reviewing the proposals and changing some details in the design, compromise was found. Due to the fact that all team members recognized that the goal of the project is more important than individual opinions of team members, it can be concluded that this was a typical example of compromising approach. Moreover, compromise is with 33% the most commonly used conflict resolution strategy for Maltese students.

Both of these examples have once again confirmed that diversity and conflicts are very complex topics that include many dimensions, which is why they have to be analyzed from different aspects. Further, this is also the reason why the conclusion from this research cannot be generalized for other contexts. There is a lot of factors such as tradition, core cultural values, religion, the level of education, personality, age

differences, sex differences etc. that affect the conflict resolution process. However, the conclusions are very useful for better understanding of different cultures. Besides, other benefits that I found are the knowledge about the necessity of using different conflict resolution approaches in different situation, with different people and in different project environments.

7. CONCLUSION

Globalization has changed the business environment which is why is in the best interest of all stakeholders to take into account the cultural diversity in the workplace. At the same time, the internal management of conflict situations, especially in global distributed project teams, is vital for the project success. Researchers have also recognized the importance of the topic, which is why many studies about the influence that cultural diversity has on conflict management exist. The research presented in this paper provides insights into conflict-handling style of different nationalities that were present in the two global design projects. Even though, the research reflects on the experience from only two projects, findings can be useful for better understanding of the topic. The main conclusion that should be pointed out in the end of this paper is that cultural diversity always has to be considered as an important factor that will certainly impact the conflict resolution process. Further research in this area should examine the impact that culture has on a communication among the project team members, as well as the impact that personality, age, sex and religious differences have on conflict management.

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MANAGEMENT OF UNEXPECTED EVENTS IN CONSTRUCTION PROJECTS

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Abstract: *Unexpected events are events that have not been planned to emerge during the project, and they are usually caused by external factors. The aim of this paper is to understand these events in construction projects and to point how project managers deal with the unexpected. The research methodology selected comprised a comprehensive literature review and a questionnaire to civil engineering experts. Fourteen experts were involved in research and they explain unexpected events from their experience. Results point to four fields of managing unexpected events: Characteristics of organisations that successfully manage unexpected events, Methods for reducing uncertainty, Practice of adapting the project plan and Strategies to deal with unexpected events. These four fields show which characteristics of organisation are important for providing successful response to an unexpected event, how to reduce a possibility of the unexpected, how to adapt the project plan if such an event has occurred and which strategies have been proved successful.*

Keywords: *unexpected events, project management, construction projects*

1. INTRODUCTION

As projects are inherently uncertain, appearance of unexpected events is inevitable. Geraldi, Kutsch & Lee-Kelley point out that these are events that may have been predicted (or not), but are not expected to happen. They compare unexpected events with the sinking of the Titanic, because hitting the iceberg could have been predicted, but nobody expected that it could sink the boat. Unexpected events are uncommon situation that have a strong impact on the project. If this event happen, it is necessary to act quickly. Therefore it makes the time pressure on managers. It is concluded that there are three key steps to successfully manage unexpected events: responsive and functioning structure at the organizational level, good interpersonal relationships at the team level and competent employees at the individual level (Geraldi, Kutsch & Lee-Kelley, 2010).

Understanding these events is important from the point of managing uncertainty in whole project. Uncertainty depends on project characteristics. Researches show that it is higher in multi-national projects, and in projects that are more complex and lasts longer (Aaltonen, Murtonen & Tukiainen, 2009).

The risk management procedures are in place to mitigate consequences of external factors that may have a negative impact on the project. It is known that environmental relations need management attention but as the relation become more complex it is also becoming less possible to foresee and less possible to plan. The possibility of unexpected events is higher on projects that depending on several partners. The partners usually have different objectives which could cause conflict among them (Söderholm, 2008).

Although the classical treatment of projects suggests that they can be well-planned, there is plenty of room for unanticipated events to interfere with plans. Projects are frequently bid on a fixed-time, fixed-cost basis.

Thus, unanticipated events may quickly rise to the level of crises if they happen to lie on the critical path that determines the time for completion (Hällgren & Wilson, 2008).

There is an increasing awareness that unexpected events will happen. Many authors pointed that it is not a question of „if“ but „when“ unexpected events will emerge (Hällgren & Wilson, 2008; Söderholm, 2008; Sun & Meng, 2008).

2. PROJECT ENVIRONMENT AND STAKEHOLDERS - IMPACT ON CHANGING PROJECT

As it is done in a dynamic environment, the project has to be more or less dynamic category. In the project management context dynamics is taken to be a dimension of a project that represents the extent to which a project is influenced by changes in the environment in which it is conducted. Rapid changes in the environment, including tools, methods and tendency for innovation, increase the uncertainty of the project (Collyer & Warren, 2009).

Stakeholders of the project are defined in the literature in different ways. Most common is the general point from which they represent any group or individual, or affect the project or project affects them (Aaltonen & Sivonen, 2008).

The project involves different stakeholders, whose interests and demands have to be taken into consideration in order to ensure success of the project. So, one of the key parts of project management is managing stakeholders (Olander & Landin, 2005).

Although the risk associated with stakeholders is often ignored in risk analysis, it is important to identify all stakeholders and if it is possible to make a stakeholders map. Their expectations and interests need to be explored and understood. Each project has several stakeholders, so it is required to manage their relationships. The stakeholders' conflict can have a negative effect on the project itself. It is a frequent cause of unexpected events and brings significant financial losses. It is therefore important to do the stakeholder analysis, to reduce the uncertainty. The complexity of the network of stakeholders is directly related to the probability of appearance of unexpected events. The more complexed the network is the greater is the likelihood of the unexpected. Position and influence of different stakeholders is changing during the project lifetime. Therefore, monitoring stakeholders must be continuous, during the implementation of the project. These changes of stakeholders influence can significantly change the course of the projects progress (Aaltonen, Murtonen & Tukiainen, 2009).

As the stakeholders have high impact on project, managers engaged in these projects have to develop different strategic responses as a result of the stakeholders pressures. Those strategic responses are: adaptation strategy, compromising strategy, avoidance strategy, dismissal strategy and influence strategy. In a situation where stakeholders require changes, responses could be redefined (Aaltonen & Sivonen, 2008).

A negative attitude to a construction project by stakeholders can severely obstruct its implementation. Such obstruction will cause cost overruns and exceeded time schedules due to conflicts and controversies concerning project design and implementation. A method of stakeholder mapping and the power/interest matrix are some techniques that could be used to identify stakeholders and their influence on the project (Olander & Landin, 2005).

3. CATEGORIZATION OF UNEXPECTED EVENTS BY CAUSAL FACTORS AND RESEARCH RESULTS

The following division of unexpected events is based on external factors that cause those events. Division is based on the division of the key risks in construction projects (Zou, Zhang & Wang, 2007), and is adjusted to unexpected events literature and results of the research. Approximate frequency of the unexpected events is shown after the event category. Data are based on experts' answers, given in questionnaire. Unexpected events generally influence project objectives in terms of time, quality and cost. This influence is listed below.

Unexpected events related to investor. He is one of the most important stakeholders in the construction project, and the one that provides funding. Two events related to investor will be explained below.

- Unexpected project funding problems (50%). In this case, project team tries to find a way to continue the implementation of the project (deferred payment to suppliers, companies using the contingency fund or by borrowing from financial institutions) and only in extreme cases stops project, until funding is provided.
- Investor entries unexpected variations in project changing projects original plan (60%). This could happen if he changes his mind, or if there were misunderstandings during the project contracting. This event has impact on time, quality and project cost.

The most of unexpected events are related to contractor.

- Unexpected problems because of inadequate soil test (25%). According to experts' answers, this could influence on object design (for example, type of foundation) which have to be adapted to unexpected terms. Event has impact on cost and quality.
- Getting lawsuit (not frequent). Reasons for lawsuit could be different (for example workers are not insured, serious air, water or noise pollution, disregard of rules, ect.). This event has indirect impact on projects' objectives.
- The unexpected cancellation of the contract - the contractor is unable to complete the project (20%). This event is not common, but it directly impacts project completion time.

Suppliers usually affect the project time, because the delay in delivery causes delay of whole project.

- Supplier is unable to deliver materials on time (30%).

The government is an external stakeholder that influences the occurrence of unexpected events.

- Unexpected problems with government regulative. Examples of such event are disabling transfer of machines from one country to another because of government regulative, then stopping the project by inspection because government regulation did not define building megaboards (it is only defined for public surface).

Other external factors that could cause unexpectedness:

- Extremely bad weather conditions. It influence on postponing building.
- Unexpected changing material price. It influence on overcoming planed project budget.

Chart 1 shows research results for most frequent events. On the abscissa are offered answers, and on ordinate are answers in percentage.

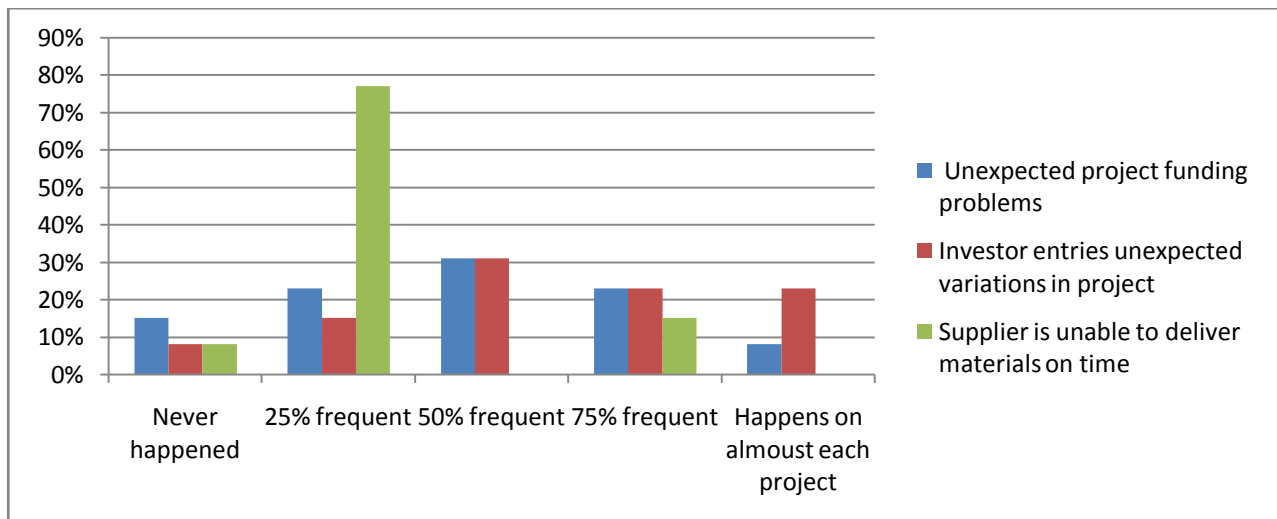


Chart 1: Frequency of the unexpected events

4. FOUR FIELDS OF MANAGING UNEXPECTED EVENTS

Managing unexpected could be divided in four fields. Knowing those fields could help managers to reduce uncertainty, or to answer on unexpected events successfully. These four fields shows which characteristics of organisation are important for giving successful response to unexpected event, how to reduce possibility of unexpected, how to adapt the project plan if event appeared and which strategies of response are proved to be successful.

4.1. Characteristics of organization that successfully manages unexpected events

Success, upon emerging of unexpected event, greatly depends on the characteristics of the organization, team and individuals working on the objective of the given project. That is why characteristics that increase the likelihood of success, on organizational, group and individual level, stand out while managing unexpected events (Geraldi, Kutsch & Lee-Kelley, 2010).

1. Organizational level-flexible and functional organizational structure.

Fast decision making and their implementation. Top management is involved in the process and it ensures political support and fast reactions. Responsive structure implies correctly timed appropriate answers to changes. Responsibility and authorization should be awarded with key people in each specific situation. Project manager requires great freedom of choice to produce successful answers, if not, a lot of time gets wasted on getting approvals and filing reports. As something unexpected is surely going to happen, time buffers should be left while planning, which will help the team to make a successful response.

2. Group level – good interpersonal relationship.

Relations with stakeholders are essential for two reasons: firstly, their full support is needed while solving these situations, secondly, negotiating with all of them is required (clients, suppliers, members of the team). Good flow of information is also required.

3. Individual level – competent individuals

Leader and the team have to know what to do, have available sources and adequate skill sets, function with the group. The leader has to be able to manage team members' behavior in stressful situations.

According to experts answers the most important factor for solving unexpected problem is competent project manager. Research results are shown in chart 2. They mark importance of each factor on a scale of 1 to 5.

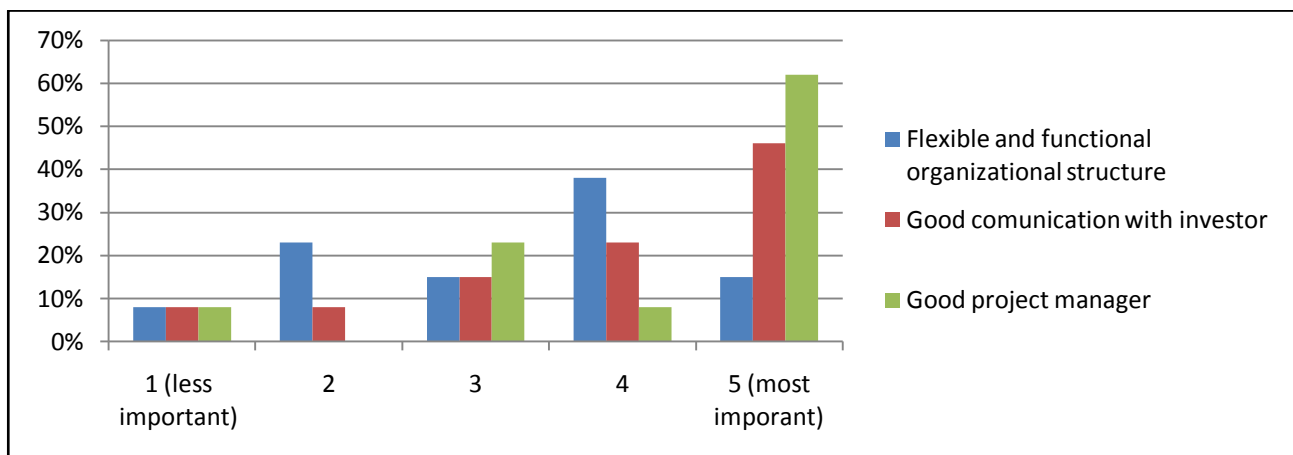


Chart 2: Importance of factor for successful response to unexpected events

4.2. Methods for reducing uncertainty

Uncertainty can be defined as a gap between information that are needed and the ones that are available while project is in motion. Investigating construction projects, author defines three ways to overcome this gap (Leijten, 2009).

1. First is increasing the expertise of the client (project proprietor). Both case studies show that the client is incapable overseeing and judging efficiency of certain project phases.
2. Second way is engaging another company to do part of the job (outsourcing). It is positive to include a private company in the project so that company itself would accept responsibility and it would have its own interest in project completion.
3. Third way is adjusting to circumstances and it implies minimizing the gap in a way that the need for information would be reduced, if its flow could not be increased by one of the before mentioned ways. In practice, it means adjusting (probably lowering) ambitions, in a sense of prolonging the dead line or decreasing functionality.

Meaningful step in reducing uncertainty and avoiding the unexpected is following work signals. Management by early warnings ensures extra quantity of information which closes the gap of uncertainty. The most useful fact is that this concept provides information for the event that is yet to happen, which increases chances of successful overcoming of possible problems (Nikander & Eloranta, 2001).

4.3. Practice of adapting the project plan

As a result of the influence of the parties involved, managers react in one of the following ways, adapting the project plan: re-opening, revision and daily fine tuning of project (Söderholm, 2008).

1. Re-openings mean that restrictions, in terms of deadlines, tasks and expenses, are re-defined. They are caused by changing stakeholders' requests and they are very frequent on project depending on several stakeholders. It is also possible that some stakeholders quit and others enter into project, which cause changing requests.
2. Revisions and adaptation of the initial plan are often, as long as the plan is made for longer time period and as long as the project depends on other projects and companies. Revisions and changes of initial plans are however very common and most managers would argue that they are inevitable for any project that is extended over some time.

Daily fine tuning is third way of adapting project plan. It implies constant flow of information with environment and adaptation to variable terms. It will always be channels for exchange of experiences and knowledge not only within a project but also among projects or from project to surrounding organization. Consequently there is a daily fine tuning of project work and outside commitments.

4.4. Strategies to deal with unexpected events

Four common strategies are set up through research to deal with unexpected events (Söderholm, 2008). Team leader and whole project team has a vital role for success of each strategy.

1. Innovative actions. They represent creative ways of managing unexpected changes, unusual actions that stand out of set boundaries.
2. Curriculum with frequent meetings and short-termed coordination. It is essential to observantly follow the situation and consequences of unexpected event, but also to ensure constant flow of information between members of the project team. Extensive meetings include frequent decisions on resources or assignments among team members.
3. Strategy of separation. Isolating revision consequences, to lessen the impact on other parts of the project, or creating another sub-project which will manage the revision.
4. Negotiating skills and preservation of project. To change some of the limiting factors and ensure essential terms for successful project completion, through negotiations with executive board and other stakeholders.

5. LIABILITY FOR UNEXPECTED EVENTS IN CONSTRUCTION PROJECTS

Occurrence of unexpected events often causes great unplanned expenses. For that reason, unless liability is defined by contract, it is open to a lawsuit for any resulting damages or a court order to perform (as in a breach of contract or violation of statute). If it comes to that, court must define who has liability for failing to complete on time. Following is taken into consideration are: if the contractor is liable for the delay, if the machinery is properly maintained, if there were any other parallel delays which affected the project failure, etc. If it is found that neither side is liable, expenses are covered by project owners, investors. All relationships are defined by contracts based on some internationally accepted models of contracts, for example FIDIC (Baker, Mellors, Chalmers, & Lavers, 2009).

One of the most distinctive features of professional building practice in recent years has been the overlapping of performance of tasks by people with difference types and standards of training. The courts have now becoming less reluctant to differentiate skills simply on the basis of labels attached to the party performing them, especially of the expanding functions undertaken by the person trained as an engineer. This is not to say, however, that the courts are anywhere near saying that all who offer advice on the design, construction or performance of a building are to be deemed to have the same skills and competence. At a practical level, the way to avoid future problems (of perhaps being attributes with skills that individuals may not actually possess) is to work towards greater co-ordination of educational and vocational training. The differences between the undergraduate work of a trainee architect, surveyor and engineer are considerable, yet there is considerable overlap of responsibility in the end when out in the field (Chai, 2005).

6. CONCLUSION

Although we plan and try to take all possible risks into consideration, something unexpected can always happen on a project. Those are usually events that drastically change the realisation of the project and that is why they require special attention. Given that they are caused by environmental factors, most often stakeholders, special attention have to be given to those stakeholders and their relationships. Early warnings must be noticed and uncertainty gap must be decreased. Organization has to be equipped to deal with these types of situations, because even with aforementioned precautions unexpected can arise. Flexible planning, higher authorizations of project manager, good team and qualified individuals, would increase responsiveness and decrease reaction time. Such organization, by use of tactics as innovative actions, curriculum with frequent meetings, strategy of separation and negotiating skills has great chances to successfully realize the project, despite unexpected events. Although we are unable to completely foresee the future, by applying these solutions to manage the unexpected the managers are more able to make their own luck.

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PROCESS OF MOVING FROM WATERFALL TO AGILE PROJECT MANAGEMENT MODEL

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Abstract: *This paper focuses on the process of migrating from the Waterfall Project Management Model to the Agile Project Management Model. The main idea is to present the Waterfall and Agile Models, their advantages and disadvantages, as well as the procedure which should be followed in order to move from the Waterfall Model into the Agile Model. Expected risks of the process, which may jeopardize the project, have also been defined, and the means for their mitigation and elimination are put forward. The study has emerged as a result of insight into the project leaders and project consultants' reports. This paper will help project managers as well as developers to understand and be aware of all risks and benefits that may come up while adopting the Agile Project Management.*

Keywords: *Waterfall Model, Agile Project Management, extreme programming, risk management*

1. INTRODUCTION

In addition to the right choice of technology, in software development it is extremely important to decide on the correct model of project management. In search for the pattern that would lead to the guaranteed success and safe project finalization, the first model appeared as the appropriate one – the Waterfall Model (Winston, 1970). Then, the other models kept appearing, such as: Prototyping Model, Incremental Model, Spiral Model, Rapid Application Development Model, Engineering Driven Model and finally in 2001 the Agile Software Development was created. The reason for such great number of models lies in the percentage of failure to manage projects which is still very high, but in the mean time, project management has also displayed certain betterment.

Table 1 shows the general percentage of project success, regardless of the project management model in the period from 1994 till 2009. In 1994 the Standish Group published the CHAOS Report asserting that 31% of projects were cancelled before they ever had got completed. Then, 53% of projects were cost and time overrun and only 16% of projects were completed on-time and on-budget. According to the Standish Group CHAOS Report in 2000, 23% of projects were cancelled, cost/time overrun had gone down to 49% and there were 28% of projects completing required features and functions on time. The last report, published in 2009, has shown that percentage of success has not that much progressed considering the time period. Namely, 32% of projects was completed successfully, 44% with delay and 24% were cancelled.

Table 1: Software Project Success Through Years According To Standish Group Chaos Reports

Year	Successful (%)	Challenged (%)	Failed (%)
1994	16	53	31
1996	27	33	40
1998	26	46	28
2000	28	49	23
2004	29	53	18
2006	35	46	19
2009	32	44	24

Project leaders use the Waterfall Model quite often. The majority of project leaders do not want to jeopardize the project by converting the management to agile methods. Nevertheless, the analyses have shown that the project success of the project managed by agile methods is almost guaranteed. According to the CHAOS Manifesto of Standish Group, published in 2011, as illustrated in Figure 1, the probability of project failure is even three times greater if the Waterfall Model was used, and not the Agile Model.

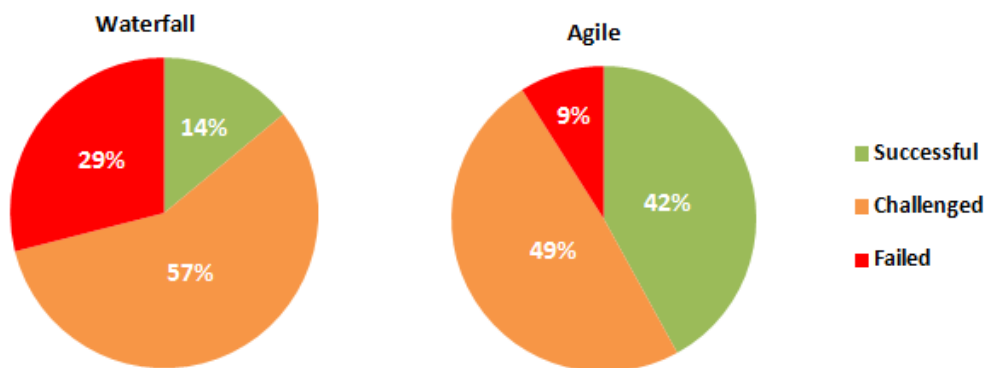


Figure 1: Differences Between Waterfall And Agile Model In Project Success

The basic problems which are encountered during software development are: failing to meet the deadlines, abandoning the projects mostly after failing to meet the deadlines, the piled up architecture, lots of bugs in code (therefore, the program is useless), project participants replacement. However, using agile methods in project management contributes to diminishing the number of the above stated problems, and the way this is achieved will be explained in the remainder of this paper.

Section 2 describes the Waterfall Model principles, while in section 3 Agile Model principles are described. The way how the Waterfall Model-led project may be transferred into the Agile Model-led project is described in Section 4. Section 5 describes specific problems arising in the course of transition to agile methods. The final section summarizes our research and provides the conclusion.

2. WATERFALL MODEL

This model is called in such a way because the model develops systematically from one phase to the other in a downward fashion, like a waterfall. The phases are: defining requirements, designing system an software, implementation and unit testing, integration and system testing and operation and maintenance (Sommerville, 2011). The linearity of this method indicates that each phase may be assigned to the separate team, and only after one phase is completed, another one would begin.

Advantages of this model lie in the fact that a lot of emphasis is dedicated to paperwork in this method when compared to the newer methods. When new workers enter the project, it is easier for them to carry on the work from where it has been left. The newer methods don't document every step in their developmental process which makes it difficult for a recently new member of the team to understand which step is going to follow. The second advantage is that Waterfall Model is well known amongst the software developers, and therefore it is easy to be employed.

There are many disadvantages of this model. Many software projects are dependent upon external factors, amongst which the product purchasers is the biggest factor. It could happen that the product purchaser changes the project requirements thereby influencing an alteration in the normal construction plan, and hence the functionality as well. In such a situation, team must return to the first phase and go through all phases again. The second negative aspect of this model is that a huge amount of time is wasted while running project. If designers are still designing software, time of developers is completely wasted. Also, because the outcome is expected at the end of the phase, usually workers are not so hardworking at the beginning of the phase, and then as the deadline is closer, they overwork in order to finish in time. The phase deadline is often missed. Another disadvantage of this method is that the testing period comes quite late in the developmental process and for that reason the design flaws are found late and all phases have to be repeated. Elaborate documentation during the Waterfall method has its advantages, but it is not without the disadvantages as well. It takes a lot of effort and time to maintain valid versions of documents.

Due to the various disadvantages there are couples of modified versions of this model. For example Sashimi Model overlaps the phases so the developers start to work on implementing design while

designers are creating documents for the rest of the requirements. Since they overlap, one can return to the previous step if desired.

3. AGILE METHODS

Agile methods care for different values in relation to Waterfall Model. Individuals and interactions are more important than processes and tools. Working software is more important than comprehensive documentation. Customer collaboration is more important than contract negotiation and quick responding to change is more important than following a plan (Cohn, 2006). It may be freely said that solutions created by agile methods evolve during the development.

According to Agile Alliance there are twelve principles showing what 'agile' really means. Principles are given in Table 2 below.

Table 2: Twelve Principles Of Agile Model

No.	Agile principles
1.	The most important is to satisfy the customer through early and continuous delivery of valuable software. Hence, the satisfied customer is priority.
2.	Change request is allowed even late in development. This can be used as advantage over the competitors.
3.	Functional software is delivered often, from a couple of weeks to a couple of months. Shorter period is preferred.
4.	Business people and developers must work together daily throughout the project.
5.	Projects are built around motivated individuals. Principle is to give them the environment and support they need, and trust them to get the job done.
6.	Face-to-face conversation is the most efficient and effective method of conveying information to and within a development team.
7.	Primary measure of progress is working software.
8.	Agile processes promote sustainable development.
9.	Continuous attention to technical excellence and good design enhances agility.
10.	Keeping simplicity is essential.
11.	The best architectures, requirements, and designs emerge from self-organizing teams.
12.	The team inspects periodically good and bad procedures and accordingly tunes and adjusts its behavior in order to become more effective.

The overall product development is divided into small iterations which require minimum planning time. Iteration is the short time interval – time box (which mostly lasts one to four weeks). In every iteration a team will go through all the phases of software development (planning, analysis, coding and testing). The iteration result is product release which is functional and which may be presented to the clients. The finalized iteration implies the set of features, and each feature is precisely specified with regard to its function and is tested in details. There is no iteration duration prolongation, and no new requests addition in the course of iteration. If it is observed that the team cannot fulfill all planned requirements, the request of lower significance is tasked and they are switched off the release iteration.

Agile methods should be implemented in high dynamics environment conditions. If there is no dynamic environment, agile methods should not be applied. It could easily happen that there is lack of documentation, because the design is sometimes discussed at meetings and then no person writes it down. Also, the risk is if the customer representative is not clear about the final outcome they want. Then the project can easily get taken off track.

4. PROCESS OF MIGRATING WATERFALL TO AGILE

Agile methodology migration is viewed as a type of experiment by managers. With the beginning of the migration process from waterfall to agile project managers display fear of failure. This is the reason why this process develops gradually and there are many transitional phases. We may say that Waterfall Model mutates into Agile Model at speed which depends on project participating team capabilities.

If there is no one in team who is experienced in agile methods, than it is advised that the consultant should be employed thus monitoring the project flow and helping the team to grasp the agile project management by learning from their own mistakes. So, it is very difficult to implement all agile methods from the beginning, and that is why they are being acquired gradually during each iteration (Sureshchandra & Shrinivasavadhani, 2008). The team usually learns in the more difficult manner by deciding not to accept a method which seems complex to them and which they evaluate as being time consuming. It is only when failure occurs, the team realizes that it happened due to lack of that method usage. Thus, this is usually the most common way of adopting agile methods.

The process begins by agreeing on the way of meeting management. Agile methods favor stand-up meetings. On the first meeting, the team should make a plan defining a number of iterations to be done and which functionalities are being planned for each of them. This plan should not be elaborate, but rather an outline according to which the things would function and which would be updated after each iteration.

Iteration is composed of the following steps:

- Iteration duration time is specified and functional specification requirements for that iteration are written down. The meetings should include also the product purchasers in order to define functionalities correctly thus avoiding the huge number of change requests.
- The team is having daily meetings while there is a meeting with a product purchaser once a week.
- Coding standards should be defined before the beginning of the coding. In this way, developer hesitation and confusion is being prevented from occurring, uniformity code is achieved, code quality is enhanced and the code review and refactoring time are being reduced.
- Automatic tests are composed and used during the code development.
- Daily builds should be made during the development phase.
- Iteration result is the product version and the implemented functionalities list. The product is submitted to the team which tests the product like a user. If the bugs are detected, they are submitted to the team and the team should decide whether they would be corrected in the next iteration or be left for some later iteration.

Iterations are executed one after the other. But one iteration finalization should not be waited for in order to begin with the other, but rather, iterations should overlap (Ming et al., 2004). Figure 2 displays iterations overlapping. The team members may be divided into three groups: those composing functionalities specifications, those coding and testing and those verifying the product. Therefore, one iteration may be displayed through three phases: functional specifications writing (FS), coding with testing (C+T) and verification (V). In the first iteration, when developers work on coding phase, a product architect in collaboration with the product purchaser prepares functional specifications for the other iteration. Thus the developers after finalization of coding phase deliver a release to the verifiers and immediately initiate coding phase of the second iteration. After the verification finalization the verifiers obtain the new product release and this lasts up until the final release has been obtained.

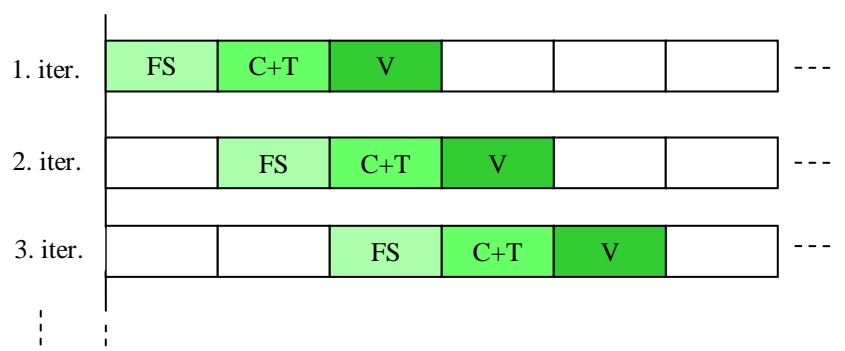


Figure 2: Overlapping Of Agile Iterations

The above mentioned agile methodologies are described in detail in the part which follows: Stand-up meetings, Burn-Down charts, Coding standards, Test Driven Development, Behavior Driven Development and Daily builds.

Stand-up meetings and Burn-Down Charts

The simplest agile methodology easily accepted by team members is in the form of stand-up meetings. A stand-up meeting is a daily team meeting held to provide a status update to the team members. During these meetings each member is asked three questions: 1. What did s/he do yesterday?, 2. What does s/he plan to do today?, 3. Are there any problems? This lasts 15 to 20 minutes at maximum and gives rhythm to iteration.

Another agile method shows how project develops by means of the Burn-Down chart. A Burn-Down chart is a graphical representation of work left to do, versus time. The outstanding work (or backlog) is often on the vertical axis, with time along the horizontal.

Coding standards

Individual style is great when you're working alone. In team software development, however, the goal is to create a collective work that is greater than any individual could create on his/her own. Because requirements are changing very often and code is amended or fixed in iterations, it is needed to have clear code. That's where coding standards are welcome. Code standards are guidelines on which all the developers agree to adhere while programming. However, when you are putting together your coding standards, don't fall into the trap of arguing about formatting. There are more important issues.

Test Driven Development or Behavior Driven Development

One of the differences between agile and traditional testing methods, such as the Waterfall Model of software design, is that testing of the software is conducted at different points during the software development lifecycle. Waterfall Model applies testing after complete system development. Agile Model applies techniques such as Test Driven Development where the tests are written before the code. Since the result of entire iteration is one final product version which implements certain functionalities in order to be sure that these functionalities function correctly and that their introduction has not jeopardize product remaining part, the products must be frequently tested during the iteration. The common practice is that each developer before code committing, starts up all the tests or at least those which s/he regards that cover changes. Before release announcement all the tests should be implemented successfully.

In agile approach, the other testing way is also frequent, and it takes into account sense. This one is called Behavior Driven Development where the scenarios are written before the code, after which automated suite of tests are written. Scenario represents a natural sequence of actions which are possible within the product verifying whether the code meets the required functionality and/or quality standards.

Daily builds

Frequent releases provide product purchasers with current product functionalities, so that they may check out the earlier phase functionality accuracy. Product purchasers may also give their own comments and requests which are used for next versions planning. Both daily builds and automated testing ensure that the code base is not broken after code has been checked in.

5. POTENTIAL PROBLEMS AND HOW TO HANDLE THEM

The risks accompanying stand-up meetings refer to the instances when meetings are prolonged due to problems which are elaborated by a team member and the others willing to help by providing advice. This problem is easy to solve by discussion interruption and if further solving is required additional meeting should be scheduled (Hines et al., 2009).

Many project teams insist on trying to define all of the requirements in advance. This is not just dangerous, but is actually waste of time, since you can almost be assured that a certain percentage of those requirements will be invalidated and the time spent for analyzing them will be for naught (Churchville, 2006). An agile approach to requirements definition is to defer detailed analysis as late as possible, which is typically just before the work is about to begin. Until then, you capture requirements in the form of "user stories", which are brief descriptions of customer relevant functionality.

It is really important to change project manager role from controlling the team to removing roadblocks which impend to the team's progress. Team has to suggest the action and project manager has to approve or disapprove it. Also, the estimation of remaining effort has to be left to the team. The estimation would be more realistic if it comes from the team and there would be more ownership and enthusiasm to complete the iteration in time. Also, decision making is faster. It is better to make a decision quickly even if being a bad one and thus achieve continuity, than wait for weeks on decision which may again be bad and require changes.

It is very hard to make daily builds of a product, especially in the early stage of adopting agile methods. Usually, weekly builds are done and it is satisfying modification of agile methodology as well as there is a build at the end of the week. Something is better than nothing. If project leader notice that none of the developers had checked in their code for the weekly build because they were not sure if the code was working, there is a time to include Test Driven Development. It will ensure that developed code actually meets the requirements.

6. CONCLUSION

This research is base on published reports of team members, project leaders and project consultants, all of whom migrated from Waterfall to Agile Project Management Model. The authors themselves participated in one such project.

On previous projects, we were involved in projects that were Waterfall Model-led. Frequent problems were: the team overworks during 4 to 5 weeks preceding the release, many times the release date has had to be postponed due to delay in development and testing, too many defects have been raised by the customer during acceptance testing, etc. After this, first project was carried out successful by combining agile methods - Extreme Programming (XP) and Scrum. The results were: high productivity of team members, production of high quality code, product purchasers were satisfied because they were involved in project from start to finish.

Process described in this paper is useful for the teams migrating from Waterfall Model to Agile Model. However, knowing this process could be useful for the teams willing to migrate from any other project management model to Agile.

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MANAGING THE COMPETITIVE POSITION OF SERBIA IN ORDER TO ADVANCE TOWARDS EUROPEAN UNION MEMBERSHIP

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Abstract: *In Serbia, the crisis has caused unimaginable devastation and its economic and financial consequences will be felt for a long time. General economic instability, constant political turmoil and financial hardships are hindering the process of European Union accession. The fact is that Serbia and its neighbouring countries have very favourable predispositions to become a developed and attractive location, interesting to many EU investors. One of the primary aims of our country is to end the economy transformation and to enhance national competitiveness in order to move closer to the EU membership. The main aim of this paper is to emphasize one of the possible measures in the process of solving the economic and financial problems in Serbia and to accelerate the EU accession in the light of enhancing its competitiveness. As the main source of data, we have used the Global Competitiveness Report as a basis in our research on actual and previous values of the global index and sub-indexes of competitiveness in Serbia. By detailed analysis of twelve key pillars of competitiveness we will define the actual competitive position of Serbia and note its change compared to the previous years. The purpose of our work is to point to the main factors that distort competitiveness of our country and propose measures which will reduce or even eliminate effects of the mentioned factors in order to improve the competitive position of Serbia which tends to advance towards the EU membership.*

Key words: *European Union, Membership, Crisis, Competitiveness, Index, Sub-indexes, Pillars of Competitiveness*

1. INTRODUCTION

Taking into consideration that improvement of competitiveness of Serbia is the primary driver of its economic recovery and future economic prosperity, we all note that during the period of overcoming the consequences of crisis and accelerating process of EU access, it is highly desirable to analyze its competitive position. In recent years, global economic crisis has been an area of interest and actions of economic policy makers, professional organizations and institutions, researchers and scientists, and it has certainly been a hot topic in various media, so that it indirectly affects the population as well. Precisely at a time when developing countries have made some progress in the way of their own transformation and started hoping for a better future, they came across a huge disappointment and became quite discouraged in the struggle to improve their economies. Serbia is also among the mentioned countries, which is economically and financially very weak and it has huge difficulties to overcome one of the largest global recessions and become EU member. Huge contractions in consumer demand, sharp rise of unemployment, reduction of foreign investments, and decline in demand for export products are just some of very serious problems that our country had to face. The influence of global economic crisis on Serbia is manifested primarily in two ways: in terms of money getting more expensive and the difficulties in export. More expensive money leads to increases in prices of servicing existing debts and new loans, while the difficulties in export are a result of falls of economic activities and lower demand for Serbian economy on main export markets (Knjiga preporuka Nacionalnog Konventa o EU u Srbiji, 2009). In a difficult global economic environment, it is very important for Serbia to realistically examine its own economic situation and realize its competitive position, so that it could be able to act towards its improvement on time. The overwhelming consequence of globalization is such that competition is no longer observed only within national borders (Jenkins et al., 1999). If it uses and analyzes the reports of the World Economic Forum, it will become able to perceive competitive strengths and weaknesses, improve its competitive position, create better conditions for the promotion of its own economic growth and development, and thus leave the whirlwind of the global crisis and accelerate its EU access as soon as possible. In addition to explaining the research methodology applied by the Forum, and processing all the elements that constitute a complex competitiveness concept, in this work we will put special emphasis on the analysis and possible measures to improve the competitive position of Serbia. Using gradual deduction of the

Global Competitiveness Index, into individual sub-indexes and pillars of competitiveness as their parts, we will create a realistic picture of Serbian economy and catch sight of its current competitive advantages and disadvantages.

2. THE WORLD ECONOMIC FORUM AND IMPROVEMENT OF THE GLOBAL COMPETITIVENESS

For nearly forty years, the World Economic Forum has been monitoring and analyzing the indicators of development of national economies, finding answers to numerous economic issues and suggesting solutions to current global problems. It is an independent, international organization established as a Swiss non-profit foundation with the purpose of providing detailed estimates regarding the productivity of global economy and national economies. The motto of this organization tells us quite a lot about its aspirations and goals: “entrepreneurship in the global public interest” (A Partner in Shaping History – the first 40 years, 2009). One of the goals towards which this organization gravitates is encouraging the development of all countries by providing an adequate basis in the form of useful and current data, information and calculations of economic character. One can often read a statement in many Forum reports which says that economic progress without social development is not sustainable, and that social development without economic progress is not feasible. The importance of corporate governance and fostering social and ethical values in the process of development of both individual businesses and entire national economies is also constantly being emphasized.

The World Economic Forum was originally conceived as a partnership of world leaders who contribute to improving global economy and engage in the creation of global and regional plans. Gathered in order to achieve common goals and led by common interests, the leaders say that the role of the Forum is triple:

1. The most prominent organization that establishes and promotes the development of leading global communities.
2. Creative force that shapes global, regional and industrial strategies.
3. The catalyst of choice for its communities when undertaking global initiatives to improve the current situation in the world.

The Forum has successfully achieved set objectives thanks to a wide network of over a hundred partners throughout the world that are doing research on public opinion within national frameworks. These are usually reputable, professional institutions dealing with the aforementioned issues and they periodically send to the Forum high quality and useful information obtained as a product of various research undertakings. Within our regional area, the World Economic Forum cooperates with the Center for Advanced Economic Studies – CEVES in Serbia, National Entrepreneurship and Competitiveness Council in Macedonia, National competitiveness Council in Croatia and School of Economics and Business in Sarajevo in Bosnia and Herzegovina. The Forum publishes summarized results of conveyed researches, classified by areas, in its numerous publications, including the Global Competitiveness Report. It provides multiple useful data on competitive positions of most world countries, as well as their current competitive advantages and disadvantages.

3. RESEARCH METHODOLOGY IN THE GLOBAL COMPETITIVENESS REPORT

Certainly, one of the most significant research publications of the Forum is the Global Competitiveness Report which presents the calculated values of global competitiveness index and individual sub-indexes, in addition to many useful data on achieved levels of economic development of most world countries. Each analyzed national economy is first ranked according to the achieved result of global index, and then according to results of all three sub-indexes and twelve pillars of competitiveness. The end of the report provides a detailed overview of the constituent elements of competitiveness pillars, and results and positions achieved according to all of the analyzed criteria, making a total of over a hundred researched variables that are eventually manifested in the form of competitive advantages or weaknesses of a certain country.

The value of the index provides a better understanding of key factors that determine economic growth of each country, and it also provides the answer to one of the fundamental economic questions: Why are some economies more successful than the others in implementing the process of raising the population's standard of living? The Global Competitive Index records microeconomic and macroeconomic foundations of national competitiveness (The Global Competitiveness Report, 2009). In the current period of overcoming the consequences of economic and financial crisis, a very important role of this index in

measuring the impact of global recession to sustaining long-term competitive advantage of a certain country is strongly emphasized. We can extract three sub-indexes of competitiveness from the abovementioned index.

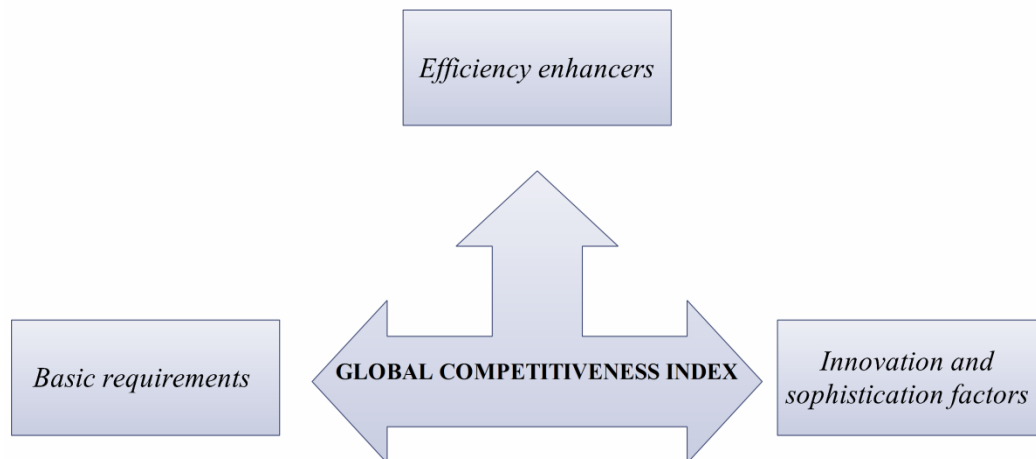


Figure 1. Sub-indexes of competitiveness

Source: Extrapolation of data from "The Global Competitiveness Report 2008-2009"

Presented sub-indexes consist of twelve pillars of competitiveness that are not independent but mutually connected, with the tendency of impact of one pillar on strengthening another and vice versa. Individually speaking, each pillar has different importance and unequal level of impact in the process of forming competitiveness of an individual country, primarily because of obvious differences in the level of development of countries.

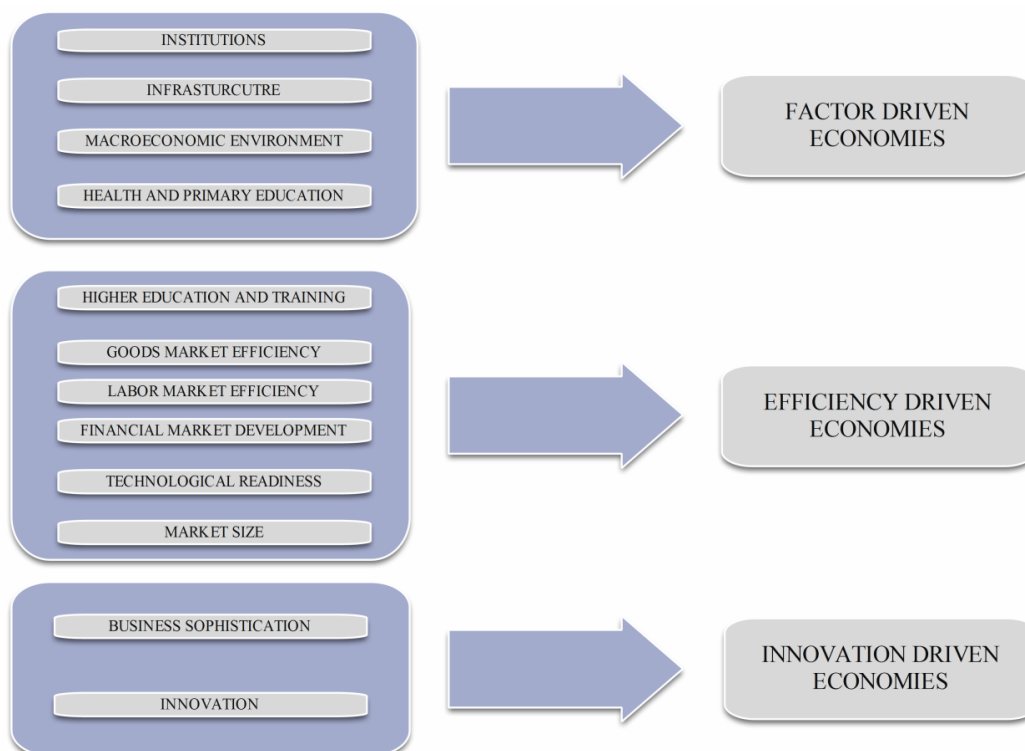


Figure 2. Pillars of competitiveness in various phases of development of national economy

Source: "The Global Competitiveness Report 2009-2010"

During the calculation of Global Competitiveness Index, the infallible and certainly the key fact is the level of development of national economy. In the initial stage of economic development, a certain country predominantly owns basic resources so it enters the competitive battle with the support of production factors, qualified labour force and natural resources in its possession. Further improvement of development is conditioned by growth of real wages and creation of conditions in order to enter the next phase where the emphasis is placed on encouraging efficiency. The country becomes competitive if it implements more productive manufacturing processes and improves the quality of its key products. In the mentioned phase it is essential to invest in the education of human resources, adopt new production technologies, improve manufacturing processes, create high quality products, create such an economic environment that is suitable for attracting foreign investors (reduction of customs tariffs, decrease of taxes, administrative procedures etc.), as well as to establish stability in the financial market. The last phase of development suggests that a certain country is able to keep wages at a significantly higher level and to provide an increase in living standards only if its companies are competitive in producing new and unique products. Developed countries, whose economies are precisely in this last phase, dedicate a great amount of attention to improving corporate culture, introducing innovations, protecting intellectual property and investing in research and development projects. The belonging of a certain country to any of these developmental phases also indicates the size of the Index, sub-indexes as well as its overall competitive position. In accordance with the previously described process of development and pillars of competitiveness that accompany each of the mentioned phases, we can derive three sub-indexes from the Global Competitiveness Index: Basic Requirements, Efficiency Enhancers and Innovations and Sophistications Factors. While calculating the Index, it is very important to adjust individual measurements to the degree of development of a specific country, and to take into account the contribution of each pillar of competitiveness to the final result. The methodology based on data from The Global Competitiveness Report 2010-2011 is as follows:

$$GCI_{ij} = W_{j1}Basic_i + W_{j2}Efficiency_i + (1 - W_{j1} - W_{j2})Innovation \quad (1)$$

$k = 1, 2, 3$

i – Index of a country

j – Stage of country development

W – Ponder

We note that the final result actually represents a weighted average of several different components, each of which represents only one part of the complex concept of competitiveness. All three sub-indexes of competitiveness are directly involved in the calculating of the global index, and therefore also basic pillars as their constituent elements that mutually influence each other in order to create a better final result. The determination of weights depends precisely on the participation of each sub-index in the mentioned developmental phases.

If we want to calculate the value of the Global Competitiveness Index of a country that is in the second phase of development, whose economy is driven by efficiency enhancers such as highly educated labour force, technological equipment, sufficient size and efficiency of the market, then the values of the weights are as follows: $W_{21} = 0.4$ / $W_{22} = 0.5$ / $W_{23} = 0.1$ and they determine the final result. The calculated value of the Index varies between 1 and 7 measure units, and it is value that affects the achieved position of a national economy on the list of global competitiveness, that according to the report from 2011 contains 142 countries.

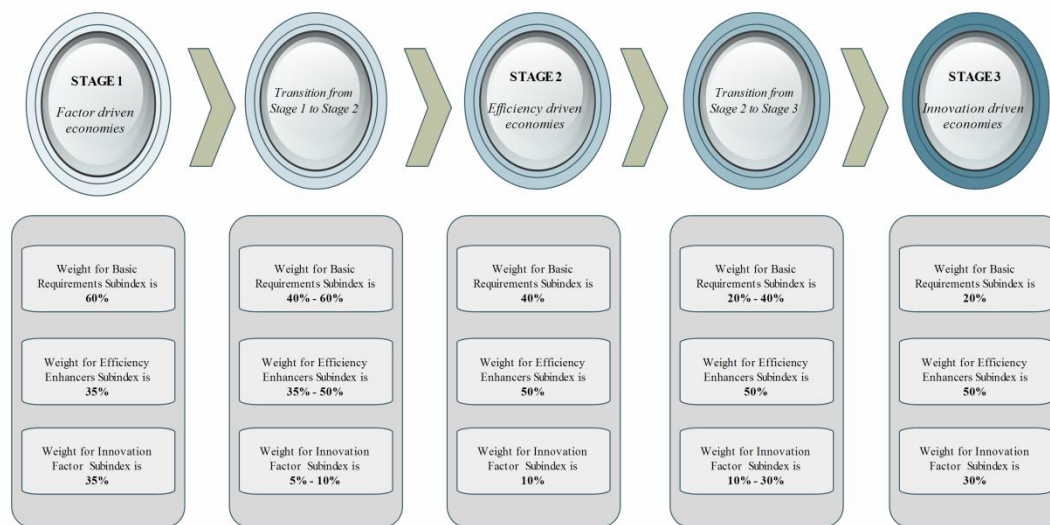


Figure 3. The participation of competitiveness sub-indexes in certain developmental phases of national economy

Source: Extrapolation of data from "The Global Competitiveness Report 2011-2012"

4. SERBIA – EFFICIENCY DRIVEN ECONOMY

In order to define the belonging of a national economy to a certain phase of development, it is necessary to take into account the realized value of GDP per capita, which represents a widely applied and readily available measure of national welfare. It is used instead of the amount of wages in a certain country, since this information is not internationally comparable nor it could be obtained easily. The Forum has set the following reference values of GDP per capita that determine the belonging of a certain country to a specific phase of development:

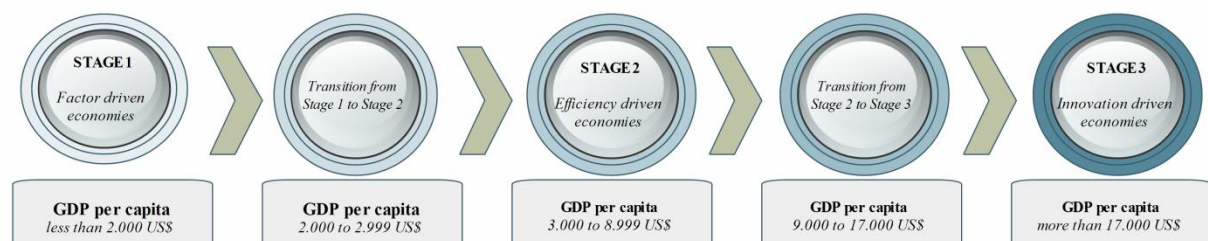


Figure 4. Value of GDP per capita in certain developmental phases of national economy

Source: Extrapolation of data from "The Global Competitiveness Report 2011-2012"

According to the results of a research conveyed by the World Economic Forum, Serbia is in the second phase of economic development – efficiency driven phase (Konkurentnost Srbije i Vojvodine, 2009). Apart from Serbia, our neighbours are also in this phase: Macedonia, Bosnia and Herzegovina, Albania, Macedonia and Romania, while Croatia and Hungary have a real chance to move into the third phase of development.

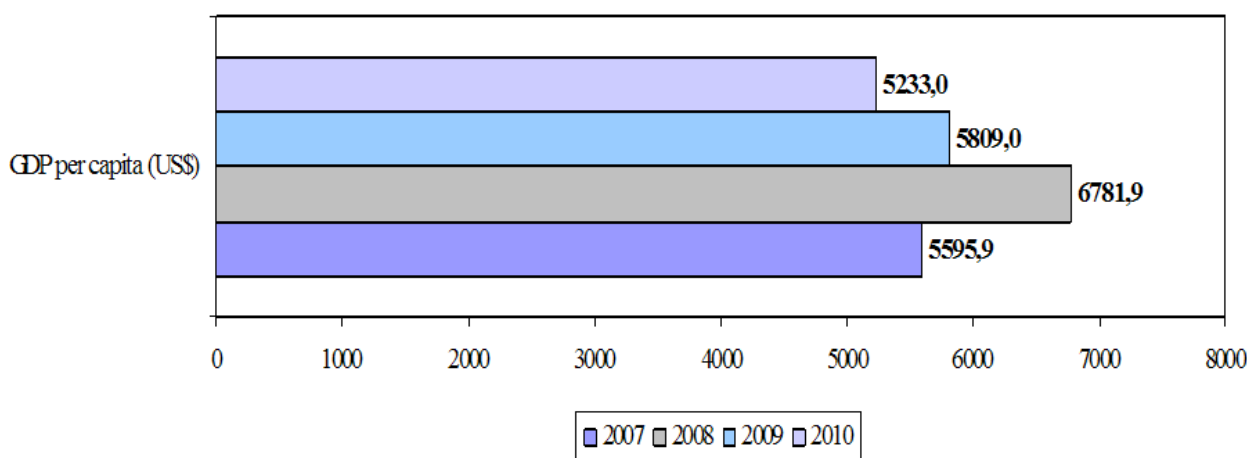


Figure 5. Value of GDP per capita in Serbia in the period between 2007 and 2010

Source: Extrapolation of data from "The Global Competitiveness Report 2011-2012", "The Global Competitiveness Report 2010-2011", "The Global Competitiveness Report 2009-2010" and "The Global Competitiveness Report 2008-2009"

We note that the value of GDP per capita from 2008 was reduced by as much as 1.500 US\$ in 2010, the year that can also be identified by the initial wave of economic and financial crisis. One of the key goals of further development of Serbia is precisely the increase in value of this indicator, i.e. the provision of greater social welfare. To reach this goal, Serbia must focus its strategy of economic development primarily on achieving dynamic economic growth as the basic material prerequisite for quicker increase in standard of living, and reducing unemployment and poverty (Bajec & Jakopin, 2006).

5. ANALYSIS OF COMPETITIVE POSITION OF SERBIA

Global Competitiveness Index of Serbia

In order to further deepen the analysis itself and to gain better insight into the movements of the Index, apart from Serbia, we showed the achieved results and positions of five strongest and weakest economies, especially for proper and objective consideration of the competitive position of our country. According to the last year Report, the research included 139 countries, whereas the current report includes 142 countries. The table below shows current results of the Global Competitiveness Index and, based on this, the positions of certain countries, with reference to the data from the previous year in order to detect changes.

Table 1. Values of the Global Competitiveness Index (GCI) in 2010 and 2011

Country	GCI 2011		GCI 2010
	Position	Result	Position
Switzerland	1	5,74	1
Singapore	2	5,63	3
Sweden	3	5,61	2
Finland	4	5,47	7
USA	5	5,43	4
Serbia	95	3,88	96
Yemen	138	3,06	<i>not measured</i>
Angola	139	2,96	137
Burundi	140	2,95	138
Haiti	141	2,90	<i>not measured</i>
Chad	142	2,87	139

Source: The Global Competitiveness Report 2011-2012

It is interesting to note that the top of the global competitiveness list no longer belongs to the USA, which used to be a common occurrence. Due to its fall from 4th to 5th position, in front of it now are Switzerland, Singapore, Sweden and Finland which, compared to the previous year, made a giant step forward, from 7th to 4th place. The last five countries, whose economies are in an early developmental phase, constantly occupy the bottom of this list it's just their order that changes from year to year. Serbia has also changed its competitive position, so from its best place, 85th in 2008 and the achieved result of 3.9, it dropped all the way to 96th place in 2010. It is interesting that the same global index value of 3.9 in 2011 provided Serbia with 95th place that year, since the list of competitors was expanded by adding new countries.

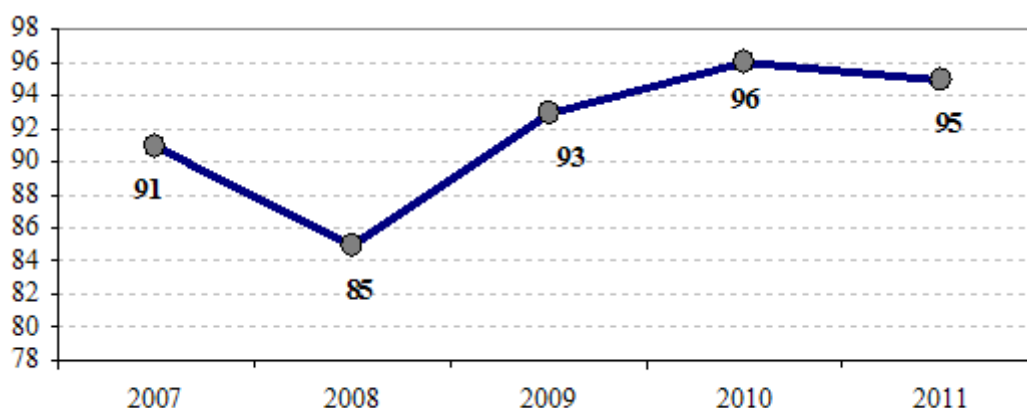


Figure 6. Changes in competitive position of Serbia in the period between 2007 and 2011

Source: Extrapolation of data from "The Global Competitiveness Report 2011-2012", "The Global Competitiveness Report 2010-2011", "The Global Competitiveness Report 2009-2010" and "The Global Competitiveness Report 2008-2009"

The apparent drop in the positioning of Serbia in this case refers to overall competitiveness, which in turn does not necessarily mean an identical fall within individual fields as well. However, it is still, compared to many countries of the world, at a low level of general economic development, whereas hindered conditions of functioning of Serbian economy in the period of crisis have certainly boosted the adverse results.

Sub-indexes of competitiveness of Serbia (*Basic – Efficiency – Innovation*)

We have previously stated and explained in detail that the Global Competitiveness Index contains three sub-indexes that indicate the achieved positioning of a country depending on the developmental phase to which it currently belongs. It is obvious that the sub-indexes are mutually conditioned and that only a highly competitive economy achieves good results in all three fields. The basic resources that a country possesses are its key source of competitiveness and the base for further development and conquering higher competitive positions. Improving efficiency and market expansion, high quality education and adoption of new technologies are characteristic for countries in development such as Serbia. Serbia will remain in this phase for a long time since it is still very far from the possibility of building high quality, sophisticated business systems and undertaking innovative business ventures as contemporary sources of competitive power.

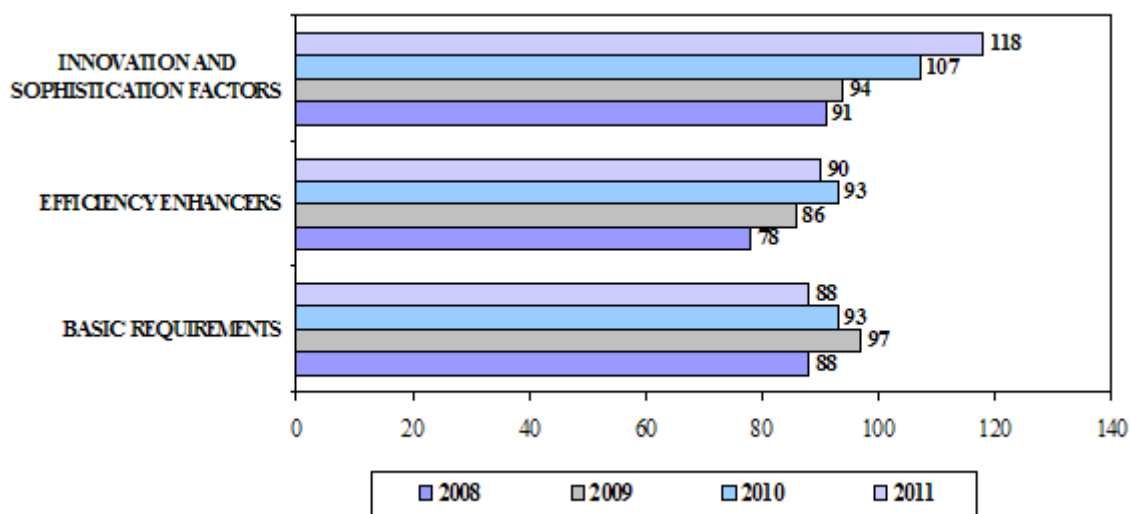


Figure 7. Changes in competitive position of Serbia from the aspect of competitiveness sub-indexes in the period between 2008 and 2011

Source: Extrapolation of data from "The Global Competitiveness Report 2011-2012", "The Global Competitiveness Report 2010-2011", "The Global Competitiveness Report 2009-2010" and "The Global Competitiveness Report 2008-2009"

We note that Serbia is very poorly positioned in the field of achieved innovativeness and business culture, and that there is evident deterioration from one year to another (91→94→107→118). We can freely conclude that the lack of financial resources is a crucial factor in neglecting this area; that will undoubtedly lead to low rankings of Serbia even in comparison to some transition countries and put it at the bottom of the competitiveness list. It takes many years to reach a satisfactory level of economic development, provide financial resources and especially to change the consciousness of Serbian citizens about the importance of researches, patenting and scientific achievements.

If we take a look at the second sub-index, we will note that Serbia achieved slightly better results compared to the previous, but yet again there is deterioration in position in the observed years. Satisfactory health care, especially in the field of prevention of infectious diseases and the obtained level of primary education of the population had the largest effect on the better result of the second sub-index. It is also important to point out that investors interested in Serbia come across flexible wages, suitable employment policy and low cost of layoffs, which represents a significant competitive advantage. However, these privileges for the investors sometimes can be extremely disastrous for the country that is invested in, i.e. the host country. The dismissal of workers by foreign investors stipulates that unemployment may be a huge social cost which is manifested in its worst forms – urban violence, rising crime and social and political unrests. But even if there are no such problems, there are high costs of unemployment (Stiglitz, 2002).

The work of public institutions and infrastructure development in Serbia represent very problematic areas, which is confirmed by its poor positioning in the case of first sub-index of competitiveness. The abovementioned was also contributed to by uncontrolled spending of funds from state budget, citizens' discontent with the government, the rigidity of state measures and lack of judicial independence and efficiency.

Pillars of competitiveness of Serbia

We strongly support the above mentioned facts by breaking down and analyzing each sub-index in detail, citing the results and achieved positions in the field of individual pillars of competitiveness in the period between 2008 and 2011.

Table 2. Pillars of competitiveness of Serbia in the period between 2008 and 2011

Pillars of Competitiveness	Achieved position			
	2008	2009	2010	2011
Institutions	108	110	120	121
Infrastructure	102	107	93	84
Macroeconomic environment	86	111	109	91
Health and primary education	46	46	50	52
Higher education and training	70	76	74	81
Goods market efficiency	115	112	125	132
Labor market efficiency	66	85	102	112
Financial market development	89	92	94	96
Technological readiness	61	78	80	71
Market size	65	67	72	70
Business sophistication	100	102	125	130
Innovation	70	80	88	97

Source: Extrapolation of data from "The Global Competitiveness Report 2011-2012", "The Global Competitiveness Report 2010-2011", "The Global Competitiveness Report 2009-2010" and "The Global Competitiveness Report 2008-2009"

We are aware of the fact that Serbia has a very poor infrastructure network, and we are also witnesses that, in this sector, the process of liberalization has not yet started, and that the reforms are being carried out very slowly. Transition in the sector of economic infrastructure of Serbia demands progress in key areas such as tariff reforms, commercialization, competitiveness, privatization and legal institutional development (Bajec & Jakopin, 2006). Serbia constantly achieves its best position in the field of health care and elementary education. It gains its competitiveness through adequate ways and means of prevention of infectious diseases, extending the life expectancy of its residents and establishing a cost-effective and yet high quality system of elementary education. The institutional sector of Serbia and especially the government that takes care of macroeconomic stability deserves most severe criticism since it constantly lowers Serbia to the bottom of the competitiveness list. Governments often spend too much energy doing things they should not do. It distracts them from what they should really be concerned about. The problem is not only in the enormous size of the government, but also in not doing the right thing (Stiglitz, 2002). Lack of effectiveness of the goods market and extremely low level of business culture are particularly critical areas that we can clearly see in the analysis of the current position of Serbia from the aspect of individual pillars of competitiveness.

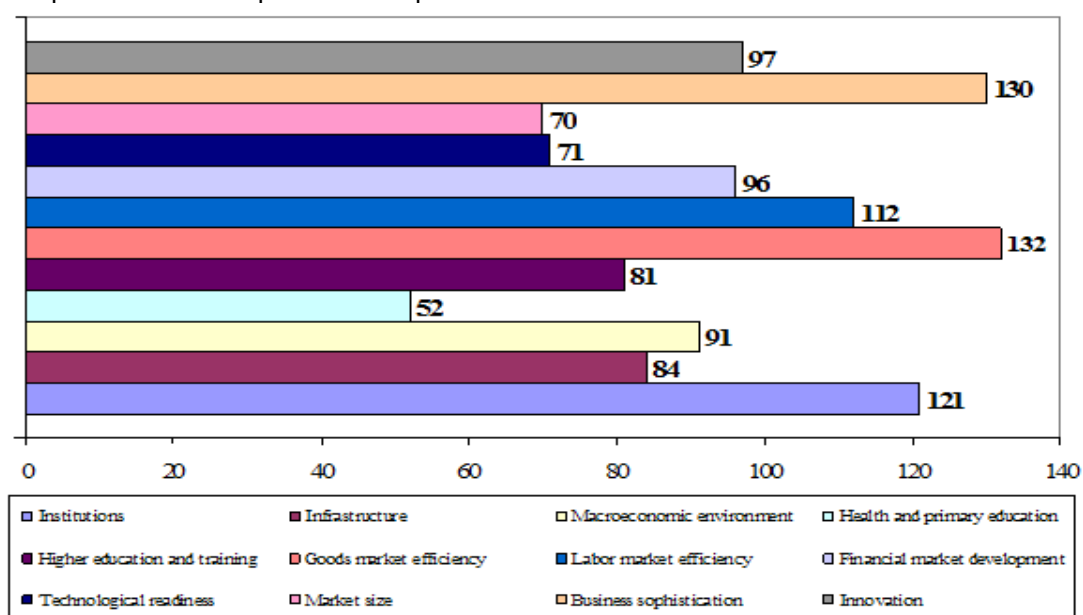


Figure 8. Competitive position of Serbia in 2011 from the aspect of pillars of competitiveness

Source: Extrapolation of data from "The Global Competitiveness Report 2011-2012"

It might seem impossible, but according to the current data on the goods market efficiency, our country is ranked similarly to undeveloped African countries. Such placement is primarily caused by inefficient anti-monopoly policy, high degree of market control and constant interference with its free functioning. Competition in the national market is at an unenviable level, whereas the entry of new, foreign competitors is rather difficult due to very unfavourable and inflexible conditions offered to foreign investors. Consumers in Serbia are not sufficiently informed about all aspects of purchasing, are unprotected from possible risks that arise from the act of purchasing and subsequent usage of the product, and they certainly lack the manners of modern consumers. The 130th place rank in the area of business sophistication seems very daunting, especially to foreign investors wishing to invest their capital in Serbian companies. It is very difficult to change previous habits and established, rigid norms of behaviour of workers and employers in the Serbian market. They are primarily not interest enough for developing a positive business culture as well as to creating a pleasant working environment. Employers often consider investments in education and training of their employees as irrecoverable costs and unnecessary waste of capital.

Actual competitive advantages and disadvantages of Serbia

In order to determine leading factors that impede the normal functioning of the economy and prevent smooth conduct of business activities in Serbia, the World Economic Forum and the Serbian Centre for Advanced Economic Studies – CEVES have conducted a survey among entrepreneurs and managers regarding the mentioned issues and singled out the most critical areas.

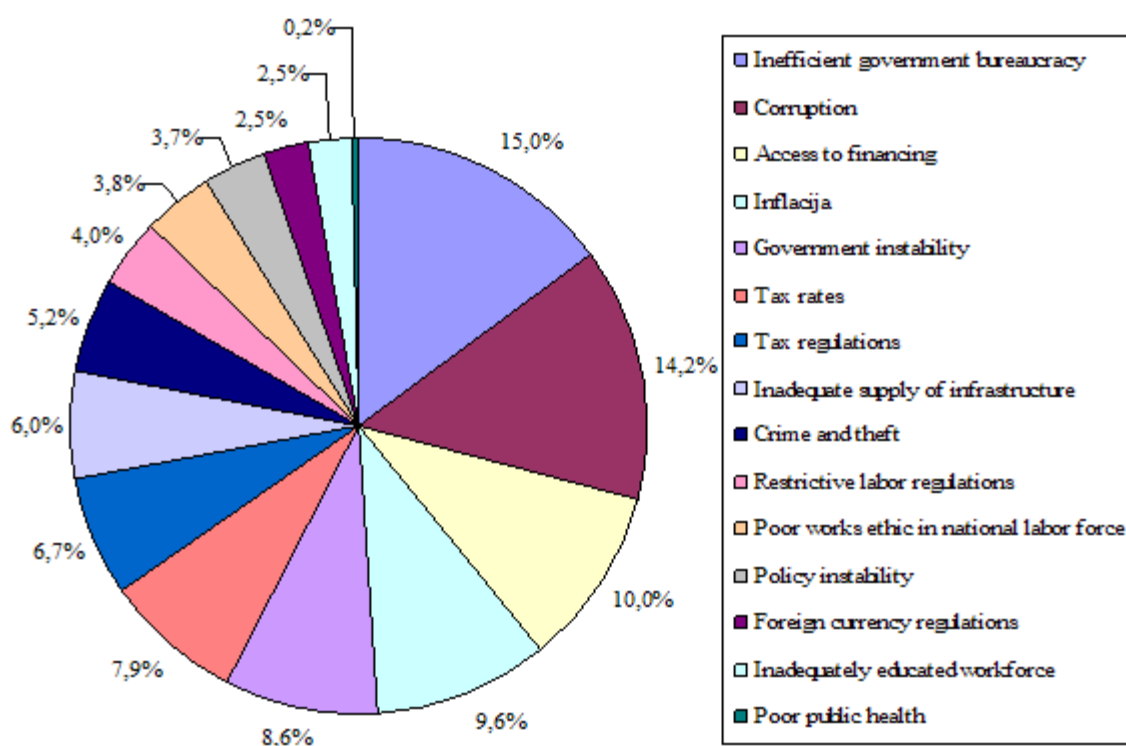


Figure 9. The most problematic factors for doing business in Serbia in 2011

Source: Extrapolation of data from "The Global Competitiveness Report 2011-2012"

Current business instabilities are generated exactly by those factors that influenced low values of global index and sub-indexes of competitiveness and caused Serbia to gain extremely poor position in the competitiveness list. Inefficient government, high levels of corruption, lack of funds and poor credit conditions, as well as high inflation rates generate almost half of the problems in the business activities of Serbian entrepreneurs. The aforementioned and other presented factors strongly reject foreign investors from the idea of starting a business on the Serbian market. They are particularly concerned about

constant political instability, very expressive corruption, rigid foreign exchange regulations and poor work ethic. Long lasting procedures for obtaining building and other permits, insufficiently precise legislation governing many business areas and unfavourable tax treatment of business entities are additional elements that make Serbia a very unattractive investment destination. In 2006, the Serbian Government adopted the "Strategy of encouraging and developing foreign investments" that defined the activities aimed at improving the business environment, providing support and incentives in order to attract foreign investments and boosting export. The action plan for removing administrative barriers for foreign investments includes measures and activities in the following areas: establishment of companies with foreign capital, infrastructure development, functioning of companies, reforms of public administration, judicial reforms and other system measures (Bajec & Jakopin, 2006).

By breaking down the presented pillars of competitiveness into constituent elements, we can obtain data on over a hundred variables that are manifested in the form of competitive advantages or disadvantages of Serbia. The implementation of this process is not performed according to the same methodology for all countries, but depends on the ranking of a certain country on the overall list and the realized value of the Global Competitiveness Index. Advantages and disadvantages of the countries that occupy the top 10 places on the abovementioned list are also differently determined compared to those in places from 11th to 50th, as well as countries that are ranked in the second half of the list, i.e. below the 50th place. We have concluded that in 2011 Serbia takes 95th place; the value of its Competitiveness Index is 3.9, in which case we apply the following rule:

1. If a certain variable enables ranking of Serbia onto any place above the 50th, it represents a competitive advantage.
2. If a certain variable enables ranking of Serbia onto any place below the 50th, it represents a competitive disadvantage.

Taking into account the abovementioned rule, we come to a very discouraging conclusion. According to current measurements of the World Economic Forum, Serbia has only 14 competitive advantages, while nearly a hundred remaining variables represent competitive weaknesses. The advantages themselves are quite modest, since they are manifested in the form of widespread telephone and Internet networks, mass usage of mobile phones, low costs of workers' severance pay and established legal regulation of the financial market. Serbia also has advantages in the field of successful prevention of infectious diseases such as tuberculosis, malaria and AIDS, whereas a satisfactory level of elementary, secondary and higher education of citizens and high quality math and science education could become potential competitive advantages.

6. CONCLUSION

In the period of overcoming the consequences of the crisis, continuing economic transition and accelerating process of EU membership, Serbia has to pay more attention to improving its own competitive position in order to create real opportunities for attracting foreign investors and to start economic growth. This goal is very ambitious and requires a lot of time, resources and sacrifices in order to begin its implementation. One of the obstacles is the institutional sector of Serbia that is at a very low level of development, especially due to inadequate functioning of the government, presence of organized crime, anti-competitive behaviour of companies and lack of interest in providing more convenient conditions to foreign investors. Dilapidated and unmaintained roads and railways hinder both usual and business movement of people, and slow down and often prevent normal functioning of trade flows. The most important problems in the energy sector are insufficient capacities for generating electricity and the dependence of the country on energy imports. A critical issue every winter is the insufficient capacity for storing natural gas used by households and industry for heating (Bela knjiga, 2009). The constant threats of inflation, unfavourable interest rates and government budget deficit are constant problems whose solution is very uncertain at the moment. Serbia can be praised for the rapid development of telephone and internet network that in the future may become its significant competitive advantage. In recent years, there has been significant progress in the prevention of infectious and other diseases, protection of human health and prolongation of its life expectancy. If we add to the aforementioned the improvement of elementary, secondary and higher education system by introducing more modern principles of operating,

we can note that the competitive potential of Serbia definitely lies in capable, professional and qualified labour force. However, young professionals are rarely provided with adequate treatment after completing their education, which contributes to further continuation of the phenomenon of “brain drain” from Serbia in the future. The dominance of individual over global goals, as well as the aspiration of the governing coalition to meet their own interests has led to rapid impoverishment of Serbian population. One of the key competitive weaknesses that make Serbia a very unattractive for foreign investors is underdeveloped business culture, lack of work professionalism and disrespect of ethical values.

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PUBLIC SECTOR MANAGEMENT IN CRISIS: DISORIENTATION CASE OF SLOVENIA

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Abstract: *Since 2007, when the economic crisis in the world started, we have been facing various attempts to improve economic stability and re-introduce growth in individual economies around the world. However, despite some indications that after 2010 economy slowly started to recover, today it is more or less obvious that it was just a false hope before a further step downwards. In this general trend, Slovenia has not been an exception. However, what makes the case of Slovenia different is its transitional struggle with economic principles, especially in the light of its lack of political maturity. The article itself is mainly focused on different measures that have (not) been taken in order to improve economic recovery in Slovenia.*

Key words: *economic crisis, public sector, Slovenia, reforms, politics, transition*

1. INTRODUCTION

Severe economic situation in the world since 2007 opens several serious questions. However, governments as well as economy in individual states as well as globally, are mainly addressing only those which are considered as mainstream supportive. Such behaviour can be understood contra-productive and not solving the economy. However, situation itself directly influences not only private sector but public sector as well. Despite the article shall discuss influence of recovery measures on the public administration or better on public sector in Slovenia, it is necessary to set certain point of perspective which can help us to understand mismanagement of public sector in the time of crisis. Thesis that we will try to support in this paper is that economic crisis in certain state can be generated by state or recovered with help of state but it remains economic crisis and not state crisis. European Union (in some cases for sure absolutely justified, but not in general) was searching for the opportunities to create next cycle of economic growth in systematic cutbacks of public expenditures of highly indebted states. However, little incentives were offered for economic recovery. Greek case was used as potential scenario for each state that did not take all the necessary steps to reduce the size of public sector to almost minimal level. In 4th year of economic stagnation or recession Brussels realized that reducing public expenditure is not working and in mid-April first information on starting economic incentives was released. Initial information is that there will be 200 billion Euro investment plan in order to start new economic cycle based on investments into infrastructure, green energy and hi-tech development. By changing the direction of recovery plan, European Union indirectly admitted that public sector cannot be responsible for economic crisis in a sense of being shock absorber for what went wrong in private sector. However, states can be held responsible for bad management of public finances during the years of economic growth which helped to low possibilities for state intervention in economy during the recession.

2. HISTORICAL BURDEN OF SLOVENIAN PUBLIC SECTOR

After change of political and economic system Slovenia should start transition in what is market economy and democracy. However, it seems that political transition (in the sense of establishing transparent and relatively free, plural electoral system) was much more effective than economic one. Main problem that was never completely resolved was privatisation. Slovenian government tried to keep main state companies under control as long as possible and it was trying to support them in order to reduce the chances for bankruptcy. By doing so Slovenia managed to reduce the risk of social instability due to increased number of unemployed, but on the other hand, state was systematically spending enormous budgetary funds, not only on social security but also on preserving status quo in the semi-private sector. By doing so, Slovenia developed system of semi-state owned or state controlled (via ownership shares) companies which existence was secured by the state budget (state in fact guaranteed for their loans). Same goes for the biggest bank system in Slovenia (NLB d.d.) which is state owned and considered of strategic importance which opts-out possibility for foreign investment. In recent years, state invested hundreds of millions of Euros in order to keep NLB d.d.

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working. By doing so, state was clearly indicating mainly one thing. It will not let allow classical capitalist logic take over the private sector. In this perspective state was trying to introduce different measures also after 2008, not only to keep jobs but also to keep bad companies alive.

3. MAIN ISSUES OF SLOVENIAN ECONOMY

Slovenian economy was due to the historic development of market economy relatively closed to foreign investments and at the same time domestic companies were due to the administrative and taxation burden eager to move abroad. Despite Slovenian workforce is rather expensive, the main problem is lack of innovation and lack of its flexibility on the individual level (people prefer state support than searching for working opportunities). Despite state sees this mainly as the problem of structural nature at labour market, it is more likely to be problem of classical socialist assumption that state should take absolute care of unemployed person. Despite some measures were taken (need to take job opportunity given by unemployment agency in order to keep unemployment subsidy, need to take offered job for education level lower for two levels after certain period of unemployment, etc.) people were mainly misusing these opportunities. People were attending job interviews and openly saying that they are not interested to work, getting employed and sabotaged the work in order to get fired and receiving unemployment subsidy again.

In order to introduce better opportunities for self-employment state was issuing grants in the approximate size of 4500 Eur from European Social and Structural funds under condition that company of self-employed person will work for at least two years. This was misinterpreted by state as providing starting opportunity and by grant receivers as free money. Because when self-employed person started the business quickly realized that grant will cover barely social security fees while burden of accounting, other taxes and salary is absolutely on the worker, who started business usually with 4500 Eur of free money in the mind and without serious strategic plan, how to run business and also without proper knowledge of the economy. In this sense waste majority of such enterprises was closed down after initial two-year period.

On the other hand, established companies have interesting approach of seeing state role in the economy. They are systematically demanding reduction of state burden for private sector in three different ways. First is lower taxation burden on the profit. Main reason shall be increased share of profit for reinvestment into business, but there is significant doubt that companies would sign the agreement which would oblige them to do so. On the other hand, avoiding taxation, companies are trying to run around zero profit level. Second, companies demand lower burden of work force price. Each worker cost company about 30-40% more than just net salary due to prepayment of personal income tax (25%, social and healthcare benefits and pension fund). We need to add also travel cost reimbursement and lunch payment or provision which are rights that belong to workers. Third demand from private sector is need for labour market liberalisation, which would enable companies to hire and especially fire people much faster and with less negative effects for the company.

From this perspective private sector is on one hand avoiding taxation and on the other hand it demands less security of jobs. They are not interested in level of life standard and quality. Answer who should protect individuals remains unanswered. From this perspective slavery should be ideal economic regime from private sector perspective.

However, it is interesting that private sector in general sees state responsible for keeping them solvent. This goes especially for state controlled companies. In this sense we observe situation when owner shall take care of the resources which should enrich shares for it. State owned company should try to realize as much as profit on market in order to support state budget and not ask for financial support from the owner. And owner (state) should sell or let go bankrupt company that is not doing so. From this perspective we can call such pattern of economy still transitional at its best or we can critically refer to it as reversed communism of private sector, where private sector demands from the state planned economic policy enabling private sector to develop environment of state secured zero profit level with benefits.

In this situation state follows political logic of keeping the power as long as possible between active economic elite and passive public/work-force. In this situation state is much more willing to create economic and labour policy according to the demands of the private sector. Because they always count on the fact that people will slowly get used to any negative change which will not take effect immediately before the election. Second problem with the state in the case of Slovenia is that, state is still one of the greatest domestic consumers, especially for certain types of the products, such as construction. At the same time economic crisis revealed also that state is one of worst payers. In the case of construction industry, economic crisis revealed that companies were not paying workers social, healthcare and pension fees, as well as not sub-contractors for months and that on the other hand state was not paying for projects in timely manner. Consequently all mayor construction companies were destroyed (SCT, Vegrad, GP Grosuplje, Primorje), few thousands of workers become jobless and sub-contractors are mainly not paid off because banks have

priority in the process of paying off the debt of certain company. At the same time construction companies were creating their own companies in order to spread revenues and for keeping low profit.

In this sense state is more than obviously protecting capital prior to labour because it is allowing the system where debt to the banks shall be served in the process of bankruptcy prior to other debts, which usually causes that there is little or no lefts to pay off sub-contractors and workers. By doing so state actively support lowering the standard and life quality as capital oriented economic policy. By doing so, state creates extra budgetary costs due to higher requests for social security by workers/citizens. Under described situation there is no possibility for budgetary balance and even less for sustainability without serious reforms of whole economy.

4. PUBLIC SECTOR IN THE CRISIS

Description of the general situation in previous part leads to the increasing pressure to change work of the state or public sector. In order to understand the situation better, we are presenting few data on Slovenian budgetary, and public sector situation. According to the Slovenian Statistical office debt of the state was growing form 18,6% GDP in 1995 to 47,6% in 2011.

Table 1: Government gross debt as % of GDP

year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
%	18,6	21,9	22,4	23,1	24,1	26,3	26,5	27,8	27,2	27,3	26,7	26,4	23,1	21,9	35,3	38,8	47,6

Source :Internet 1 (3.5.2012)

However, all the threats with Greek scenario and similar cases can be considered as general overreaction and media supported intimidation. Main goal of such activities is aforementioned need to cut public expenditure and reduce social security. Eurostat data on the Government gross debt as % of GDP. (Table 2) shows that Slovenia has only about 60% of EU member states debt average in 2011.

Table 2: Comparative government gross debt as % of GDP for 2011

geo\time	2011
Greece	165.3
Italy	120.1
Ireland	108.2
Portugal	107.8
Iceland	98.8
Belgium	98
Euro area (16 countries)	87.4
Euro area (17 countries)	87.2
France	85.8
United Kingdom	85.7
EU (25 countries)	83.2
EU (27 countries)	82.5
Germany	81.2
Hungary	80.6
Austria	72.2
Malta	72
Cyprus	71.6
Spain	68.5
Netherlands	65.2
Poland	56.3
Finland	48.6
Slovenia	47.6
Denmark	46.5
Slovakia	43.3
Latvia	42.6
Czech Republic	41.2
Lithuania	38.5
Sweden	38.4
Romania	33.3
Norway	29
Luxembourg	18.2
Bulgaria	16.3
Estonia	6

Source: Internet 2 (3.5.2012)

Table 2 shows that Slovenia is 12th least indebted country within the EU. In order to get to the point of Greece technically, Slovenia would need to in-debt itself for another 4 times. And if we compare Government debt in Germany one can see that it is almost twice as high as in Slovenia in 2011. From this perspective it seems that public spending, despite it is far from sustainable is not main problem of economic recovery in Slovenia

Table 3: GDP growth rate (in %) compared to the previous year, sorted descending on basis of 2011

geoltime	2005	2006	2007	2008	2009	2010	2011
Estonia	8.9	10.1	7.5	-3.7	-14.3	2.3	7.6
Turkey	8.4	6.9	4.7	0.7	-4.8	9	7.5
Lithuania	7.8	7.8	9.8	2.9	-14.8	1.4	5.9
Latvia	10.1	11.2	9.6	-3.3	-17.7	-0.3	5.5
Poland	3.6	6.2	6.8	5.1	1.6	3.9	4.3
Sweden	3.2	4.3	3.3	-0.6	-5	6.1	3.9
Slovakia	6.7	8.3	10.5	5.8	-4.9	4.2	3.3
Austria	2.4	3.7	3.7	1.4	-3.8	2.3	3.1
Iceland	7.2	4.7	6	1.3	-6.8	-4	3.1
Germany	0.7	3.7	3.3	1.1	-5.1	3.7	3
Former Yugoslav Republic of Macedonia	4.4	5	6.1	5	-0.9	1.8	3
Finland	2.9	4.4	5.3	0.3	-8.4	3.7	2.9
Montenegro	14.7	8.6	10.6	6.9	-5.7	2.5	2.7
Romania	4.2	7.9	6.3	7.3	-6.6	-1.6	2.5
Malta	3.7	2.9	4.3	4.1	-2.7	2.3	2.1
Belgium	1.8	2.7	2.9	1	-2.8	2.2	1.9
Switzerland	2.6	3.6	3.6	2.1	-1.9	2.7	1.9
Bulgaria	6.4	6.5	6.4	6.2	-5.5	0.4	1.7
Czech Republic	6.8	7	5.7	3.1	-4.7	2.7	1.7
France	1.8	2.5	2.3	-0.1	-2.7	1.5	1.7
Hungary	4	3.9	0.1	0.9	-6.8	1.3	1.7
United States	3.1	2.7	1.9	-0.3	-3.5	3	1.7
Luxembourg	5.4	5	6.6	0.8	-5.3	2.7	1.6
Norway	2.6	2.5	2.7	0	-1.7	0.7	1.6
EU (27 countries)	2	3.3	3.2	0.3	-4.3	2	1.5
EU (25 countries)	1.9	3.3	3.2	0.2	-4.3	2.1	1.5
Euro area (17 countries)	1.7	3.3	3	0.4	-4.3	1.9	1.5
Euro area (16 countries)	1.7	3.2	3	0.4	-4.3	1.9	1.5
EU (15 countries)	1.8	3.1	3	0	-4.4	2	1.4
Netherlands	2	3.4	3.9	1.8	-3.5	1.7	1.2
Denmark	2.4	3.4	1.6	-0.8	-5.8	1.3	1
Ireland	5.3	5.3	5.2	-3	-7	-0.4	0.7
Spain	3.6	4.1	3.5	0.9	-3.7	-0.1	0.7
United Kingdom	2.1	2.6	3.5	-1.1	-4.4	2.1	0.7
Croatia	4.3	4.9	5.1	2.2	-6	-1.2	0.6
Cyprus	3.9	4.1	5.1	3.6	-1.9	1.1	0.5
Italy	0.9	2.2	1.7	-1.2	-5.5	1.8	0.4
Slovenia	4	5.8	6.9	3.6	-8	1.4	-0.2
Japan	1.3	1.7	2.2	-1	-5.5	4.4	-0.7
Portugal	0.8	1.4	2.4	0	-2.9	1.4	-1.6
Greece	2.3	5.5	3	-0.2	-3.3	-3.5	-6.9

Source: Internet 3(3.5.2012)

From table 3, one can see that Slovenian GDP growth drop in 2009 was fifth most serious after Estonia, Latvia, Lithuania and Finland. Only difference is that in 2011 aforementioned countries are realizing among highest levels of GDP growth while Slovenia, keeps bottom with Japan, Portugal and Greece.

Table 4: Unemployment in selected countries over the years

Source: Internet 4 (3.5.2012)

GEO/TIME	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Spain	11.4	11.4	10.9	9.2	8.5	8.3	11.3	18.0	20.1	21.7
Greece	10.3	9.7	10.5	9.9	8.9	8.3	7.7	9.5	12.6	17.7
Latvia	12.2	10.5	10.4	8.9	6.8	6.0	7.5	17.1	18.7	15.4
Lithuania	13.5	12.5	11.4	8.3	5.6	4.3	5.8	13.7	17.8	15.4
Ireland	4.5	4.6	4.5	4.4	4.5	4.6	6.3	11.9	13.7	14.4
Slovakia	18.7	17.6	18.2	16.3	13.4	11.1	9.5	12.0	14.4	13.5
Croatia	14.8	14.2	13.7	12.7	11.2	9.0	8.4	9.1	11.8	13.5
Portugal	5.7	7.1	7.5	8.6	8.6	8.9	8.5	10.6	12.0	12.9
Estonia	10.3	10.0	9.7	7.9	5.9	4.7	5.5	13.8	16.9	12.5
Bulgaria	18.2	13.7	12.1	10.1	9.0	6.9	5.6	6.8	10.2	11.2
Hungary	5.8	5.9	6.1	7.2	7.5	7.4	7.8	10.0	11.2	10.9
Euro area (17 coun	8.5	9.0	9.3	9.2	8.5	7.6	7.6	9.6	10.1	10.2
European Union (27	8.9	9.1	9.2	9.0	8.3	7.2	7.1	9.0	9.7	9.7
France	8.3	8.9	9.3	9.3	9.2	8.4	7.8	9.5	9.8	9.7
Poland	20.0	19.7	19.0	17.8	13.9	9.6	7.1	8.2	9.6	9.7
United States	5.8	6.0	5.5	5.1	4.6	4.6	5.8	9.3	9.6	8.9
Turkey	:	:	:	9.2	8.7	8.8	9.7	12.5	10.7	8.8
Italy	8.5	8.4	8.0	7.7	6.8	6.1	6.7	7.8	8.4	8.4
Slovenia	6.3	6.7	6.3	6.5	6.0	4.9	4.4	5.9	7.3	8.2
United Kingdom	5.1	5.0	4.7	4.8	5.4	5.3	5.6	7.6	7.8	8.0
Cyprus	3.5	4.1	4.6	5.3	4.6	3.9	3.7	5.3	6.2	7.8
Finland	9.1	9.0	8.8	8.4	7.7	6.9	6.4	8.2	8.4	7.8
Denmark	4.6	5.4	5.5	4.8	3.9	3.8	3.4	6.0	7.5	7.6
Sweden	6.0	6.6	7.4	7.7	7.1	6.1	6.2	8.3	8.4	7.5
Romania	7.5	6.8	8.0	7.2	7.3	6.4	5.8	6.9	7.3	7.4
Belgium	7.5	8.2	8.4	8.5	8.3	7.5	7.0	7.9	8.3	7.2
Czech Republic	7.3	7.8	8.3	7.9	7.2	5.3	4.4	6.7	7.3	6.7

However we can nicely see from the unemployment table that Slovenia in the time of crisis did not take appropriate measure to act against unemployment problem. This shows inability of state and economy to cope with increasing number of jobless workforce. Despite general unemployment in Slovenia compared to other states or different averages is still relatively low Slovenian unemployment rate almost doubled from 2008 to 2011 while in some other states such as Czech Republic, Belgium, Sweden, Finland as well as in the Euro zone and EU27 unemployment rate was stabilized in 2010. In concrete numbers this means that since 2008, Slovenian unemployment rate rose from approximately 65.000 to approximately 115.000 unemployed people available for work. According to statistical data from Slovenian Statistical office highest unemployment rate was in 1993 with 9,1% (Internet 5), which indicates that current economic situation has as devastating impact on labour market as change of political and economic system had it 20 years ago.

Under these circumstances, Slovenian public sector needs to take measures in order to save economic situation according to the government plan. Slovenian labour market consists from approximately 1 million workers out of which 8,2% are currently unemployed and around 930.000 are working. According to the report of Agency of the Republic of Slovenia for Public Legal Records and Related Services at the end of 2007, Slovenian public sector had 154.500 employees and by the end of 2011 number raised up to 160.900 public sector employees³. Total number of those that were directly paid from the budget dropped from approximately 42.800 to 42.600 employees (Internet 6) The difference of 111.000 to 120.000 employees is composed from employees in public services such as pre-school education, all three levels of public education (primary, secondary and higher education), public research institutions, healthcare and social security system. According to the same data set there is approximately 3.750 employees in public sector on individual contract (usually directors of public sector institutions) with the average gross salary of 3.557 Eur, while rest of 157.000 employees, working on the basis of the collective contract receive average gross salary of 1.785 Eur. At the same time, general (of both, private and public sector) average gross salary was, according to the data of Slovenian statistical office, 1.546 Eur.

Possible solutions are going in two different ways. One is reducing the size of public sector as such, despite its size is relatively close to the size of public sector in any other EU member state (in relative terms). Any significant cut in public sector size would increase the number of patients per doctor, and students (pupils)

3 Number is estimated on the sum of working hours.

per teacher. It is known that Slovenia has already huge problem to provide adequate number of doctors of different profiles to serve the needs for healthcare. Privatization of the healthcare and education could partly solve the problem, but there is significant doubt that private pricing would mean also private quality. This is questionable especially in higher education where Slovenia is facing serious problems by lack of control over quality of knowledge as well as over the quality of performance. Problem is connected to the general idea that state should take care of all the risks while profit will be collected by private institutions. In general Slovenian public sector represents approximately 18% of all working force and in such situation government sees main solution to the economic crisis in reduction of size of public sector.

Second suggested option is reduction of public sector expenditures. Current government is proposing 800 million Euro savings project which reduce salaries in public sector for more than 10%, shorten 100% covered maternity leave from 1 year to 3 months and in the last quarter to approximately 70-80% of full subsidy. Different other benefits or incentives could be limited as well. However, at the same time, government is not really pressing on state owned companies to act more responsibly and it is thinking about new additional financial investments in order to save them from bankruptcy.

Additional level of cynicism is shown by some high civil servants who are calling public sector for more responsible behaviour in a private sector terms. Especially in the field of research and development there are demands for more market oriented or applicative research that will produce some added value for economy. Such approach might be seen as good thinking but the problem is that economy – especially Slovenian one is mainly relying on state support than on innovation and application of theoretical findings in the practice. Hereby, civil servants usually forget that higher education has double role (one is basic research in any given field and second is transition of the knowledge on the young generation). Role of the new graduates and economy is to find the way how to apply knowledge into innovative products. Demanding otherwise is like expecting doctor to do the diet on patients' behalf.

6. CONCLUSION

From the general development of current economic situation in the world and aforementioned changes in EU policy, where member states realized that cutting the expenses was not very effective solution. At the same time, general statistical data (at least those which are usually presented as indicators of the problem in Slovenian case) show relatively low level of relevance on the solution side of thinking. Slovenian Public sector was not growing exponentially and 160.000 employees mainly include those people who are providing services of higher life quality (education, social and healthcare security, cultural development, etc.). Reducing the size or costs of these services can have significant influence on the long term potential for the development of the state. Despite there are possibilities to rationalize and reorganize public sector, there is for sure no reserve to save almost one billion Euros without serious danger to general quality of life.

In this sense Slovenian government shall concentrate on recovery of economy by investment in perspective products and services (even if this means some additional increase of the debt in first phase) and only in the phase of recovery state should start to think about savings.

Last point which should be stressed again is that Slovenian government should provide higher level of transparency of use of public finances, should do more in the field of separation of political and economic elite and in final stage should decide to provide serious transition in economic sphere where state will be on the side of protecting the quality of life for general population (providing public goods and services) and where private sector will have nothing more but fair chance to compete for those projects which would be outsourced by the state. In order to achieve this, state shall start to demand from state owned enterprises to produce profits (in the cases where public goods are not in question) and on the other hand state should not interfere into economy by saving enterprises but by providing stimulative competitive environment on one hand and protecting level of life quality on the other hand. Surviving on the market shall be issue of owners and managers of the companies.

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THE SELECTION OF SOFTWARE FOR THE INFORMATION SYSTEM IN UTILITY SERVICE DEPARTMENT „VODOVOD IN VALJEVO“

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Abstract: *This document shows the research carried out on the selection of software for the Information System in Utility Service Department Vodovod in Valjevo. It also clarifies the basic alternatives and criteria which were taken into serious consideration while making the best choice of software for the Information System in Utility Service Department Vodovod in Valjevo. The most important reason for introducing a new software for the Information System is the inadequacy of the current one as well as the growing necessity of introducing a software which will integrate all organizational units into Utility Service Department Vodovod in Valjevo. The aim of this research is to analyze all relevant solutions and to select a solution which is compatible with the needs of the organization. The research has been carried out in three different phases. We developed and used "Additional questionnaire" in the first phase of the research, Delphi method was used in the second stage of the research whereas AHP method together with application software was used in the third stage of the research. After a detailed study, we concluded that the most acceptable and adequate alternative for the implementation of the system is Digit alternative. Utility Service Department Vodovod in Valjevo has all rights to change the given parameters. This model of making the best selection, which includes three phases (together with the developed 'Additional questionnaire') as well as the combination of decision-making methods with the use of the software, can also be used as a model of decision-making when other organizations have to choose the best software for their Information Systems.*

Keywords: *Information, System, Integrated, Software, Solution, Choice, Decision, Analytic, Hierarchy, Process,*

1. INTRODUCTION

All organizations that want to develop their businesses successfully and to retain their dominant positions in the market economy environments have to value information properly and manage with it adequately. The developed information system makes it possible to achieve.

„An information system can be defined as a set of interrelated components that collect, manipulate, store and disseminate data and information and provide a feedback mechanism to meet an objective“ (Vavpotič., 2012). Therefore, each organization should dedicate itself fully to the selection of adequate software for its information system. That particular software should suit the needs and specific conditions of a particular organization. This means that all relevant decision-making criteria as well as alternatives, which are suitable for the implementation of a concrete system, need to be defined when choosing the best software for the information system. The selection of software for the information system must be adequate because the successful development of all organizations depends exactly on this selection.

2. THE REASONS FOR DECIDING ON THE SELECTION OF THE SOFTWARE FOR THE INFORMATION SYSTEM

Utility Service Department Vodovod in Valjevo is an organization with proactive plans for the future which keeps pace with the latest market innovations. The Management Sector of the company in association with Development Service has defined the goal of the company which is based on the need of introducing new software in the information system, so that the goals set could be efficiently achieved in the future. New information system should be integrated into all business functions inside an organization i.e. it should be involved completely in its business activities. Two basic sectors which would be fully integrated by introducing new information system are presented in the organizational scheme. These two sectors are: 1. Economic Legal and General Operations Sector, 2. Technical Production Sector.

New integrated software should consolidate these two sectors. Also, it should enable its users to exchange information in an effective and efficient way. With the help of such an exchange of information the management of the company will be able to handle with difficulties and to make proper decisions in time.

The introduction of new integrated software would enable the introduction of a higher management level, the development and application of new business strategies, lower business expenses, and the increase in

productivity. Also, it would allow the increase in flexibility, standardization, in the quality of information, integration of business activities, and reengineering. Furthermore, new integrated software would allow the enhancement of business processes, higher level of their efficiency, fast data entry and the implementation of professionals' methodical and rich experience accompanied by the professional training.

Considering the fact that keeping pace with the latest innovations in Information Technologies is indispensable part of any business activity, the Management of Utility Service Department *Vodovod* in Valjevo has decided that the top priority of the company is to introduce new software for its information system.

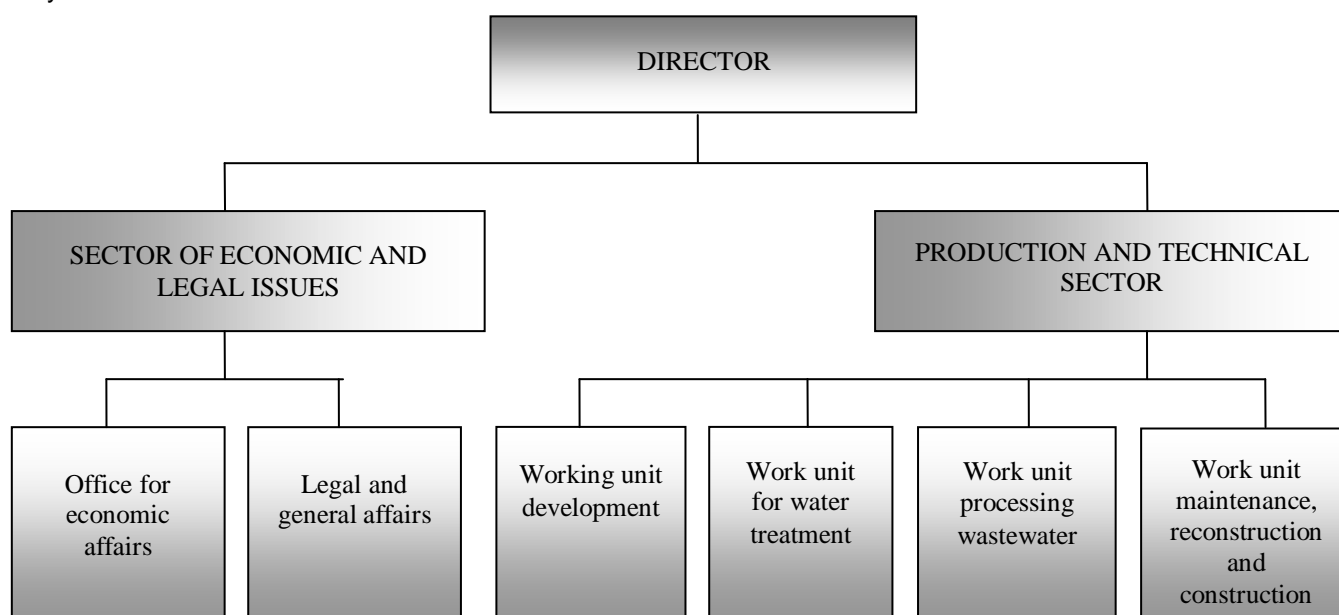


Figure 1: Organization chart in “Vodovod – Valjevo”

3. DECISION ALTERNATIVES

The Department of Development has defined five decision alternatives. These alternatives are the most available and current possibilities for the introduction of the integrated software on our market. All five alternatives have been listed in the first decision-making.

- Mycrossoft Dynamics,
- AB soft,
- Digit,
- SAP and
- The company's own alternative.

Microsoft Dynamics NAV 6.0

The main *Microsoft Dynamics NAV 6.0 platform* features and benefits are: it has more than 46,000 users, more than 2,000 partners with licences, more than 41 localized versions of a product which was sold in more than 130 countries. The offer of the project for the implementation of *Microsoft Dynamics NAV 6.0 CS* includes the information system's concept design, a questionnaire, an interactive meeting, presentations and an opportunity to share the experience gained on a similar project for the implementation of the information system in Utility Service Department *Naissus* in Niš. The offer is based on:

1. the usage of 12 (twelve + 1) licences for simultaneous users (BSC Software., 2012),
2. the operating modules which are the part of a standard licence range: Financial accounting, the basic assets and a low inventory, planning and budgeting, supplies and obligations, storage and storehouse operations, sales, marketing and receivables, Personnel records and business analytics;
3. additional modules for *financial reports* such as: input calculation, VAT (value-added tax) records, cards GK, a client supplier, articles and fixed assets. The *specific modules designed for Utility Service Department activities*: the system of customers' personal information, the system of personal property water measurements information, tellers' operations (unlimited number of counters, mobile counters). The *specific modules designed for the water-supply activities*: the control of the maintenance of water meter, the control of the maintenance of the network and storehouse, the

- register and calculation of water consumption, complaints, collection letters as well as preparation for the integration into Web application that allows water meter reading entry,
4. the formulation of the project plan and documents,
5. the implementation and
6. providing training and support for customers.

AB soft

AB soft business software is designed for only one legal person and for only a specific number of users set by the company business who can install and work on this software. *AB soft* includes: „financial management service (financial service accounting, financial executive, the Treasury), the management of material resources (material accounting and fixed assets), the staff management (staff records and earnings accounts), the information system management (it implies the formation of users who have certain legal rights to access different parts of the information system)“ (Ab., 2012). There are several levels of customers' rights which could be adapted to suit the needs of each customer individually. Customers' performance data (data entry, data change, data deletion...) is recorded in data base.

Primary maintenance of *AB soft* business software includes 12 months, starting from the day when a customer signs the contract to legally use *AB soft* business software. Primary maintenance includes: the usage of the adaptation of the original *AB soft* business software, which is produced when the need for it arises, in order to adjust changes of regulations in database processing and to eliminate possible latent failures of the business software. After the expiry of these 12 months starting from the day when a customer signs the contract, *AB soft* will continue the standard maintenance of the contracted *AB soft* business software provided that a customer decides to sign the contract with *AB soft* which implies extension of the standard maintenance of contracted *AB soft* business software. Annual *AB soft* business software usage fee is 20 % of the royalty fee when using the contracted *AB soft* business software, starting from the day when a customer decides to sign the contract with *AB soft*, which implies extension of the standard maintenance.

Digit

Software package *Digit* from Belgrade is a product which consolidates modular and parameterized functional units which are implemented in more than 20 related businesses. Software package *Digit* from Belgrade suits the needs of all customers. „It is based on the experiences and real needs of numerous users“ (Digit., 2012). It can be automatically filtered and it enables users to search and select different information by various attributes. It is vital that all future users are well-prepared to deal with this software. It includes: the registration of the connection requests, the analysis of the connection requests, an issue of incorporation, the registration of customers, the registration of product consumption, settlement of accounts, accounting for manufacturing businesses, collecting customers' charges, customers' exclusion from the system, the system of products classification, the description of the integral elements in complex products as well as planning when providing supplies. It also includes: the classification of products, storehouse activities when providing supplies, the registration of the fixed assets as well as of the equipment and set of tools, the maintenance of the fixed assets, equipment and tools, financial accounting (general register), customers, suppliers, the treasury, material accounting, project accounting, budget planning, monitoring of budget realization, the definition of parameters for income account, the registration of performance data and income account, the definition of the organizational structure, the organization of workplaces, the registration of employees' personal information, the registration of employment changes, employment record book, the registration of documents (registry) and the electronic archive system.

The development of company's own alternative is seen as a decision-making alternative. The development of company's own alternative would create the alternative which suits the needs and requirements of the Utility Service Department *Vodovod* in Valjevo. However, the implementation of such an alternative wasn't achieved because the company lacks proper technical and time potentials. The investment in new equipment and the employment of skilled and highly experienced professionals in this field of work would bring about considerable expenses.

Also, this alternative would require a considerable amount of time to create, develop and test its new possible solution. Because of these limiting factors this alternative was rejected after the first stage of decision-making (*Delphi method*)

SAP ERP software is designed to suit the needs and requirements of large and middle-sized companies covering all industrial organizations and sectors:

- SAP ERP Human Capital Management – transforms the role and the value of human resources.

- SAP ERP Financials – transforms financial management into a strategic business partner.
- SAP ERP Operations – bring about efficiency and rapidity in company's operations.
- SAP ERP Corporate Services – modernize business processes and the analysis of expenses.

SAP ERP Financial system includes „planning and realization of budget, general register, finance, supplies, fixed assets, management accounting, material accounting, and full maintenance of technical systems and all staff activities as well as sales i.e. invoicing“. (Sap., 2012). The price of SAP system is approximately 400,000 Euros. Its high price was the dominant factor which categorized SAP system as unacceptable in the first stage of decision-making (Delphi method).

4. DECISION - MAKING CRITERIA

The next important task when selecting the best software for the information system is to define and value decision-making criteria. The Development Working Group has defined the following eight decision-making criteria:

- the price criterion,
- functionality,
- stability,
- the number of users,
- reference list (the implementation in Utility Service Departments in Serbia),
- compatibility with the knowledge and skills of the employees,
- compatibility with the hardware technical system and
- advisors' assessment.

The price criterion is the first decision-making criterion we agreed on. Taking the company's limited assets into account, we had to recognize the great importance of this criterion. When we first considered defined alternatives, the alternative number 4 SAP and the alternative number 5 exceeded the company's budget. Therefore, these two alternatives didn't reach the second stage of the decision-making analysis and weren't accepted as possible solutions. Functionality is the criterion which takes the functionality of the suggested alternative into serious consideration i.e. it examines how well the given alternative performs business activities and carries out functions set by a particular company. The stability of the selected solution is the criterion which determines the level of system reliability and safety. The alternatives which showed higher level of reliability and safety will be given a higher mark.

Another important decision-making criterion is the number of users. Each suggested alternative depends on a specific number of users. The suggested alternatives will get a specific number of points depending on the number of their users. The alternative with the largest number of users will get the most points and will be placed first according to this decision-making criterion. The reference list criterion is one of the already defined decision-making criteria. It ranges the given alternatives according to their number of implemented solutions in the systems of the same or similar business activities inside the country. In this way, we put a greater value to those alternatives with larger number of implemented solutions inside the systems of the same activities (Utility Service Department –Vodovod and sewage-in the country). The introduction of new information system faces strong opposition from the employees in every organization as they are used to the old system of working. In order to bridge the gap between the old and the new system, new information system has to be compatible with the knowledge and skills of the most employees. Therefore, the alternative which is the most compatible with the knowledge and skills of the employees will be placed first according to this decision-making criterion.

Hardware can be a limiting factor if the software solution is too demanding. Utility Service Department began the phase of introducing new computer network which is designed to fully suit the needs of the information system. Considering this criterion, the limiting factors are computers. All computers in Utility Service Department in Valjevo belong to the old generation of computers. This means that additional assets are needed in order to raise the technological level of computers. The software solution that requires lower expenses will be given a higher mark. Utility Service Department Vodovod in Valjevo is a system which has always cooperated with the most eminent science institutions in the field of Information Technology and Management. For these reasons, outside advisors took part in the decision-making process on the new software alternative and they assessed the given alternatives. The alternative with the highest mark will get the most points according to this decision-making criterion.

5. THE PRESENTATION OF A DECISION - MAKING MODEL

The decision-making model developed and implemented by Utility Service Department *Vodovod* in Valjevo consists of three phases. In the first stage, the employee, who is responsible for the Information System, decided upon the alternatives which will be the case of the further analysis and decision-making process based on the „Additional questionnaire“ (which is defined as a model for other organizations).

„*Additional questionnaire*“ enables quantitative assessment of the alternatives. 'Additional questionnaire' includes the following six questions:

- 1) The lowest market price,
- 2) The highest market price,
- 3) The optimum price,
- 4) The alternative with the largest number of functionally modular characteristics,
- 5) The alternative which is time-saving and
- 6) The alternative which requires optimum time for the implementation

An alternative has to meet the requirements for at least one of the presented questions if it is to be on the list of desirable alternatives. By comparing the possible alternatives with the list of these questions, an IT expert has formed the list of desirable alternatives which deserve attention due to their quantitative characteristics. After answering to these questions, an IT expert has formed the group of desirable alternatives. These are: *Ab soft*, *MS Dynamics*, *Digit*, *Sap* as well as *the development of company's own alternative*.

Delphi method was used in the second stage of decision-making process.

This method 'is carried out in several steps (circles) which lead to the prediction acceptable to all experts' (Matić, 2008). Delphi method determined the final list of the alternatives which will be taken into consideration during the third stage of the decision-making process. In the first stage of Delphi method decision-making, the team of experts were asked which information system is the most relevant system to be implemented in Utility Service Department *Vodovod* considering five offered alternatives: Microsoft Dynamics, AB soft, Digit, SAP and the development of company's own alternative. After we acquired results in the first stage, we moved to the second stage of decision-making. Professionals were assessing the given alternatives of all experts. While defining their claims, experts presented their marks and commented on each alternative one by one. As the final result of Delphi method decision-making process, it has been concluded that SAP and the development of company's own alternative received the lowest rating. As such, these alternatives are unacceptable for the further analysis and decision-making. Most experts' opinion is that these two alternatives are too expensive. The development of company's own alternative is not only too expensive but it is also time-consuming. Therefore, both alternatives were marked as unacceptable and they didn't enter the third stage of decision-making.

The third decision-making stage uses *AHP method* (Analytic Hierarchy Process method), together with the software for the method implementation. One of the best decision-making softwares is Expert Choice and it can be used in this decision-making process. AHP method implies analytic hierarchy process method. This method enables the person who makes a decision to include his/her personal point of view, personal experience, knowledge and his/her intuition in the decision-making process. AHP method presents complex problems as a model of hierarchy. This kind of model requires four phases: "problem structuring, data collection, the assessment of relative complexities and problem-solving decision" (Suknovic., 2010).

The price criterion

9 8 7 6 5 4 3 2 | 2 3 4 5 6 7 8 9

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Figure 2: Comparison criteria

AHP decision-making result is shown in picture 3, Line number 1 shows Digit alternative, Line number 2 shows Microsoft Dynamics alternative, and Line number 3 shows AB Soft solution.

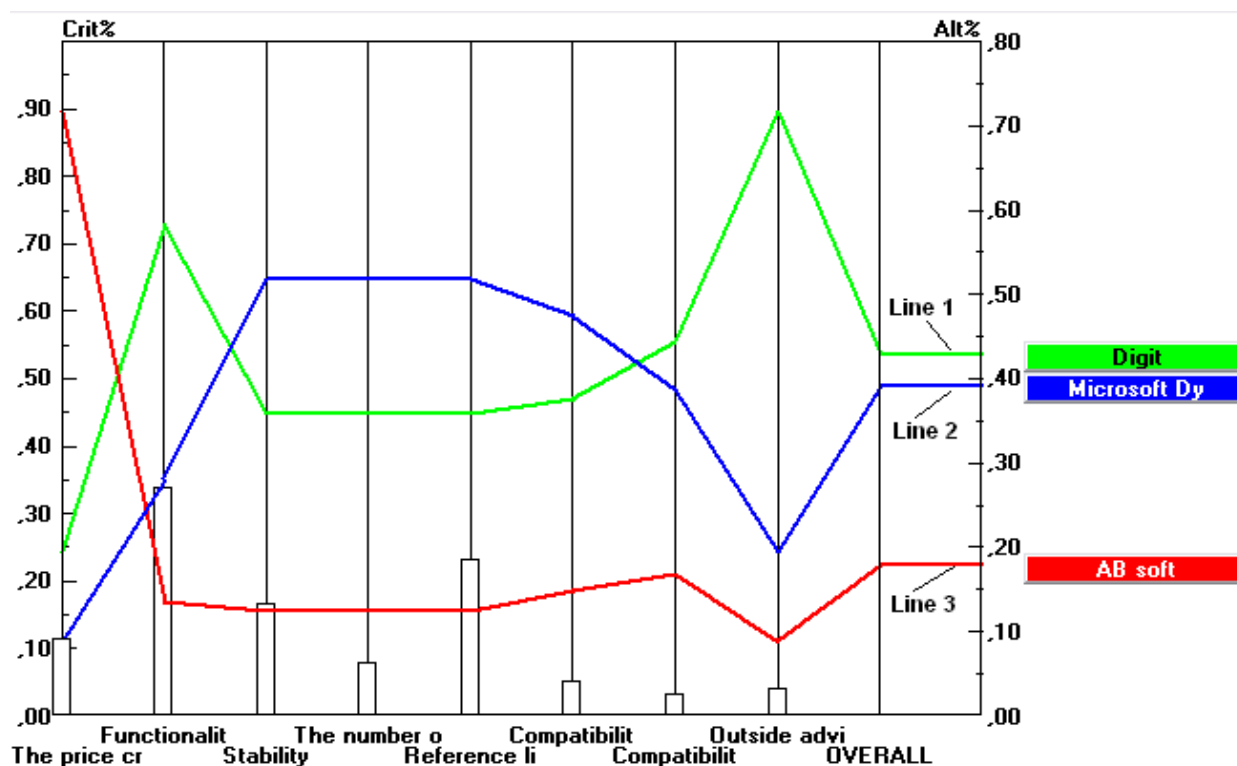


Figure 3: Comparison of alternatives

Table 1: Value criteria and alternatives

Num.	Criteria	Value criteria	Ateranativa rank in relation to criteria	
1.	Functionality	0,332	Digit	0,584
			Micro.Dyn.	0,281
			AB Soft	0,135
2.	Reference list	0,226	Micro.Dyn.	0,517
			Digit	0,359
			AB Soft	0,124
3.	Stability	0,158	Micro.Dyn.	0,517
			Digit	0,359
			AB Soft	0,124
4.	The price criterion	0,107	AB Soft	0,717
			Digit	0,195
			Micro.Dyn.	0,088
5.	The number of users	0,072	Micro.Dyn.	0,517
			Digit	0,359
			AB Soft	0,124
6.	Compatibility with the knowledge and skills of the employees	0,045	Micro.Dyn.	0,474
			Digit	0,376
			AB Soft	0,149

7.	Advisors' assessment	0,033	Digit	0,717
			Micro.Dyn.	0,195
			AB Soft	0,088
8.	Compatibility with the hardware technical system	0,026	Digit	0,443
			Micro.Dyn.	0,387
			AB Soft	0,169

The criteria are presented in order of their importance. According to the first criterion, the top alternative is Digit because it includes the largest number of functionally modular characteristics. According to the second criterion, the top alternative is Micro.Dyn because it includes the greatest number of relevant users. According to the third criterion, the top alternative is Micro.Dynas as it is highly reputable and reliable alternative. According to the fourth criterion, the top alternative is AB Soft as it includes the free accession of the software. A large number of users possess Micro.Dynas so it was the top alternative according to the fifth criterion. Furthermore, Micro.Dynas alternative is the most compatible with the knowledge and skills of the employees (Microsoft Office, Microsoft Windows XP...).

According to the seventh criterion the top alternative is Digit because advisors assessed it with the highest mark (Dorius d.o.o. Belgrade and an assistant at Business Administration School in Valjevo).

According to the eighth criterion the top alternative is Digit because it doesn't require special hardware characteristics.

6. MAKING DECISION

The decision on the selection of software for the information system is the result of the current condition analysis and the growing need for the new information system.

AB soft system was placed last on the list. It was assessed with 0,179 points. The next on the list is Microsoft Dynamics alternative with 0,392 points. The first on the list as the best alternative is Digit solution. It was assessed with 0,429 points. Therefore, the Digit alternative is the most suitable alternative for the implementation.

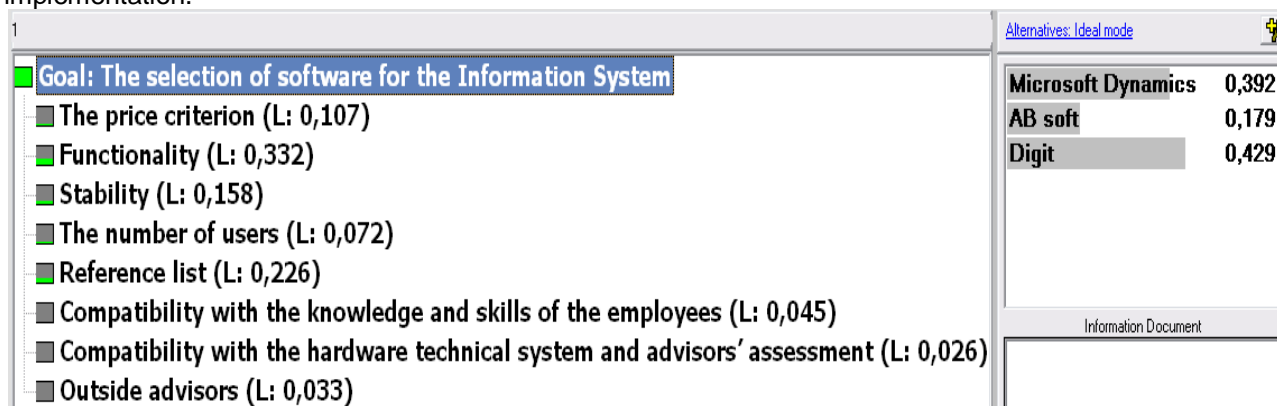


Figure 4: The result of making

7. CONCLUSION

The implementation of this decision-making model will bring lasting benefit. The advantages of this model are:

- Utilization of objective quantitative indicators,
- Inclusion of the employees (future users) into the decision-making process,
- Inclusion of experts' knowledge into the decision-making process,
- High precision and reliability and
- The selection of the most compatible alternative

The decision-making model will be used by Utility Service Department „Vodovod in Valjevo“ but it can also be very useful for other organizations if they opt to introduce new software for the information system. The implementation of the suggested software alternative in Utility Service Department „Vodovod in Valjevo“ would enable the fulfilment of a higher level of management, the development and application of the new

business strategies, lower business expenses, increased productivity, greater flexibility, standardization, higher information quality, integrated business processes, reengineering, the enhancement of business processes and their higher efficiency. Furthermore, it would enable fast data entry, and the implementation of professionals' methodical and rich experience accompanied by the professional training.

In this way, other organizations are given opportunity to have a decision-making model on the selection of software for the information system. The result of the decision-making process on the selection of integrated software is: the software which is the most compatible with the current needs and capabilities of not only Utility Service Department „Vodovod in Valjevo“ but of many other organizations.

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MEASUREMENT OF INFLUENCE OF QUALITY MANAGEMENT ON COMPETITIVENESS REGARDING REPUBLIC OF SERBIA AND ISO 9000 STANDARD SERIES

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Abstract: *World Economic Forum measures competitiveness of nations in its Global Competitiveness Report every year. This paper is about the influence of quality management on final ranking of nations in GCR. Measurement is conducted by comparing indicators with ISO 9001 request for organizations. The rank of Serbia in highlighted indicators is also compared with Western Balkans, EU, Japan and USA to show its weaknesses and what is needed to be done for Serbia to get better ranking in future.*

Key words: *competitiveness, quality management, Global Competitiveness Report*

1. INTRODUCTION

“Competitiveness of nations is not created by its natural wealth, work force, interest rates or national currency value. Competitiveness of a nation depends on the capability of its economy to innovate and to move forward. The more the basis of competition moved towards production and assimilation of knowledge, the stronger the role of the country became. Competitive success is contributed by differences in national values, culture, economy structures and institutions. Each country has a different competition structure and its competition sector. The suitable role of the country is to be the catalyst and stimulant; it should encourage companies to be more ambitious and to achieve even higher levels of competitive advantage. Country policies are successful once they create an environment in which companies can achieve competitive advantage, i.e. they fail when they implicate the country directly into the process, except in those countries that are in the initial stage of development. Country regulations can stimulate competitive advantage by stimulating and strengthening local demand. Strict standards related to characteristics and safety of products, as well as to the impact on the environment, make pressure on companies to ensure quality, perfect technology and ensure those characteristics that correspond with the demands of consumers and the society.” (Michael E. Porter, 1998). Main hypothesis of this paper is: Quality management influence for more than ¼ on final rank on competitiveness of country in GCR measured by World Economic Forum.

2. COMPETITIVENESS OF THE REPUBLIC OF SERBIA

The World Economic Forum is, along with the World Bank, the largest, most quoted and therefore the most significant institution dealing with analysis and competitiveness measuring today. For more than three decades, the World Economic Forum's annual *Global Competitiveness Reports* have studied and benchmarked many factors underpinning national competitiveness. From the onset, the goal has been to provide insight and stimulate discussion among all stakeholders on the best strategies and policies to overcome the obstacles to improved competitiveness. Since 2005, the World Economic Forum has based its competitiveness analysis on the Global Competitiveness Index (GCI), a comprehensive tool that measures the microeconomic and macroeconomic foundations of national competitiveness. World Economic Forum defines *competitiveness as the set of institutions, policies, and factors that determine the level of productivity of a country* (Klaus Shwab (Editor), 2011). The concept of competitiveness involves static and dynamic components, although the productivity of a country determines its ability to sustain a high level of income, it is also one of the central determinants of its returns to investment, which is one of the key factors in explaining an economy's *growth potential*.

According to the Global Competitiveness Index of the World Economic Forum for the 2011-2012, the Republic of Serbia is in the 95th rank out of 142 countries. This result is a deterioration compared to the 2009 list, when it was the 93rd out of 133 countries. Serbia's index value is 3, 9 out of possible 7. That represents a melioration compared to 2009, but only by 0, 1, considering the fact that last years' index value was 3, 8. Three years ago, Serbia was rated 3, 86, and took the 85th place. One can clearly see the impact of the world economy crisis to the fall of competitiveness of Serbian economy and its mild recuperation in 2010.

The marks are very close, however, the necessary reforms were not made and it is obvious that Serbia fell behind other countries. The index value for 2007 was 3, 78, and Serbia was at the 91st place. The competitiveness of Serbian economy was measured by this report for the first time in 2003, as the part of the State Union of Serbia and Montenegro, taking the 77th rank. The Republic of Serbia holds one rank higher place, than Montenegro, but still is in very bad position comparing to its needs for investments and developing of economy.

3. INDICATORS INFLUENCED BY QUALITY MANAGEMENT

World Economic Forum measures competitiveness of nations in 12 pillars of competitiveness using 110 indicators. Quality management doesn't influence every indicator. To measure influence of QMS on GCI, every indicator is tested with ISO 9001 requests and few of them are shown in this work. In this work is shown how implementation of QMS in organizations can influence rankings in indicators. In order to gain better ranking Serbia must enhance all indicators, but using QMS will improve indicators that are linked to QMS and Serbia will have better rank.

a. Extent of staff training

„6.2.2 Competence, training and awareness - The organization shall:

- a) determine the necessary competence for personnel performing work affecting conformity to product requirements,
- b) where applicable, provide training or take other actions to achieve the necessary competence,
- c) evaluate the effectiveness of the actions taken,
- d) ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives, and
- e) maintain appropriate records of education, training, skills and experience (see 4.2.4). ¹(ISO 9001:2008, 2008)

Organizations that are certificated based on ISO 9001 shall fulfil these requirements. They shall provide training or take other actions to achieve the necessary competence. Usually organizations have a procedure that defines ways to fulfil this requirement. Organizations invest a lot of money for staff training and awareness, especially for new employees. Employers invest money in order to gain economically feasible new employee who has to be productive. Trainings can be organized in house or in organization specialized for employee training. Maintaining appropriate records is necessary as method to show how competitive, trained and aware employees are. In this indicator Serbia holds 132nd rank, with score 2.9, which is well by two positions comparing to 2010-2011 Report.

b. Degree of customer orientation

One of eight principle of quality management defined in ISO 9000:2005 is Customer focus: "Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations." ISO 9001 requires in 7.2. "That every organization shall have processes that are focused on customers". Customer requirements shall be well understood, defined and measured. Organizations shall have resources and technologies required to fulfil customer's needs. Organizations shall be oriented on customers in order to be certificated in standard 9001. Serbia holds very bad 131 rank in GCI in this indicator, same as Bolivia and Suriname. Again in this indicator the result is worse than in 2010-2011 Report for 12 positions.

c. Buyer satisfaction

¹ ISO 9001:2008, *Quality management system – requirements*, ISO /TC 176 Committee,

ISO 9001 is based on customer (buyer) satisfaction. Model of QMS begins and ends with customer satisfaction. Customers input requirements in organization; organizations measure how customers are satisfied with their output when process is finished. It is necessary to measure customer satisfaction, because most organizations are managed based on it. ISO 9001:2008 requires in **"8.2.1 Customer satisfaction"** - *As one of the measurements of the performance of the quality management system, the organization shall monitor information relating to customer perception as to whether the organization has met customer requirements. The methods for obtaining and using this information shall be determined. NOTE Monitoring customer perception can include obtaining input from sources such as customer satisfaction surveys, customer data on delivered product quality, user opinion surveys, lost business analysis, compliments, warranty claims, dealer reports.*"; also in **"5.2 Customer focus"** - *Top management shall ensure that customer requirements are determined and are met with the aim of enhancing customer satisfaction (see 7.2.1 and 8.2.1).*" 5.2 is connected with other indicator in GCI - Buyer sophistication. Organizations that meet requirements of ISO 9001 continuously measures customer satisfaction and has obligation to enhance it. Organizations must have methods and tools to measure satisfaction and manage information's in order to enhance customer satisfaction. Serbia holds 136 rank on this indicator. Serbia has similar rank as Mauritania, Chad, Senegal and Haiti. Last year Serbia had 129 rank, so buyer satisfaction in Serbia is getting worse. Compare with 2010 rank Serbia fall for 21 places and that is a very bad sign. Every organization that has implemented ISO 9001 must improve its buyer satisfaction continuously. Interest of every organization is to have satisfied buyers. Organizations in Serbia must work on this indicator in order to gain better ranking next year.

d. Quality of management schools

The number of management schools in Serbia is getting higher, due to the foundation of private Universities and schools. Faculty of organizational science, founded in 1967, is the first faculty where management was studied. First QMS programs were studied in 1996 at the FON faculty. Education in this area surely gives better chances of using QMS in future. But now Serbia with 114th rank, and score of 3.5 holds bad position, similar to Cambodia and Honduras. Last year Serbia was 111th, and in 2009-2010 Report Serbia was 90th. This rank shows that quality of education in management schools is very bad and it is getting worse. The reason might be the multiplication of private schools, however the rank is awkward if you take in consideration the awards that students of FON won in international competitions. Furthermore comparing Serbia to Montenegro which is ranked 45th, the doubt about this rank is even bigger. It is of great importance that QMS is learned in our Universities for the sake of future rank of Serbia in GCR.

e. Local supplier quality

As number of multinational corporations in Serbia rises, raises also the importance of this indicator. Local suppliers can improve quality using ISO 9001 and gain confidence that their process and business practice has high quality. In various numbers of cases this standard is obligated in contracts, as are also ISO 14001 and OHSAS 18001. In this indicator Serbia is ranked as 94th, same as Cameroon, Ecuador, Burkina Faso, Macedonia, Vietnam and others with score 4.1. Last year Serbia scored 3, 92 and held 107th rank, so in this indicator Serbia is having better results.

It is interesting to compare rankings of USA and Japan based on these indicators, because in those countries quality management concept was founded. Japan hold first ranking on indicators that are directly linked on implementation of ISO 9001 standard, degree of costumer orientation, buyer sophistication, and product process sophistication. USA has lower ranking and holds 15 positions in average. In selected indicators average ranking for Japan is 15, and for USA is 19. Problematic is that both USA and Japan hold not so good rankings (57, 12) for quality of management schools. This is especially the case for USA because most famous and best-ranked Universities for management are in USA according to Economist magazine. Japan is 6-th for Extent of staff training and that is maybe the way to overcome bad rank for quality of management schools. Average best ranked country on these indicators is Sweden that has high third place, while second is Finland. In EU worst position holds Bulgaria, while in Western Balkans Bosnia and Herzegovina and Serbia.

Also it is very interesting to compare competitiveness of Serbia and Montenegro, because these two states were members of a joint State Union six years ago. Former Serbia and Montenegro held better rankings based on Global Competitiveness Report. Quality of management schools is better ranked in Montenegro comparing to Serbia. That is very strange considering results and ranking of Universities in both countries. Also most of the students from Montenegro that want to study management enrol to the University of Belgrade. Comparing to that fact, Serbian students don't study at Universities in Montenegro. This indicator

is measured by survey that is conducted are companies in each country and it measures level of knowledge that students obtain when they finish studies. The best ranked country for this indicator is Belgium. Montenegro holds very interesting ranking in GCI, and has better rankings than Western Balkans (103), SEE (83), and it is very close to EU average (35). First job for Serbia is to close the gap to Western Balkans average ranking.

Table 1: Rankings of Serbia comparing to Montenegro, Western Balkans, EU, Japan, USA and Sweden.

Indicator	Serbia	Montenegro	Western Balkans ²	EU	Japan	USA	Sweden
<i>Intellectual property protection</i>	107	57	89	37	22	28	4
<i>Ethical behaviour of firms</i>	130	47	90	48	18	30	3
<i>Efficacy of corporate boards</i>	136	82	94	62	24	26	1
<i>Quality of management schools</i>	114	45	80	46	57	12	9
<i>Extent of staff training</i>	132	66	103	50	6	12	2
<i>Degree of costumer orientation</i>	131	78	81	47	1	24	2
<i>Buyer sophistication</i>	136	52	99	49	1	12	4
<i>Product process sophistication</i>	129	82	94	35	1	15	4
<i>Reliance on professional management</i>	133	82	105	48	15	17	6
<i>Local supplier quality</i>	94	81	94	35	3	13	5
<i>Average</i>	124	67	93	46	15	19	4

Beside indicators described in this work, quality concept influences all indicators that are marked in table 3. In table 2 it is shown how the influence of quality management concept on competitiveness is measured.

²Avreage rank for Western Balkans: Serbia, Montenegro, Bosnia and Hercegovina, Albania, Croatia, Macedonia

Table 2: Measure of quality influence on indicators in GCI

	Pillar	Quality influence	Value	%	Sum	Sub index weights for stages of development (%)		
						I	II	III
Basic requirements	I	$((1/5 \cdot 3/4) \cdot (1/2 \cdot 1/4 + 2/4 \cdot 1/4)) \cdot 1/4$	0.1093	10.93	10.93	60	40	20
	II	0	0	0				
	III	0	0	0				
	IV	0	0	0				
Efficiency enhancers	V	$(\frac{1}{2} \cdot \frac{1}{3} + \frac{3}{4} \cdot \frac{1}{3} + \frac{1}{3}) \cdot \frac{1}{6}$	0.12493	12.49	32,3	35	50	50
	VI	$(4/14 \cdot 2/3 + 1/3) \cdot \frac{1}{6}$	0.0871	8.71				
	VII	$(2/6 \cdot 1/2 + 2/4 \cdot 1/2) \cdot \frac{1}{6}$	0.0694	6.94				
	VIII	0	0	0				
	IX	0	0	0				
	X	$\frac{1}{4} \cdot \frac{1}{6}$	0.0416	4.16				
Innovation and sophistication factors	XI	$\frac{1}{2}$	0.5	50	68.75	5	10	30
	XII	$3/8 \cdot 1/2$	0.1875	18.75				
Quality management influence for each stage of development						21,30	27,39	38,96

Measurement is conducted by defining which indicator is influenced by quality management concept in each pillar. Each indicator is differently pondered. Result of such methodology is pondered influence of quality management for each pillar. Pillars are divided in three parts that have different impact on final rank. Each development stage has its own ponder and measurements are allocated to this ponder. Influence of quality management is different depending on stages of development. The more the country is developed, the higher is the influence. In first stage of development influence of measurement amounts 21, 3 %, this is almost $\frac{1}{4}$ of all indicators. If the State uses quality management it can get better rank for $\frac{1}{4}$ in the first stage of development. Serbia is in second stage of development. Measurements show that quality management for Serbia can change its rank by more than $\frac{1}{4}$. In third stage of development influence is higher and it is almost 40%. This calculation shows big impact of quality management on competitiveness of countries. By implementing QMS standards a country can increase its competitiveness and because competitiveness of a nation depends on the capability of its economy to innovate and to move forward this is the best way to do it. In order to get certification by QMS standards organization in the country must innovate and move forward.

Table 3: Indicator influenced by quality management

Serbia

The Global Competitiveness Index in detail

INDICATOR	VALUE	RANK/142
1st pillar: Institutions		
1.01 Property rights.....	3.1	126
1.02 Intellectual property protection.....	2.7	107
1.03 Diversion of public funds.....	2.7	100
1.04 Public trust of politicians.....	2.0	106
1.05 Irregular payments and bribes.....	3.6	90
1.06 Judicial independence.....	2.4	128
1.07 Favoritism in decisions of government officials.....	2.3	124
1.08 Wastefulness of government spending.....	2.2	130
1.09 Burden of government regulation.....	2.3	134
1.10 Efficiency of legal framework in settling disputes.....	2.5	137
1.11 Efficiency of legal framework in challenging regs.....	2.6	127
1.12 Transparency of government policymaking.....	3.9	102
1.13 Business costs of terrorism.....	5.5	74
1.14 Business costs of crime and violence.....	4.5	84
1.15 Organized crime.....	4.3	107
1.16 Reliability of police services.....	3.9	84
1.17 Ethical behavior of firms.....	3.0	130
1.18 Strength of auditing and reporting standards.....	4.0	114
1.19 Efficacy of corporate boards.....	3.7	136
1.20 Protection of minority shareholders' interests.....	2.8	140
1.21 Strength of investor protection, 0–10 (best)*.....	5.3	60
2nd pillar: Infrastructure		
2.01 Quality of overall infrastructure.....	3.1	120
2.02 Quality of roads.....	2.4	131
2.03 Quality of railroad infrastructure.....	1.6	102
2.04 Quality of port infrastructure.....	2.7	133
2.05 Quality of air transport infrastructure.....	3.1	132
2.06 Available airline seat kms/week, millions*.....	53.7	96
2.07 Quality of electricity supply.....	4.5	76
2.08 Fixed telephone lines/100 pop.*.....	40.5	26
2.09 Mobile telephone subscriptions/100 pop.*.....	129.2	28
3rd pillar: Macroeconomic environment		
3.01 Government budget balance, % GDP*.....	3.5	86
3.02 Gross national savings, % GDP*.....	14.8	103
3.03 Inflation, annual % change*.....	6.2	106
3.04 Interest rate spread, %*.....	6.9	91
3.05 General government debt, % GDP*.....	44.0	85
3.06 Country credit rating, 0–100 (best)*.....	39.8	81
4th pillar: Health and primary education		
4.01 Business impact of malaria.....	N/Appl.	1
4.02 Malaria cases/100,000 pop.*.....	(NE)	1
4.03 Business impact of tuberculosis.....	6.1	34
4.04 Tuberculosis incidence/100,000 pop.*.....	21.0	43
4.05 Business impact of HIV/AIDS.....	6.3	17
4.06 HIV prevalence, % adult pop.*.....	0.1	21
4.07 Infant mortality, deaths/1,000 live births*.....	6.2	40
4.08 Life expectancy, years*.....	73.7	65
4.09 Quality of primary education.....	3.7	74
4.10 Primary education enrollment, net %*.....	94.2	58
5th pillar: Higher education and training		
5.01 Secondary education enrollment, gross %*.....	91.5	57
5.02 Tertiary education enrollment, gross %*.....	49.8	50
5.03 Quality of the educational system.....	3.1	111
5.04 Quality of math and science education.....	4.2	58
5.05 Quality of management schools.....	3.5	114
5.06 Internet access in schools.....	3.8	83
5.07 Availability of research and training services.....	3.2	113
5.08 Extent of staff training.....	2.9	132

INDICATOR	VALUE	RANK/142
6th pillar: Goods market efficiency		
6.01 Intensity of local competition.....	3.6	136
6.02 Extent of market dominance.....	2.5	139
6.03 Effectiveness of anti-monopoly policy.....	2.8	137
6.04 Extent and effect of taxation.....	2.9	118
6.05 Total tax rate, % profits*.....	34.0	50
6.06 No. procedures to start a business*.....	7	65
6.07 No. days to start a business*.....	13	51
6.08 Agricultural policy costs.....	3.4	112
6.09 Prevalence of trade barriers.....	4.2	90
6.10 Trade tariffs, % duty*.....	5.5	68
6.11 Prevalence of foreign ownership.....	3.9	116
6.12 Business impact of rules on FDI.....	3.5	125
6.13 Burden of customs procedures.....	3.7	93
6.14 Imports as a percentage of GDP*.....	43.6	69
6.15 Degree of customer orientation.....	3.6	131
6.16 Buyer sophistication.....	2.2	136
7th pillar: Labor market efficiency		
7.01 Cooperation in labor-employer relations.....	3.3	136
7.02 Flexibility of wage determination.....	5.2	64
7.03 Rigidity of employment index, 0–100 (worst)*.....	35.0	90
7.04 Hiring and firing practices.....	3.6	89
7.05 Redundancy costs, weeks of salary*.....	25	50
7.06 Pay and productivity.....	3.4	103
7.07 Reliance on professional management.....	3.3	133
7.08 Brain drain.....	1.8	139
7.09 Women in labor force, ratio to men*.....	0.78	69
8th pillar: Financial market development		
8.01 Availability of financial services.....	4.0	103
8.02 Affordability of financial services.....	3.8	93
8.03 Financing through local equity market.....	2.7	112
8.04 Ease of access to loans.....	2.4	97
8.05 Venture capital availability.....	2.0	121
8.06 Soundness of banks.....	4.4	116
8.07 Regulation of securities exchanges.....	3.3	121
8.08 Legal rights index, 0–10 (best)*.....	8.0	20
9th pillar: Technological readiness		
9.01 Availability of latest technologies.....	4.0	123
9.02 Firm-level technology absorption.....	3.7	136
9.03 FDI and technology transfer.....	4.0	110
9.04 Internet users/100 pop.*.....	40.9	60
9.05 Broadband Internet subscriptions/100 pop.*.....	8.5	57
9.06 Internet bandwidth, kb/s/capita*.....	19.2	34
10th pillar: Market size		
10.01 Domestic market size index, 1–7 (best)*.....	3.5	70
10.02 Foreign market size index, 1–7 (best)*.....	3.9	77
11th pillar: Business sophistication		
11.01 Local supplier quantity.....	4.5	84
11.02 Local supplier quality.....	4.1	94
11.03 State of cluster development.....	2.5	128
11.04 Nature of competitive advantage.....	2.4	136
11.05 Value chain breadth.....	3.0	113
11.06 Control of international distribution.....	3.3	126
11.07 Production process sophistication.....	2.6	129
11.08 Extent of marketing.....	2.8	128
11.09 Willingness to delegate authority.....	2.6	136
12th pillar: Innovation		
12.01 Capacity for innovation.....	2.5	110
12.02 Quality of scientific research institutions.....	3.8	61
12.03 Company spending on R&D.....	2.4	130
12.04 University-industry collaboration in R&D.....	3.4	81
12.05 Gov't procurement of advanced tech products.....	3.4	92
12.06 Availability of scientists and engineers.....	3.9	83
12.07 Utility patents granted/million pop.*.....	0.4	67

4. CONCLUSION

Quality management systems began to actualize in Serbia in the 90-ies, with one ambitious project of certification of the Government of the Republic of Serbia in 1992. Main goal was to make clear how much the state is committed to this concept, but like most good projects, this one has not been completed either. Application of ISO 9001 is the most applied in Serbia, as well as in the rest of the world. The state has given impetus to its implementation by insisting that the participation in public procurement requires certification by the requirements of this standard. The Serbian Agency for Foreign Investment and Export Promotion (SIEPA) provides grants to assist organizations to implement this standard, but also helps the application of other standards that may increase the competitiveness of Serbian economy. According to the latest data,

there are over one million certificates for the implementation of the requirements of ISO 9001 in the world. (ISO Survey, 2009) So far there are no precise data of the number of certificates in Serbia, but it is estimated that there are over 3000 certificates existing. Certification by these models shows continuous growth, however, there is a problem of not implementing the essence requested by the standards and also there is a need to obtain certificate so it could be used as an advantage on tenders. It is important to apply the essential requirements in order to maximize the company's ability to operate better in the future. Good example for this is Italy, which is second placed by the number of certificates while the state of its economy as well as the position occupied according to the GCR is far from that second place on the list. It is therefore necessary for organizations to operate in accordance with essential requirements that have long been superseded in modern business and represent only the base for upgrade.

The competitiveness of Serbian economy is poorly rated if the most relevant research carried out by the World Economic Forum is observed. Serbia is located in the second stage of development, precisely in the efficiency-driven economy according to this methodology. For the more mature stage of development the most important role play factors critical to the efficiency, higher education and training, good market efficiency, labor market efficiency, sophistication of financial market, knowledge and use of technology and market size. In other words, after reaching the basic factors of competitiveness, for further progress the development of above mentioned factors is important. Serbia's problem is that it is not sufficiently developed in accordance to ponder set for this stage of development.

This model of evaluation is being criticized, but it is the best there is. Compared to countries in the region to whom Serbia wants to become a leader, Serbia is located at the penultimate position, only ahead of Bosnia and Herzegovina. Countries of European Union are in average sixty positions better placed than Serbia, which means that we must skip in so many places to be in the society to which we strive. Also, comparing to the countries that have become full members of European Union, Serbia lags in average of eighty positions. Of the twelve pillars of competitiveness, Serbia achieved its best result in the field of health and primary education, while the worst position is shared by sophistication of business processes and efficiency of goods market. The analysis found that quality management has direct impact on thirty one indicators. Measurement has shown that depending on stage of development, quality management concept influences from 21, 3% to almost 40% of indicators which are important for the measurement of competitiveness by GCR. Of course, the mathematical measurements conducted in this paper do not fit the actual situation because the successful implementation of quality management triggers reforms in many segments of society so that the impact on competitiveness is indirectly expanding. The widespread diffusion of quality management techniques will make an organization, an economic sector and eventually a country more competitive. (Hassel Schuurman, 1997)

Measurement has shown that main hypothesis is true for country's that are in second and third stages of development, but for the country's in first stage of development hypothesis is not true, because influence is less than 25%. As Serbia becomes more developed, it will have to develop its innovative capacity in order to maintain competitiveness that it should gain. This year, Serbia will reduce its foreign trade deficit. However, turning the economy into an export-oriented and creating a surplus in foreign trade exchange is a process that takes a long to do. It is necessary to restructure the economy and direct it towards the export. Raising the level of competitiveness will significantly contribute to this. A quality management system standard is the ticket for foreign market and it is implied that export-oriented organizations operate according to internationally recognized standards. Apart from increasing the capacity of domestic economy for doing business in foreign markets, by increasing the level of competitiveness, Serbia will at once become more attractive for foreign direct investments. The implementation and continuous improvement of these processes should increase the quality of life for citizens of Serbia.

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SME MANAGEMENT QUALITY DEVELOPMENT BY IMPROVEMENT OF PERFORMANCES “PLANS CONTENT” AND “CONNECTION OF PLANS”

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Abstract: *In this paper we indicated the possibility of increasing the “strength” (and contributing to the social and economic life) of small and medium-sized enterprises (SME), by the **innovation** of “Development of management quality”. Management itself is a complex system, so the **hypothesis** (H0) is that the enhancement in the development of management (system) quality (MQ) is obtained by improving any of the performances of this system (or their combinations). H0 is checked for only one subset/group of elements of the management system of SME-plans (as „intern management tool“, i.e. as an output of the management subsystem „Planning“) and, more specifically, for (only) two **performances of plans**: „Plans Content“ and „Connection of Plans“. **The goal** of the research is to show performances of plans as important elements of the methodology of management quality development (given here SMEs), on the example of the improvement of the two mentioned performances. We check if it is possible (separate hypothesis H1) and if it is justified (separate hypothesis H2) improvement of the plans performances - in order to increase the management quality of SME, and therefore in order to increase business success of SME. Hypothesis H1 is proven by generating a „package of ideas“ for innovation and enhancement of the given performances, and H2 – (is proven by) taking into consideration practical implications of the change (in the example of SMEs in Serbia).*

*With reliance on the previous research (personal and other), the newest data has been processed (about 27 SME in Serbia). Doing survey, interviews (of entrepreneurs, owners or/and managers of the SME) and doing analysis of the content of records about inconsistency of SME management quality (data about too large deviation from the desired quality), **the problem** of inadequate quality of plans is also been considered (so is the planning and whole managerial process), and by using the methods (of replicating) the best practise (benchmarking), brainstorming, and trial-and-error, the „package of ideas“ has been generated for (H1) improvement of the given performances; also we did analysis of reports of the cases of management quality improvement – to support our conclusion about the justification (H2) of the plan performances enhancement (so as performances of planning and whole management). With the given research we confirmed hypotheses H1 and H2, i.e. it is determined that is possible and justified improvement of performances of plans and, similarly, (improvement of) performances of other subsets/groups of elements of management (SME and other companies) in order to develop quality of management.*

*By generating the „package of ideas“, we defined a tool for **improvement of the given performances** of the plans (and planning and management), by which we also created a basis of methodology for the further development of the management quality and business of SME, with – potentially – broader and more far-reaching consequences for the society; also we created entrepreneur's inspiration for original, **practical and applicable tool for using managerial reserves** (i.e. potential for management quality improvement). In practise, these findings should use to stakeholders of SME to be able to look, in a more clear way, the needs and ways to help SME in the **development of the management quality** (and therefore in their business, and survival). The findings which we here presented may help to all organisational systems (not only to enterprises, and especially not only to SME in Serbia) – because the quality of the management directly determines the success of the work of organisational systems; unused managerial potentials are, by the rule, present everywhere and should be treated as unwanted reserve, i.e. they should be used for the benefit of the stakeholders.*

Key words: Management quality development; Planning/Management; SME; Improvement of plan performances; Plan content; Connection of plans; Managerial reserves, Management quality improvement tool.

1. INTRODUCTION

Small and middle-sized enterprises (SME) are important generator of working positions, values, goods and services, profit, general-domestic product (GDP), ideas applications (innovations), competition, business opportunities recognition, resources integration and contribution to social-economical life; therefore, from the middle of XX century, bigger attention and support has been given to them. In that spirit, Science also gives contributions – in detecting, formalizing, studying and problem solving in the sector of SME.

It has been determined, for example, that the success of the SME depends on the quality of the management of the SME (see: Omerbegović-Bijelović, J. 1995b), and that is especially on the competence of SME owners to define and delegate goals (see: Ljamić-Ivanović, B. 2008), and also depends on consistency of the support of the surroundings with the real needs of SME (or, at least, those needs which are recognized by the owners/managers of SME (see: Rakićević, Z. 2012). Management quality (MQ) can be defined as an indicator of the goals fulfilment, which are created for the management by stakeholders (SHs), so it is in the SHs interest that the MQ is as high as possible. (As MQ is a multidimensional vector and as their dimensions are measured by different units, it is better to say “as developed as possible”, as opposed to “as high as possible”). There are couple of different methodologies that can be used for the development of MQ (see: Omerbegović-Bijelović, J. 1998), for science still attractive, topics – which are related to: inputs, outputs, processes, resources (where tools are also included), structure of the management system.

In management of SME (and for MQ) very special role have entrepreneurs, owners and managers of SME, as well as tools they are using in management. Among managerial tools, the most important are plans – taking into a consideration that they are connecting and directing all managerial activities. Plans and planning are important everywhere in the world, and especially in “the countries in a transition” (especially those which are created from SFRJ – where in the 80s, in XX century, planning stopped to be mandatory enterprise activity and where it was almost forgotten how important and how to do planning.) Not even rare textbooks, nor limited competency of the employees (not only in SME) ensure the required quality of plans and planning (as well as managing itself) – in order to achieve competitiveness – required for survival.

Therefore, it is necessary to introduce the problems of planning and plans (their quality, i.e. their performances), and how that is connected to MQ.

2. THE QUALITY OF SME MANAGEMENT AND PROBLEMS OF PLANNING

As the management of any organisational system is its translation (i.e. translation of their characteristics/performances) “from the given to desired (or its close) state” (Omerbegović-Bijelović, J. 2010. p. 140), the same can be said for SME management. Specificity of SME management is connected to specificity of SME as a category of an enterprise. Among SME specifics there are (see: Regionalni centar... 2012): modest capacities of the SME resources, incapability to use business opportunities of a bigger volume, entrepreneurs/owners is rare and professionally competent (managerial) governance of SME, successful management of SME requires “renaissance type” of employees (i.e. their competance for different jobs and in different business functions), in most cases short term management, minimal knowledge of plans and planning, reactive or proactive behavior (and very, very rarely – leader), being focused on market niches, not enough skills (in resources assignment, optimizing of the business, application ICT, software-support in management etc). Taking into consideration these characteristics of SME, it is not surprising to see unsatisfying quality in practise of SME management, and therefore also poor business success of SME (and their big „mortality“).

That is the reason we are searching for way to improve/develop MQ and, in that way, to increase competitiveness and probability of SME survival. As the survival of companies (and of SME as well) depends on the development of management quality (of SME), and development – from the growth of potential/capacity to invest in the development (like in: Omerbegović-Bijelović, J. 1998), we can conclude that it is necessary to obtain means for investment in the development. Here we make an indication to a possibility to generate means for development (Fig. 1) by using better/more complete exploitation of the „managerial reserves“ (i.e. by more complete usage of potential of performances of management quality); that is possible to accomplish by improving performances of the complete management or, more realistic, by improving the chosen performances of the chosen elements of management (e.g. performances of plans).

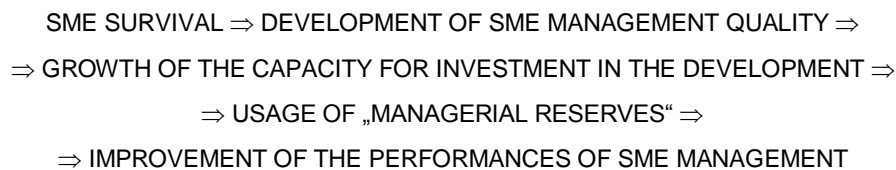


Figure 1: Schematic representation of the chain of conditions for provide SME survival

It is expected that the improved performances of the plans will make that the managerial cycles are better driven, i.e. to be more effective and efficient, and therefore the business of SME more successful and survival more probable.

2.1. Management quality and Planning quality

Management is seen as a system – due to its complex nature, and its two most important, mutually conditioned (see: Adizes, I. 1994b), attributes are processes and structure. The goodness of the management is manifested as the “quality of management/management quality” (MQ); it is determined by the “goal fulfilment (by the quantity of the goal value and by the moment of desired value fulfilment) and by the trajectory (activity employing resources) which are used for the system to be lead to the goal; those basic characteristics - goal and trajectory – are more precisely defined in the first phase of management - in the phase of planning” (from: Omerbegović-Bijelović, J. 2010. p. 140). (Mentioned basic characteristics are more commonly known as effectiveness (in goal accomplishment) and efficiency (rationally-acceptable relationship of the value of effect/goal and value of investment so that goal is accomplished).) That's where the idea comes from, to consider possibilities and justification of improvement of performances of SME plans, in the goal of increasing the value, i.e. the development of MQ.

The process of management (managerial cycle) is done via sub-processes:

1. Planning of goals and ways (activities and resources) for their accomplishment;
2. Organizing – as goal delegating (to groups and individuals) and assigning authority for: a) necessary resources availability and b) activity initiation (for the goals accomplishment);
3. Realisation of goals – via resources preparation (till the supply/“closure” of workplaces) and transformation of work objects;
4. The control of accomplished goals (with recording: deviations, reasons for deviation, operational-applied measures for breaking deviations, ideas for further improvement).

Each of the given managerial sub-processes is working in the corresponding sub-system, and has its own inputs and outputs, resources, activities... Their elements have their own performances, and these are measured by its own „packages“ of indicators.

Then MQ is the synthetic/collective indicator of the intensity (by the nature of the performance and intention) of the chosen indicators of the quality of the elements of the managerial system and their coefficient of importance. Therefore improvement any of the performances any of the elements of the managerial system lead to increment in the value of MQ (see: Omerbegović-Bijelović, J. 1998. pp. 70-93). (That – measuring of MQ improvement/increasing – is not a subject of the given research.)

Planning is first, and directing phase of management; it is used (from: Omerbegović-Bijelović, J. 2010. p. 141) to:

- Define and decompose goals (by time horizons, by objects of management and planning and by other criteria of classification);
- Define trajectory/strategy/roads/ways for goal accomplishment (i.e. defining activity and resources – by category, quantity, suppliers, dynamics etc.).

Planning runs in non-material flow – having on mind the fact that the inputs and outputs of the planning sub-system (in which the process of planning runs) are of non-material nature (data, information, knowledge). The output – plan (more exact: package of plans) – as a set of managerial decisions (grouped in a logically based cells) is also of non-material, informational nature. Planning scholars argue (Brinckmann, J., Grichnik, D. & Kapsa, D. 2010, p. 27) “that the benefits of business planning increase especially in dynamic and unstable external environments as business planning reduces uncertainty, facilitates faster decision-making, introduces controls for personal bias or subjectivity, and develops new forms of actuation”. From the plan content (structure and intensity of activity which, by plan, should be done) depends how the given organisational system (here: SME) will be managed. Plan is, therefore, at the same time and output from the

managerial sub-process/phase “Planning”, and input into the next managerial phases. So the quality of the plan is determined by the quality of planning and it self determines the quality of the next managerial phases, and the complete MQ itself.

Plan performances defined originally Fayol (from: Rajkov, M. 1980) – looking for a plan to be: unique, continuous, flexible and precise. For Rajkov (1980; p. 180), the characteristics of a good plan of actions are, in short: reality (to know what can be done, from desired), being integrated (integrated individual plans), inter-related (changes of one plan also involve changes in the rest), continuity (checking and correction of plan assumptions), efficiency. To the package of the characteristics/performances of the plan, we can also add (Omerbegović-Bijelović, J. 1998; pp. 34-37): clarity, relevant, interactivity, attractiveness, suitable, promptness, reliability, or, in short (ibid.), efficiency and effectiveness. As a component of MQ, planning quality (PQ) is also determined in a similar way.

2.2. Problems of planning and quality of plans in SME

In attempting to at least sustain competitiveness and business success, SME (as the other economic and non-economic organisational systems) are faced with different problems. All those problems – against which SME (and other enterprises) can take action (to a greater or lesser extent) – belong in the category of managerial problems. Here we consider problems (discovered in widening of the research - described in Regionalni centar... 2012) which are caused by non-adequate processes of planning – „producing“ plans which (chosen - nonadequate) groups of characteristics are:

1. Insufficiently expressed: completeness, clarity, relevance, plans usability;
2. Insufficiently manifested: connectedness, consistency, timeliness, continuity, coordination of plans etc.

Since the mentioned characteristics which we indicated are related to plans performances (and to “quality of plans”), and taking in to a consideration that the plans are result (product) of planning, the problem located in the area of “quality of planning” (and even broader, in the area of “management quality”). So, if we improve the quality of planning, the quality of plans are also gone be improved; if the exact chosen characteristics will be improved, it depends on which area of planning is improved.

First group of inappropriate characteristics of plans indicated to non-adequate “Content of plans” (PC) – as a plans performance, and the other (group) to non-satisfying “Connection of plans” (CP) – as a plans performance, also. It is verified if the improvement of PC and CP will lead to the improvement of the mentioned characteristics of plans (and to the MQ development).

2.3. Development of the management quality by solving problems of planning in SME

Solving problem-appearance of inappropriate, i.e. not sufficiently expressed (and desirable) performances of plans can be done in one of the three ways:

- a) Complete elimination of the problem, i.e. bringing expression of desirable performance of the plan to the desirable level, with eliminating possibility for the same problem to appear again;
- b) Problem attenuation, i.e. increasing expression of the desirable performances of the plan, but not till the desirable level, with a possibility that the same or similar problem appears again;
- c) Protection of the negative consequences of the problem or/and avoiding the problem, i.e. generating measures/means or adequate mechanisms which the system (SME) is protected from the appearance or from the consequences of the problem.

The process of recognizing the causes and generating solution is going on in the following order: first we try to eliminate the problem; if there's no success in that, we look for solution which will at least make it smaller, and if that's not possible, we create a solution which gives a protection from negative consequences of the problem. The biggest effect is accomplished by elimination and the least with protection from negative consequences of the problem.

In every case (a, b or c) improvement in the plan (and planning) performances will result (in the following cycles), and hence in the management quality also (of an SME or any other organisational system). Such, improved, management increases competativeness and the survival possibility (of SME etc.)

There are two questions: 1) Is it possible to improve plan performances? and 2) Is it justified? If both the answers are „YES“, then the solution is in eliminating the problem connected with plan quality and, partially, with planning too; the other, desired improvements follow as a consequence.

3. IMPROVEMENT OF SME PLANS PERFORMANCES AND MANAGEMENT QUALITY

Solving problems which interfere with planning in SME (and make their quality smaller), contributes to the development of quality of plans, and to the quality of future cycles of planning and complete management. Taking into consideration the importance of the quality of a plan (therefore and validity of their performances), we should check if it is possible and justified to find a way to improve (here, as an example only two chosen) performances of plans. If it is shown that is possible and justified, we can give recommendation for „Methodology of development of management (system) quality by improving performances of its elements“.

3.1. Methodology for testing of hypothesis about plan performances innovation

As it is mentioned in this research paper, we look at the problem of non-adequate quality of plans (and planning and complete management) – on the example of SME. (As stimulus, we used: Perry (2001), who found that non failed firms did more planning than failed firms (p. 202).) We start from an hypothesis (H0) that the contribution to the development of management quality (MQ) is accomplished by improving any of the performances of the management system (or their combination). Bearing in mind the number of elements of the planning subsystem and multiplied number of their performances – for illustration (and testing) of the innovaton idea, here, we use performances of one element of the subsystem – package of plans. (We are talking about more complementary plans which create „package of plans“.)

As plans are an output from the subsystem „Planning“ and „internal managerial tool“ and as they are characterized by large number of performances, here we made a choice of only two (performances of plans): „Plan Content“ (PC) and „Connection of Plans“ (CP). All performances of management, and performances of planning, influence the management quality (of SME e.g.) and their business success, competitiveness and survival. If we prove that the improvement of these two performances can contribute to the development of management quality, by analogy we can conclude that the „shift“ can be done by improving any of the performances (or group of performances) of any element (or a group of elements) of the SME management system (or any other organisational system).

From the general hypothesis H(0), by deconstructing, we get two intermediate hypotheses:

H1: It is possible (by generating the corresponding innovations) to improve the performances of plans;

H2: It is justified (there is sense to it – as it aids MQ development) to improve the performances of plans.

Hypothesis H1 is proved by generating an „idea packet“ for innovating/improving of the viewed performances, and H2 is proved by considering the contribution the two innovated/improved performances make to improvement/development of SME management quality, i.e. by detecting, useful for actual practise (business success of SME), implications of improving the performances (in the example of SME in Serbia, together with reference to the earlier research (both own and that of others) and to the newest data about 27 SMEs of Serbia).

Bearing in mind that the cheking of general hypothesis H0 (more accurately, H1 and H2) is being conducted for performances „Plan Content“ (PC) and „Connection of Plans“ (CP), it is necessary to further deconstruct intermediate hypotheses into particular ones:

H1;1: It is possible to improve the performance „Plan Content“ (PC);

H1;2: It is possible to improve the performance „Connection of Plans“ (CP);

H2;1: It is justified to improve the performance „Plan Content“ (PC);

H2;2: It is justified to improve the performance „Connection of Plans“ (CP).

Methodology of checking the truth (defined in this paper) of the general hypothesis H0 is, therefore, represented in the following steps:

1. Deconstructing the general hypothesis (H0) into intermediate ones: H1 and H2;
2. Deconstructing the intermediate hypotheses into particular ones: (H1,1; H1,2) i (H2,1;H2,2);
3. Regrouping the particular hypotheses according to the chosen performances: „PC“ and „CP“;
4. Proving of the particular hypotheses – grouped according to performances (where, for each particular hypothesis, at least one (measurable) indicator will be defined, which will aid in concluding – proving the truth of that particular hypotheses):
 - a) It is possible and justified (H1,1; H2,1) to improve performance „PC“;
 - b) It is possible and justified (H1,2; H2,2) to improve performance „CP“;
5. Concluding about more complex hypotheses (up to the level of general hypothesis H0) on the basis of proving simpler (mainly particular) hypothesis.

Naturally, the number of intermediate and particular hypotheses, as well as the number of indicators on the basis of values which the truth of the particular hypotheses is being tested can also be modified (in relation to the observed element of the managerial system, observed performances, adequacy of indicators, scientific strictness etc.). However, if – already in this example – it is proven possible and justified – by improving particular performances (of any) element of the managerial system – to add to the development of management quality that said system, then what is left is to apply the proven conclusion in SME practise and that of other organisational systems, i.e. to improve the management performances, to achieve better business results and, it is expected, to improve the overall quality of life.

3.2. Improving the chosen performances of plans

In this, 4th step of the Methodology for checking the truth (here defined) of the general hypothesis H0, it is necessary to check the particular hypotheses – grouped according to the observed performances. For every one of the performances the truth of relevant particular hypotheses must be checked, hence it is necessary (for each observed performance) to undertake the following activities:

A1: Generate innovative solutions (innovation suggestions);

A2: Proving the justification of the performance improvement (MQ development contribution).

At the same time the performance indicators will be observed, respectively (I1 – for A1; I2 – for A2):

I1: The number of generated suggestions for innovation/improvement of the observed performance, in [innovation suggestion], to prove that the performance improvement is possible;

I2: The number of cases in practise when the improvement of a certain plan performance has contributed to MQ development, in [case], to prove that the performance improvement is justified.

In research which is shown here, bearing in mind the nature of the problem and the logically unassailable truth of the general hypothesis (H0), minimal values of the observed indicators (for accepting individual hypothesis) are: I1min = 1 [innovation suggestions] and I2min = 1 [case]. The value of indicator I1 larger than 1 will indicate that the potential (managerial reserve) is greater to improve the observed performance, and by the same token for MQ development. Value I2 larger than 1 will show that at least several SMEs (and/or other organisational systems) are aware of the justification for improving the observed performance, as well as of the fact that its potential aids MQ development.

Scientifically speaking, it would be correct to describe also the sample on which the hypotheses are being tested. Old (own and others') and new (in 27 SMEs) research has already been mentioned so, for every individual hypothesis, the researched sample will be pointed out.

3.2.1. Improving performance „SME Plans Content” (PC)

By actual improvement of the performance „Content of plans” (PC), i.e. by presenting at least one idea for PC innovation, it will be proven that (a) particular hypothesis H1,1 – that it is possible to improve PC performance, and (b) by showing (at least one) example from practise of improving PC the particular hypothesis H2,1 will also be accepted – that it is justified (that there is a point) to improve PC performance. (First of all, we need to clarify that the plans we are talking about here relate to the regular business making in an SME, and not to radical business changes – the justification of which is tested by a business plan.)

The plans of „regular business” are made regularly, with a regulated frequency – according to the time horizon which relates to: long term plans – 3-5-or more years, medium term plans – 6-12-18 months and short term plans – 7-10-30 days. By Yusuf, A. & Saffu, K. (2005, p. 482): “In the case of small firms ... planning frequently results as a response to particular occurrences in the firms' operating environment. Planning in small firms, therefore, is mostly adaptive in nature, short-term oriented, and concerned with the manipulation of scarce and limited resources... Planning in small firms is generally typified by intense personalization. It is highly influenced by the preferences, experiences, attitudes, prejudices, and general personality sets of the entrepreneur or whoever as control of the firm.”

If in the given SME there are any written down (not only „stored” in the head of the entrepreneur/owner) plans, they tend to be notes or A4 sheets of paper with meagerly structured (and sometimes sparse filled out) tables – hardly ever in Excel, with acronyms in titles of lines and columns, frequently without units of measurement or with acronyms clear only to those who wrote them. Since they are made by „planners” – entrepreneurs/owners – for their (personal) needs in driving the business, the content of such plans is, as a rule, a mixed bag – i.e. it contains everything – for the author/“planner” – relevant categories of the plan – both the sale related ones, as well as the production/transformational and supply ones, and quite frequently also notes about stock and distributors (or even debts) and bigger buyers (and claims); naturally, given the (driven and restless) nature of the entrepreneur, there are also notes and drawings to be found – ideas for

innovation of the existing or for creating a new job. That is by no means the end of the „informedness“ of entrepreneurial/owners „planning“ improvisations: free calculations, logical and calculus errors, illegible data, lost sheets of paper (as the „plan“ is, at best, a few sheets of paper placed in a folder) and – placed in some drawer somewhere. (Or perhaps on a shelf? Or in a cupboard – at home, or on notes to be found in pockets). Assuredly, the use of such „plans“ is „artistic freedom“: they are filled out *ad hoc* – according to need and inspiration, as well as occasion (start of new year/season, bringing out a new product or going into a new market) and their role is finished the moment they are „put to paper“ (or, if they are again found, the next time something is being „planned“).

(a) In checking H1,1 data obtained by the research „Innovative SME management in Serbia“ is used (conducted in April 2012 in 27 SMEs in Belgrade and surrounding areas). In that research, the 11. Question of the questionnaire related to the entrepreneur's/owner's or (in only 3 cases) manager's mark of planning within their SME. The question, some answers and their marks are given in Table 1.

Table 1: Table for marking the planning in SME in Serbia (2012)

N ^o	Description of planning in your SME	Marks (visible to researchers)
1	2	3
1	We do strategic planning for 5 or more years ahead	3 (acc. to Likert: 5)
2	In doing our yearly plan we look 2-3 years ahead	2 (acc. to Likert: 11/3=3+2/3)
3	Every 12 months we make a plan for the coming year	1 (acc. to Likert: 7/3 = 2+1/3)
4	We have a great deal of work and have no time to plan ahead	0 (acc. to Likert: 1)

Collated answers/marks (collected through the above mentioned research) give the results – planning situation in SME in Serbia (Table 2).

Table 2: Distribution of marks for planning in SMEs in Serbia (2012)

11. Question: Planning in SMEs in Serbia		
1	2	3
Mark	Number of times it appears in sample group (27)	Value
3	4	12
2	2	4
1	19	19
0	2	0
$\Sigma = 27$		35/27=1.30

The average mark for planning in SMEs in Serbia (at the beginning of 2012) is 1.30. According to Table 1, that means that in SMEs in Serbia make yearly plans.

By further research (interviews), it was established that the only things definitely planned for a year ahead are the obligations to the government (according to the achieved yearly income) and consequently the creation/presentation of the required documentation.

In proving H1,1, and considering the state of planning (and plans) in SMEs in Serbia, the following planning (and plan) innovations are suggested:

- Bringing in „plan packets“ – for every SME, according to which the plans would be created according to the time horizons (3 types of plans – for: long, medium and short term time frames) and according to the phrases of the business cycle (5 types of plan – for: paying suppliers, procurement, production, sales, payment); that „packet“ would have 15 plans (at least);
- All SME plans should be in Excel format – as single pages of the same document (the plan package of the SME in question);
- Every plan should have a full, precise and exact name (including organisational unit which is referred to as well as the period to which it relates);
- Data in the plan must be accompanied by clear units of measurement;
- Plans must be legible (as, in Excel, the spaces or cells into which data is entered can be customised);
- Contents of the long term SME plans would refer to the program of products and/or service offerings, to more important, bigger buyers and suppliers, to already contracted business-technical cooperation (with an estimate of the value of future business dealings), to planned development of new products/services, markets, capacity, location et sim. and planned investments; their role would be to establish regular business communication with the biggest partners (and for as great a volume of exchange as possible) etc.;

- The contents of the medium term/yearly/main SME plans are related to sales, production and budgeting, procurement and stores, employing and firing, hiring subcontractors, profit etc.;
- The contents of short term SME plans would be: operative tasks, job assignation according to workplace, orders planning, job-shop plans, launching plans, operative organisation plans (overtime, worker replacement for people on sick leave, supplying/"closing" workplaces etc.), maintaining contact with operative preparation of resources and with those employed in the control segment etc.;
- Plans need to have instructions both for their creation and for their use;
- Bringing in aggregate plans (for periods from 6-18 months) – for choice of operational strategy, i.e. „response to forecasted demand“ (combination of production, stores, employment/firing, hiring subcontractors etc.);
- Bringing in a mechanism for improving all types of plans – by analyzing how well the plans were achieved in previous periods and learning from mistakes (own and others').

The number of here suggested (more or less original) ideas for innovation (and/or generating) of SME plans is $I1(PC) = 11$ [innovation suggestions], and the defined limit for accepting the individual hypothesis is $I1min = 1$ [innovation suggestions]. Therefore, it is considered that the particular hypothesis H1,1 – that it is possible to improve the PC performances – has been proven! (Also that there are huge „managerial reserves“ to be found in the managerial subsystem that is Planning.)

(b) In testing H2,1 – that it is justified (that it makes sense) to improve PC performance, Research „Current State, needs and problems of entrepreneurs in Serbia“, which was conducted – at the behest of NARR – by Statistical Institute of Serbia (march-april 2011) in 3096 SME in Serbia, amongst other things, shows (Table 3) how the „ways and means“ for business improvement are seen by those SMEs who took part. The penultimate place was taken by „Better management“ and for that same item, as the best way to improve SME business, 6.7 [%] of the participants (i.e. 207 SMEs!) voted. Therefore, at least that handful of SMEs understands (and presumably have experience of the fact) that better management is the „key“ to business improvement. As managing can not exist without planning, the same conclusion goes both for planning and plans; authors of this paper have the experience – collected over many years – in improving performances of plans and planning (as well as management systems and business results). By this ($I2(PC)=207^+$), the particular hypothesis H2,1 – that it is certainly justified to improve the PC performance – is considered proved.

Table 3: How to improve business (Source: Republička agencija za razvoj MSPP, 2009, p. 23)

N ^o	Ways of improving business	Part
1	2	3
1	More state support	29.5 [%]
...
6	Better management	6.7 [%]
7	Other	2.1 [%]

(More about particular cases of improving planning performances, and as a consequence improving business results can be found in Omerbegović-Bijelović J. (1995a).)

3.2.2. Improving the performance of SME „Connection of Plans“ (CP)

By actual improvement of performance CP, i.e. by presenting at least one idea to innovate CP, it will be proven that (a) particular hypothesis H1,2 holds true – that it is possible to improve the CP performance, and by showing (at least one) example from practise of improving CP the particular hypothesis H2,2 will also have to be accepted – that it is justified (that it makes sense) to improve CP performance.

(a) In checking H1,2 the need for plans to be connected according to time horizons is shown – connected into „concentric loops“ (as in Omerbegović-Bijelović J., Osnove Operacionog menadžementa, Sl. 4, p. 140), as the short term plan is applied according the corresponding number of times in the space of a medium term plan, and correspondingly, a medium term plan is created (and applied) a corresponding number of times within the framework of a long term plan.

In addition to pointing out the time aspects of plans, one has to bear in mind the „movement of data“ along in the process of planning: data from the long term plan – about potential markets of selling and procuring are used to create contracts within medium term sale and procurement; and so the data about, e.g. planned production are used as orientation for keeping available capacity required according to the short term plan. Hence the processes of creating particular types of planes are shown also as algorithms (with input and output data packets and their transformations within the activities of the planning process).

The idea by which H1,2 is proven (the possibility to improve connections between plans) is shown in Fig. 2. It consists of simultaneous (matrix like) connection of plans both according to time horizons and type of plan (objects), which increases the availability of data and consequently the quality of the plans. Another innovation would be „creative use“ of the colours of documents. Hence: $I1(CP)=2$ and H1,2 is considered proven.

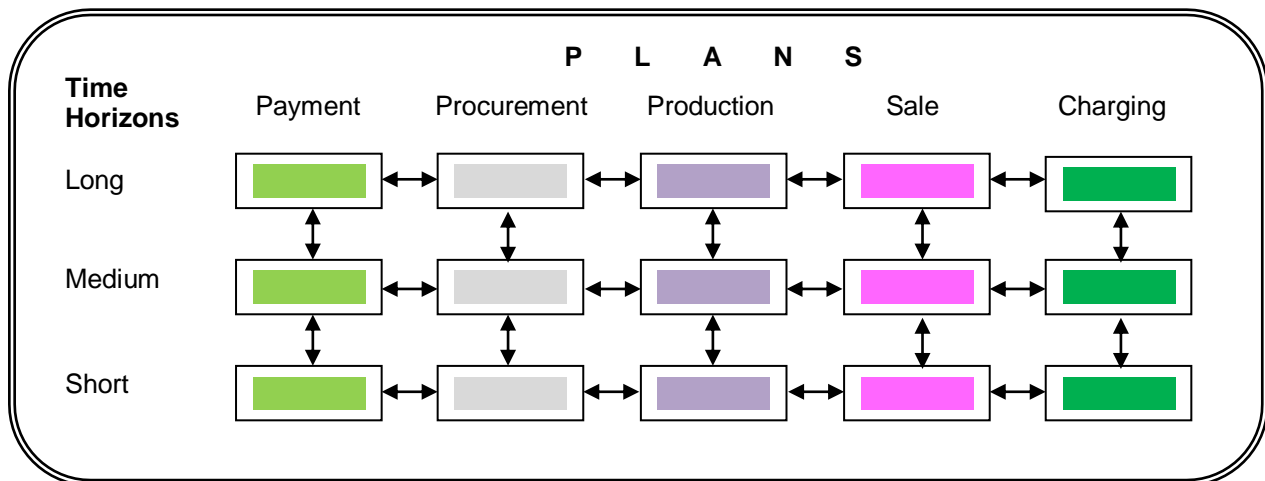


Figure 2: Matrix like connection of plans, using colours as symbols

(b) In checking H2,2 – justification of connecting plans, the necessity for just such a connection is pointed out: if the connections were not there, the plans would lose their sense (as plans of shorter time frame are used to plan achieving goals which are defined by plans of longer time frame). Namely, plans are the „carriers“ of the goals, and for them it holds true that operational goals are ways of achieving medium and long term goals; and reverse, long term goals are the purpose, the reason and the justification for the existence of medium and short term goals.

On the other hand, except for aims, plans also share data relating to the current states, norms, flow (of capacity) etc. – everything which is necessary for plan generation. In addition, the many years of experience the authors have in planning and improving connections between plans (in theory as well as practise) confirm that the value of $I2(CP) \gg 1$; hence H2,2 can be considered true.

* * *

When the particular hypotheses H1,1 and H1,2 are proven, it can be concluded that the intermediate hypothesis H1 is also proven – that it is in fact possible to improve „plans content“ (PC) as performance of plans. Proving particular hypotheses H2,1 and H2,2 therefore proves intermediate hypothesis H2 – that it is in fact possible to improve „connection of plans“ (CP) as performance of plans.

Since intermediate hypotheses H1 and H2 are proven, it can be concluded that the general hypothesis H0 is also proven – that improving (at least one of) performances of plan (or any other element of the managerial system) contributes to management quality (MQ) development and, consequently, to increasing SME „strength“ and its contribution to the social-economical life.

4. CONCLUSION

This paper set out to show that it is important to develop management quality and that every improvement of managerial system element performance contributes to it. It has been shown, on an example of two performances of a plan (as an element of a managerial system), what the methodology for checking the truth (defined here) of general hypothesis H0 could look like and it was concluded that, indeed, every improvement of performances brings with it a development of SME (as well as other organisational systems) management quality (MQ) – which is a contribution to the definition of „Methodology of development of management (system) quality by improving performances of its elements“.

For further research there are a great many questions. We would like to ask some of them here: the order of performances improvement, intensity of change/improving performances and intensity of the consequences (MQ development and improving business results), as well as questions of practical implication: connecting phases in the SME life cycle and improving performances, training for improving performances, practical

tools for improving performances (as well as for designing, implementing and maintaining suggested innovations of plans and planning) etc.

Science has no end, but even so – this paper was certainly limited in many respects. There is always the hope that it may perhaps inspire our younger colleagues – to partake of this interesting and useful research, as well as to be, when it comes to methodology, more demanding and consistent (than, on this occasion, the authors of this paper managed to be).

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DIFFERENCES IN RANKING THE CRITERIA FOR A MANAGEMENT SYSTEM CONSULTANTS SELECTION

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Abstract: *Cooperation with an external consultant, when certifying some of the management systems, is useful especially when the aim of the certification isn't the certificate itself, but quality improvement of the management system. Organizations are free when choosing a consultant, but his qualifications have to be carefully considered. This paper aims to found out which criteria for choosing a consultant are assessed as important by customers and therefore should be considered when certifying some of the management systems. We conducted the research among 49 randomly picked (small and medium-sized) organizations from the territory of Serbia (either in direct contact or by e-mail) on criteria considered important for choosing a consultant for management systems based on the directions for choosing a consultant (contained in ISO 10019:2005). Respondents assessed the importance of those criteria in cases when they choose a consultant for the first time. The research was repeated among the same respondents who evaluated the importance of the same criteria after the implementation of observed management system. The criteria considered in the research are divided into four categories: personal characteristics of the consultant, references of the consultant, consultant's offer and information on consulting organization.*

Key words: *differences, selection, management system consultant*

1. INTRODUCTION

Abraham (et al., 2000) presented reasons for an organization implementing management systems. They pointed out that, if the implementation is conducted in accordance with a valid strategy (when the goal of certification isn't certificate itself but improvement of quality of management system under observation), certificate can also guarantee high quality of outcome. This can be a reason why an organization would decide to implement quality management system or some other management system and, on that occasion, hire a consultant for the chosen management system. According to Soriano (et al., 2002), the aim of hiring a consultant is not only to draw up a plan but also to set up a relationship based on mutual collaboration so that the client learns how to resolve problems that may arise in the future when the consultant is no longer at hand. This especially refers to small and medium-sized organizations. By 2002, 95% of all small and medium-sized organizations used services of external consultants (Bennett and Robson, 2004). However, as it is pointed out in research of McLachlin (et al., 1999), the process of hiring a consultant isn't always successful for customers. The level of success when choosing a consultant, as well as his relationship with customers is also discussed by Gable (et al., 1996) who suggests a model for assessment of customer's success in choosing a consultant. Similar to this, Cebeci and Ruan (2007) suggested analytic hierarchy process as the most appropriate analytical tool when choosing a consultant who would satisfy customers' requirements in the best way, claiming that customers often don't appreciate differences in quality of consultants.

The fact is that information on references and personal characteristics of consultants are more and more available to public and that organizations preparing for implementation of some management system can use these information to choose a consultant. Except the description of personal characteristics and references of a consultant, information on the organization in which the consultant is employed (e.g. distance from customer, number of employees, possessing of ISO 9001 certificate and so on) are also available to organizations. Information rarely available to organizations are those about consultant's offer (e.g. price of service, terms of payment and so on). However, any research hasn't been conducted yet, so it is not known to which extent organizations search and use that kind of information, as well as how customers understand those information and trust them. Besides, there is a growing number of consultants for management systems that makes the choice more difficult for organizations.

In their research from 2000 (conducted on the territory of Australia) Kumar, Simon and Kimberley found out which indicators do management consultants find the key indicators for their personal success, and which can be related to strategic abilities. These are: quality of service, setting clear objectives, solving problems, integrity and honesty, client – consultant communication and credibility. After that, Simon and Kumar (et al., 2001) found out, through their research (conducted on the territory of Australia), what the customers' opinion on strategic abilities was that lead toward consultants' success. According to this research, five key abilities are: ability to listen to and comprehend the client, quality of service, client – consultant communication, integrity and honesty and technical knowledge. Using these research, Simon and Kumar also summarized the reasons why customers would hire a consultant. Some of the most important reasons are lack of knowledge and manpower, gaining independent and objective advices, getting additional funds and quick solution of disputed issues. Also, in their research conducted in 2004, Bennett and Smith pointed out the key criteria which affect the choice of a consultant. Those are high fee rate – price of consultant's day, duration – number of consultant days spent on project and total cost of service. They also pointed out, in the same research, that the choice of a consultant isn't related to the type of a consultant, working area or type of an organization. However, it is unknown how customers evaluate criteria for choosing a consultant which are mainly based on directions of the international standard ISO 10019:2005 for choosing a consultant and which bring together the criteria that refer to consultants themselves (through their personal characteristic and references) and criteria that refers to the organizations in which the consultant is employed (e.g. consultant's offer, size of an organization, distance from customer, level of equipment of the organization and so on). Therefore, the aim of this research is to assess how customers evaluated the criteria for choosing a consultant when they were choosing him for the first time. Additionally, this research also provides an insight into whether the importance of the same criteria changed after the process of the implementation of the observed management system. Such findings can be useful for organizations when choosing a consultant again (for example, if the observed organization inclined towards management system integration), as well as for consultants to improve quality of their services.

2. HYPOTHESYS

In this research we tested two hypothesis we find important, based on gained theoretical knowledge and experience in the area of consulting:

- H1. There is a group of criteria that are significantly more important than the rest of the criteria.
- H2. There is significantly difference in criteria ranks when choosing a consultant for the first time and after implementation of a management system.

3. RESEARCH SETUP

The research about customers' opinion on criteria for choosing a consultant was being conducted from april 2009 to december 2010. Questionnaire was delivered to the respondents personally or by e-mail.

Population and sample

The population of this research consists of all organizations from the territory of Serbia that were in the beginning of implementation of some management system (quality management system, food safety management system, environmental management system and/or occupational health and safety management system) and which, on that occasion, used services from external consultants. There isn't any official register of such organizations and there isn't an official register of certification bodies that work on the territory of Serbia. According to data from some certification bodies and public available data, we estimate that population of this research consists of about 300 organizations. However, this number should be considered as unreliable because many of certification bodies have a register of issued certificates but not register of certificated organizations so, considering that one organization can have several certificates (for different management systems), the number of issued certificates doesn't have to be equal to the number of certificated organizations. Also, there is no information on status of actual validity of the issued certificates in those registers. The majority of the population (99,7%) consists of small and medium-sized organizations (<http://www.capital.ba>, 12.08.2010.). We also noticed that, according to data from Economy register of Serbia, there are more service-oriented than manufacturing organizations. Most of these organizations are

from Belgrade and central Serbia and that is probably the consequence of unbalanced development of Belgrade and central Serbia compared to the rest of Serbia.

Accordingly, the sample chosen for this research consists of small and medium-sized organizations (which have up to 250 employees, according to http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/smedefinition/index_en.htm). Most of them (28 of them) are service organizations from Belgrade and central Serbia (2/3 belongs to central Serbia, 1/3 belongs to the rest of Serbia). The sample is chosen randomly and the sample size is about 16%. Exactly, the questionnaire was delivered to 107 organizations, and we got correctly filled out questionnaires that were taken into consideration for analysis from 49 organizations that means the rate of responsiveness on the questionnaire was 45,8%. The rest of organizations weren't taken into consideration because they weren't ready for cooperation, they didn't fill out the questionnaire correctly or they didn't finish implementing observed management system. From each organization which responded to the questionnaire, we got the answers from director or chief manager (for quality, food safety, environmental or occupational health and safety).

The questionnaire

The questionnaire includes criteria for choosing a consultant which should be evaluated by an organization representative. The criteria were mainly derived from standard ISO 10019:2005: Guidelines for the selection of quality management system consultants. It lists what characteristics a consultant should possess but it doesn't point out how important are each of these characteristics. The respondents were asked to evaluate the importance of 25 criteria for choosing a consultant, listed in Table 1.

Table 4: Criteria for choosing a management system consultant

Group	Criteria	Source
Personal characteristics of a consultant	1. Fairness, honesty and sincerity	ISO 10019:2005; Simon and Kumar, 2001
	2. Communicativity and kindness	ISO 10019:2005; Simon and Kumar, 2001
	3. Discretion	ISO 10019:2005
	4. Capability of offering different and creative solutions	ISO 10019:2005; Simon and Kumar, 2001
	5. Determination and independence	ISO 10019:2005
	6. Dedication to the project	ISO 10019:2005
References of a consultant	7. Years of work experience in management systems through providing consulting services	ISO 10019:2005
	8. Years of work experience in management systems as a management representative	ISO 10019:2005
	9. Years of work experience in management systems through performing the function related to implementation of the observed management system	ISO 10019:2005
	10. Years of work experience in management systems as internal or external auditor of the observed management system	ISO 10019:2005
	11. Years of work experience in the area of the observed management system in the same area as customer's is	Work experience
	12. Possession of an additional education (attend courses and seminars, having published books and papers, having some rewards and recognitions and so on) from the area of observed management system or customer's area	ISO 10019:2005
Consultant's offer	13. Availability of service (waiting time from submitting a requirement for starting a project)	Work experience
	14. Lasting of service (offered deadlines for project completion)	ISO 10019:2005
	15. Share of days that a consultant will spend in direct work with employees within customer's organization compared to the overall time of project realization (in order to ensure that the consultant is familiar enough with	Work experience

Group	Criteria	Source
Data on consulting organization	products and processes of the organization)	
	16. The terms of service payment	Work experience
	17. The price of service	Work experience
	18. Distance of the consulting organization from customers	Work experience
	19. Number of employees in the consulting organization	Work experience
	20. Level of equipment of the consulting organization's rooms	Work experience
	21. Appearance of the consulting organization's rooms (if they are tidy and pleasant)	Work experience
	22. Availability of information on consulting organization and its employees (e.g. through the site, fairs and so on)	ISO 10019:2005
	23. Good reputation of the consulting organization	Work experience
	24. Recommendations (especially personal recommendations from business partners, customers, organizations that have been cooperating with the consulting organization and so on)	Work experience
	25. Information that consulting organization applies ISO 9001:2008 – Quality management system	Work experience

The respondents evaluated in total 25 criteria for choosing a consultant for management systems, which were grouped in 4 categories. The respondents evaluated the importance of the criteria on a scale ranking from 1=unimportant to 5=extremely important. The same respondents evaluated the same criteria twice. Firstly, the respondents evaluated the importance of the stated criteria before implementation of management system, while they, the second time, evaluated the importance of the same criteria after the implementation.

Except the given questions, there is one more, open question, in the questionnaire which gives a freedom to the respondents to add some of criteria which are maybe omitted in the questionnaire and they consider it should be among other questiones in the questionnaire. This question was also used to detect defects of the questionnaire through pilot data collection and analysis (conducted among 10 organizations that match the description of the sample of this research).

4. STATISTICAL ANALYSIS

We conducted two experiments:

1. One Sample t test for establishing the outranking criteria according to customer's preferences before and after implementation of management system.
2. Paired Samples t test for measuring whether there were changes in criteria importance, before and after management system implementation. In each of analysis, value of parameter p that is less than 0.05 point to statistically significant difference.

Identification of outranking criteria before and after implementation of management system

From data in Table 2 we can notice the difference in the customers' evaluating the criteria for choosing a consultant before and after implementation of management system. Before the implementation, the customers paid most attention to the following criteria: good reputation (Mean=4.469), consultant's dedication to the project (Mean=4.448), recommendations (Mean=4.408) and consultant's work experience as a consultant (Mean=4.286). This group of criteria is pointed out as the most important because the marks of these criteria didn't significantly differ from the highest value - good reputation (Mean=4.469). The customers also answered the question how they would evaluate the same criteria, if they had to choose a consultant for management systems again. In the same way, the group of criteria that the customers find would be the most important when choosing a consultant again is also pointed out. This group consists of the same criteria, but in different order: good reputation (Mean=4.632), consultant's dedication to the project (Mean=4.571), consultant's work experience as a consultant (Mean=4.530) and recommendations (Mean=4.469).

Table 2: The rank of criteria (One-Sample Statistics)

Before providing the consulting services			After providing the consulting services		
Criteria	Mean	Sig.	Criteria	Mean	Sig.
Good reputation	4.469	0.995	Good reputation	4.633	0.976
Dedication to the project	4.449	0.848	Dedication to the project	4.571	0.528
Recommendations	4.408	0.586	Work experience - consulting	4.531	0.311
Work experience - consulting	4.286	0.074	Recommendations	4.469	0.105
Fairness, honesty and sincerity	4.184	0.036	Fairness, honesty and sincerity	4.408	0.026
Price of service	4.184	0.004	Communicativity and kindness	4.347	0.004
Terms of service payment	4.122	0.003	Creativity	4.286	0.005
Communicativity and kindness	4.061	0.002	Availability of service	4.245	0.001
Lasting of service	4.061	0.005	Lasting of service	4.245	0.004
Availability of service	3.918	0.000	Work experience – auditor	4.204	0.000
Discretion	3.898	0.000	Price of service	4.163	0.000
Creativity	3.878	0.000	Discretion	4.102	0.000
Determination and independence	3.857	0.000	Terms of service payment	4.102	0.000
Work experience – function	3.796	0.000	Work experience – function	4.082	0.000
Possession of ISO 9001 certificate	3.776	0.002	Possession of ISO 9001 certificate	4.082	0.003
Work experience – auditor	3.694	0.000	Determination and independence	4.061	0.000
Share of days in the organization	3.694	0.000	Work experience in customer's area	4.000	0.000
Work experience in customer's area	3.592	0.000	Share of days in the organization	3.837	0.000
Availability of information	3.490	0.000	Work experience – manag. repres.	3.673	0.000
Work experience – manag. repres.	3.265	0.000	Availability of information	3.612	0.000
Additional knowledge	3.265	0.000	Additional knowledge	3.469	0.000
Appearance of organization's rooms	2.571	0.000	Appearance of organization's rooms	2.735	0.000
Number of employees	2.245	0.000	Number of employees	2.388	0.000
Level of equipment of org. rooms	2.245	0.000	Level of equipment of org. rooms	2.347	0.000
Distance from customers	2.061	0.000	Distance from customers	2.327	0.000

The group of the most important criteria is bold.

Difference between the importance of criteria before and after implementation of management system

We used the paired samples t test to check whether the ranking of criteria differ before and after management system implementation. From Table 3, we notice that this significance exists in the following pairs: For instance, in the first pair – Fairness, honesty and sincerity statistically significant increase of the mark was noticed from moment X (Mean=4,18; St. Deviation=0,928) to moment Y (Mean=4,41; St. Deviation=0,674), $t=-2,403$, $p=0,020$ (mutually). The average increase of value of the criteria observed in this Pair is -0,224, while 95% confidence interval extends from -0,412 to -0,37. The value of eta squared (0,11) shows that the influence of provided consulting service is medium. According to Cohen (et al., 1988), influence is considered to be small for each value of eta squared that is less than 0,06; influence is considered to be medium for each value of eta squared that is between 0,06 and 0,14; influence is considered to be high for each value of eta squared that is higher than 0,14).

Table 3: Difference between the importance of criteria before and after providing the consulting services

Pair	Criteria	Mean	Std. Deviat.	Paired Differences				
				Mean	95% Confidence Interval of the Difference		t	Sig. (2-tailed)
					Lower	Upper		
Pair 1	Fairness, honesty and sincerity - x	4.18	.928	-.224	-.412	-.037	-2.403	.020
	Fairness, honesty and sincer. - y	4.41	.674					
Pair 2	Communicativity and kindness - x	4.06	.852	-.286	-.489	-.083	-2.828	.007
	Communicativity and kindness - y	4.35	.663					
Pair 3	Discretion - x	3.90	.895	-.204	-.423	.015	-1.872	.067
	Discretion - y	4.10	.963					
Pair 4	Creativity - x	3.88	.992	-.408	-.649	-.167	-3.403	.001
	Creativity - y	4.29	.816					
Pair 5	Determination and independ. - x	3.86	.913	-.204	-.423	.015	-1.872	.067
	Determination and independ. - y	4.06	.852					
Pair 6	Dedication to the project - x	4.45	.765	-.122	-.322	.078	-1.231	.224
	Dedication to the project - y	4.57	.645					
Pair 7	Work experience - consulting - x	4.29	.707	-.245	-.406	-.084	-3.060	.004
	Work experience - consulting - y	4.53	.680					
Pair 8	Work exper. - manag. repres. - x	3.27	1.271	-.408	-.695	-.121	-2.862	.006
	Work exper. - manag. repres. - y	3.67	1.068					
Pair 9	Work experience - function - x	3.80	1.190	-.286	-.471	-.100	-3.098	.003
	Work experience - function - y	4.08	.932					
Pair 10	Work experience - auditor - x	3.69	1.342	-.510	-.780	-.241	-3.807	.000
	Work experience - auditor - y	4.20	.790					
Pair 11	Work exp. in customer's area - x	3.59	1.153	-.408	-.718	-.098	-2.649	.011
	Work exp. in customer's area - y	4.00	.913					
Pair 12	Additional knowledge - x	3.27	.995	-.204	-.423	.015	-1.872	.067
	Additional knowledge - y	3.47	.938					
Pair 13	Availability of service - x	3.92	1.017	-.327	-.591	-.062	-2.480	.017
	Availability of service - y	4.24	.751					
Pair 14	Lasting of service - x	4.06	.966	-.184	-.423	.056	-1.543	.130
	Lasting of service - y	4.24	.879					
Pair 15	Share of days in the organiz. - x	3.69	1.245	-.143	-.362	.077	-1.309	.197
	Share of days in the organiz. - y	3.84	1.196					
Pair 16	Terms of service payment - x	4.12	.781	.020	-.150	.191	.240	.811
	Terms of service payment - y	4.10	.848					
Pair 17	Price of service - x	4.18	.667	.020	-.117	.158	.299	.766
	Price of service - y	4.16	.717					
Pair 18	Distance from customers - x	2.06	1.029	-.265	-.545	.015	-1.906	.063
	Distance from customers - y	2.33	1.231					
Pair 19	Number of employees - x	2.24	.969	-.143	-.392	.106	-1.155	.254
	Number of employees - y	2.39	1.057					
Pair 20	Level of equip. of org. rooms - x	2.24	1.217	-.102	-.323	.119	-.927	.358
	Level of equip. of org. rooms - y	2.35	1.347					
Pair 21	Appearance of org. rooms - x	2.57	1.275	-.163	-.407	.081	-1.344	.185
	Appearance of org. rooms - y	2.73	1.319					
Pair 22	Availability of information - x	3.49	1.082	-.122	-.322	.078	-1.231	.224
	Availability of information - y	3.61	.953					
Pair 23	Good reputation - x	4.47	.680	-.163	-.311	-.016	-2.222	.031
	Good reputation - y	4.63	.602					
Pair 24	Recommendations - x	4.41	.788	-.061	-.221	.098	-.771	.444
	Recommendations - y	4.47	.680					
Pair 25	Possession of ISO 9001 certif. - x	3.78	1.476	-.306	-.595	-.018	-2.134	.038
	Possession of ISO 9001 certif. - y	4.08	1.239					

The criteria statistically different before and after implementation of management system are bold.

x- before implementation of management system; y- after implementation of management system

5. CONCLUSION

We considered, in this paper, the sample of 49 organizations which implemented some of management systems and, in that occasion, used the services of external consultants. The aim was to find out on what basis the organizations were choosing consultants for management systems, that is how did they evaluate the criteria for choosing a consultant (personal characteristics of a consultant, references of a consultant, the consultant's offer and data on consulting organization) in the moment of choosing a consultant for the first time, as well as was there a change in their value system of the same criteria after implementation of observed management system. The analysis showed that, after the implementation, when the customers gain a certain level of experience in working with consultants, they change their value system of criteria for choosing a consultant so there is significantly difference in evaluating criteria before and after implementation of management system when it comes to the following criteria: fairness, honesty and sincerity; communicativity and kindness; creativity; work experience in consulting; work experience as a management representative; through performing the function related to implementation of the observed management system; work experience as an auditor; work experience in customer's area; availability of service and possession of ISO 9001 certificate in terms of increasing the value of the considered criteria and good reputation in terms of decreasing the value of the considered criteria. We see that significantly difference didn't appear in each criteria which means that second hypothesis was partly confirmed. However, the group of the highest evaluated criteria, after implementation of management system remained the same as before the implementation. This group consists of the following criteria: consultant's dedication to the project (belongs to personal characteristics of consultant), work experience in consulting (belongs to references of consultant), recommendations and good reputation of the organization in which the consultant is employed (belongs to the information about the consulting organization). Existence of this group of criteria that are significantly more important than the rest of the criteria we can conclude that the first hypothesis is completely confirmed.

Unlike this, research conducted by Kumar, Simon and Kimberley (et al., 2000) and Simon and Kumar (et al., 2001), which are similar in the criteria being evaluated, point out 3 indicators that lead toward consultants' success, evaluated as the most important by both consultants and customers. Those are: Quality of service, Integrity and honesty and Client – consultant communication. Except those indicators, Setting clear objectives, Solving problems and Credibility are also evaluated as the most important only by costumers, while Technical knowledge and Ability to listen to and comprehend the client are also considered the most important but only by customers. These research was conducted on the theritory of Australia.

Research in this paper, conducted on the theritory of Serbia, was based on slightly different criteria, so the results do not match completely with the results from the previuos two research. Criteria for choosing a consultant being evaluated from the customers are mainly based on international standard ISO 10019:2005-Guidelines for the selection of quality management system consultants. Criteria form the standard were complemented with the criteria often used in practice (e.g. on tenders) which means that criteria in this research are both theoretically and practicaly grounded.

Indicators used by Kumar, Simon and Kimberley (et al., 2000) and Simon and Kumar (et al., 2001) refer to consultant's characteristics, while research in this paper also includes criteria refering to characteristics of the organization in which the consultant is employed as well as the characteristics of the service expressed through consultant's offer.

Criteria "Quality of service" which was evaluated as one of the most important in previously mentioned research was intentionally left out in this research because it is not clearly defined what is considered under the quality of service. The quality of service is too broad a term which can be evaluated through several criteria. There are another criteria used in those research that are, in this research divided into more criteria. When talking about consultant's characteristics, the most important, from the point of view of customers in Australia, are Technical knowledge, Integrity and honesty, Ability to listen to and comprehend the client and Client – consultant communication, while the key role, from the point of view of customers in Serbia, is Dedication to the project. Except these criteria, customers in Serbia found the most important Recommendations and Good reputation that are directly connected with the impression of previous work of the consultant. Reason for this may be found in the fact that the market in Serbia is relatively small and customers and their business partners, as well as other interested parties have good communication channels through which they exchange these and similar information.

This research is different comparing to the others because the evaluation was conducted twice. It is determined how customers evaluated criteria when they hire a consultant for the first time as well as how

they evaluated the same criteria after they gained some experience working with consultants. In addition to this, the group of the most important criteria is selected from the rest of criteria because there is statistically significant difference comparing with the others.

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DEVELOPMENT OF CO-OPERATION BASED COMPANY STANDARDS - CASE OF INOVATIVE PRACTICE IN PUBLIC SERVICE COMPANIES

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Abstract: Growing importance of so called “de facto” standardization can be seen in many areas because companies can not operate in isolation; matching problems have to be resolved and processes of formal standardization processes are time-consuming. Ad hoc de facto standardization is standardization without support of standards developing organizations (SDO). The main intention of this paper is to present example of “ad hoc de facto” standardization in the area of organizational sciences. This article presents development of non-public standard related to job classification in 21 communal and public-utility companies operating in Serbia based on the staff structure analysis, performance analysis, analysis of basic earnings and theoretical background.

Keywords: Ad hoc de facto standardization, Job classification, Public service companies, Restructuring

1 INTRODUCTION

When discussing about definitions of standardization and standards, in many cases, very narrow focus on this term is evident. According to ISO/IEC (1991) standardization is the activity of establishing, with regard to actual and potential problems provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context. According to ISO/IEC (2004) and CEN (<http://www.cen.eu/boss/Pages/glossary.aspx#s>) standard is: “document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context”. However, not all standards are consensus-based or approved by a recognized body and standards may have a format other than document, e.g. software as in the case of Windows (Hesser et al., 2007, pp. 8).

In 1997. professor Henk de Vries introduced another definitions of standardization and standard which highly contribute to establishing theory of standardization. According professor Henk de Vries (1999) standardization is activity of establishing and recording a limited set of solutions to actual or potential **matching** problems, directed at benefits for the party or parties involved, balancing their needs and intending and expecting that these solutions will be repeatedly or continuously used, during a certain period, by a substantial number of the parties for whom they are meant. According professor Henk de Vries (1999) standard is an approved specification of a limited set of solutions to actual or potential **matching** problems, prepared for the benefits of the party or parties involved, balancing their needs, and intended and expected to be used repeatedly or continuously, during a certain period, by a substantial number of the parties for whom they are meant”. In these definitions **matching** problem is problem “of interrelated entities that do not harmonize with one another and solving it means determining one of more features of there entities in a way that they harmonize with one another, or of determining one or more features of an entity because of its relation(s) with one or more other entities” (de Vries, 1999).

2. HOW COMPANIES GET STANDARDS THEY NEED - DE FACTO STANDARDISATION

It has to be clear that term of standardization is not related to only institutional or formal standardization. Term of standardization can be used in area of internal or company-based standardization, cooperation-based or consortia-based standardization or national, regional or international standardization. Growing importance of so called “de facto” standardization can be seen in many areas because companies can not operate in isolation, matching problems have to be solved and process of formal standardization is time consuming. De facto standardization is standardization carried out by non-governmental parties other than formal standardization organization (de Vries, 1999). Many standards are developed by industrial consortia

or in cooperation with other parties involved. Reasons for using consortia based standards instead of usage formal standards (developed by organizations for standardization) might be (modified in accordance to Hesser et al., 2007, pp 18):

- **Speed.** Proposing new standard development to national or international organization for standardization is possible option but time and effort consuming. Consortia of companies with same and matching problems will have more interest to develop standards faster than SDOs.
- **Confidentiality.** In area of ICT, companies, that possess specific knowledge or developed technologies, may be interested in consortia-based standards to protect their specific intellectual assets, knowledge or technologies and to establish cooperation with others companies of interest. In other fields companies may recognize interest in solving matching problems, but may not be willing to allow interference in solving that problem with others out of consortia.
- **Intellectual property rights.** Formal standardization organizations (FSOs) allow the inclusion of patents in standards only when patent holder declares willing to negotiate licenses on reasonable terms. Companies that possess essential patents may prefer a consortium that allows high licenses fees.
- **Solving mutual or matching problems.** Many organizations out of consortia have not interest in solving particular problems. In many cases FSOs are not interested in development particular standards.

Knowing that companies have many options in area of standardization one question has to be answered: How companies get standards they need? If company needs standard and satisfactory standard does not exist, the new one has to be developed (figure 1). Company must decide whether to co-operate with other companies and interested parties or not. Next important issue is usage of standard development infrastructure of SDOs (Standardization development organizations). SDOs include formal standardization organizations (e.g. international, European or regional FSO); sectoral, professional or specialized standardization organization (SSO) and governmental or national standardization organization (GSO, NSO). Developing needed standards can be done without support of SDOs – that kind of standardization is called “ad hoc de facto standardization”. More about this and other ways of standardization (formal or de facto SDO standardization) can be found at work of de Vries (1999, 2010) and Hesser et al (2007).

3. EXAMPLE OF “AD HOC DE FACTO” STANDARDS DEVELOPMENT IN AREA OF ORGANIZATIONAL SCIENCES

3.1. Matching problem

This paper presents the ongoing experience in “ad hoc de facto” standard development in area of organizational sciences. During consultant work of the project team from the Faculty of Organizational Sciences, a matching problem related to the lack of standardized systematization of job positions in the 21 public and public-utility companies in Serbia (employing over 18000 employees) was observed. Observed companies were engaged in different industries and have had different classification of jobs, making comparison among them difficult. Consequently, employees performing similar jobs in different companies have different job titles, and specific positions are often treated as different jobs, although in essence are not. It was therefore necessary to introduce a new solution (model) that would have the smallest set of typical jobs and to associate these jobs with jobs existing in observed companies.

3.2. Need for standard

During the project of restructuring of public enterprises and public utilities consultants have proposed idea related to systematization of typical basic jobs in order to diminished different number of jobs in observed companies by several tens of times. The tasks of the project team, in development solution for “matching problem” included staff analysis, performance analysis, as well as salary analysis. The analysis were performed to describe current status within each company, but also to compare companies among themselves. However, it was necessary to modify representation of the existing structures in those companies.

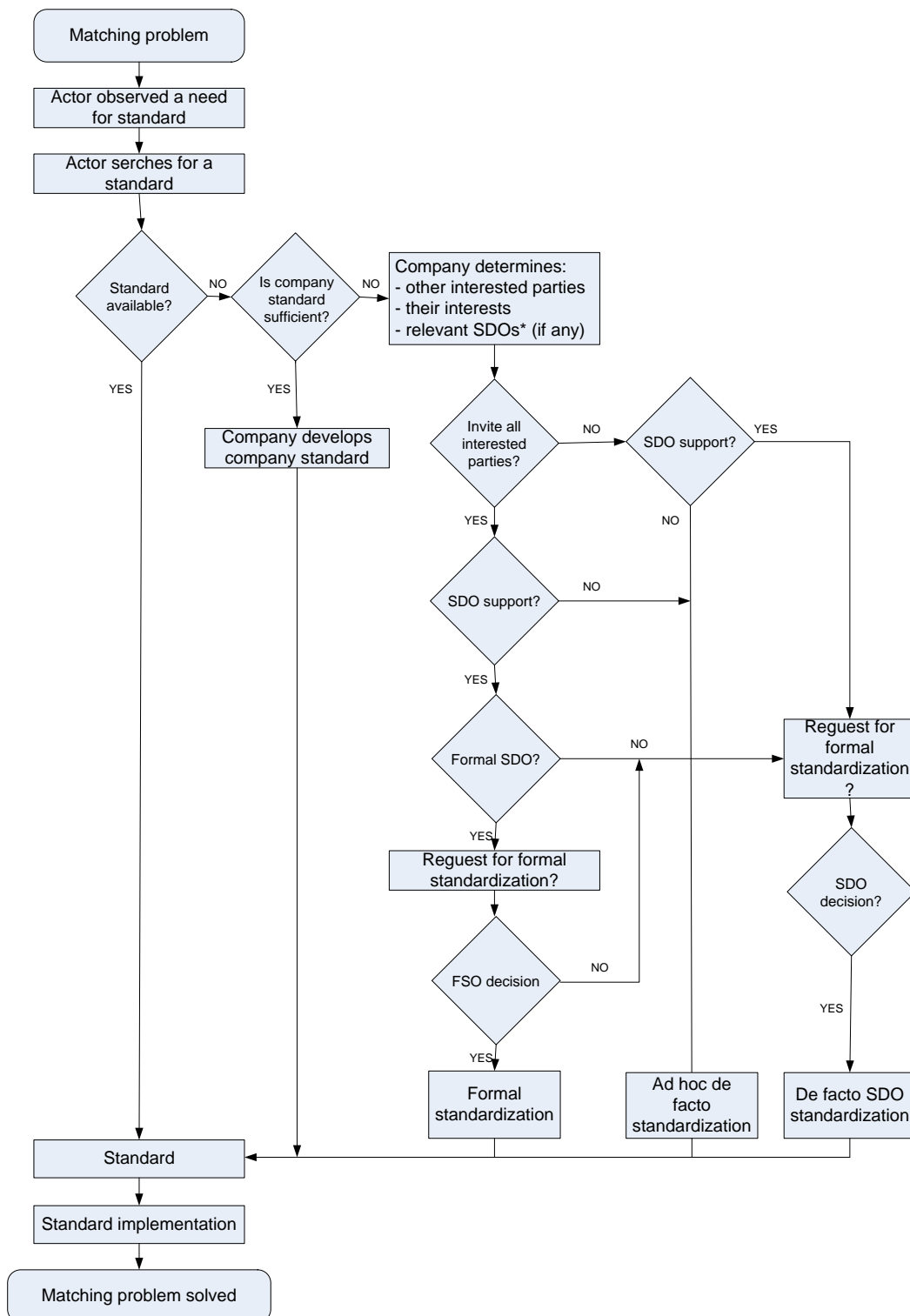


Figure 1. How company gets a standard it needs (de Vries, 1999, pp 16)

*SDO – Standards developing organizations include formal standardization organizations (FSO), sectoral or specialized standardization organization (SSO), governmental or national standardization organization (GSO, NSO)

3.3. Standard development

3.3.1. The staff structure analysis

The staff structure has been analyzed from the standpoint of its conformity with the requirements of efficient conduct of all business tasks. The analysis included also qualitative, in addition to quantitative characteristics of the organizational structure. The bases for the analysis of the observed group of companies were individual staff reports by companies. These partial analyses consist of analysis of the organizational structure and division of work in the company, analysis of span of management control, analysis of organization units by the criteria of core/non-core activities, analysis of the current job classification, the proposed systematization of jobs, analysis of qualification of employees, age structure, service and overall fluctuations. The analysis was made on the basis of the entire staff that was obtained from the personnel records of employees.

The staff structure analysis was based on:

- **The division of work:** Division of work helps to observe which model of organizational structure is characteristic of specific company, which are its organizational units, and what is the number of employees in each of them.
- **Analysis of the span of control:** The span of control shows the number of workers who are directly subordinate to a supervisor. The course of range of control is associated with the cost of management and efficiency of control of task execution. This analysis shows the total number of managers in the company, then the average span of control is by a supervisor, and the highest and lowest range by the organizational units.
- **Systematization of organizational units by the criteria of core/non-core activities:** In each company is necessary to find core units, which directly contribute to carrying out basic activities of enterprises, and non-core units, which provide indirect contribution. Depending on the company size this analysis was made at the level of sectors and/or offices.
- **The type and the number of employees in organizational units by the criteria of core/non core /support activities:** In each company were observed three groups of employees by this criterion. The first group consists of employees on core jobs, who directly contribute to the basic business activities. The second group consists of non-core employees, who contribute indirectly to the basic activities of the company. The third group consists of employing support staff, whose job is to provide support and assistance to other employees while performing their tasks. Results are shown in tables and graphs.
- **Analysis of the current job classification:** As stated, the analysis of existing jobs in the company proposed rationalization by the standardized jobs. In the existing classification was observed a large number of jobs that were valued differently, mostly because of the ability or commitment of employees, and with the departure of employees retained same way of evaluation. Therefore, a small number of standardized jobs is suggested and that still allow stimulation of employees over the variable part of salaries and related mechanisms. This analysis shows the total number of jobs in the existing classification, as well as the total number of standardized jobs in the company.
- **Systematization of typical jobs:** In accordance with the conclusions of analysis of the current job classification, a set of standardized jobs was proposed, through the enrichment of basic activities, with respect to technological limitations. The common services were conducted at the level of coordination of all public and public utility companies which were included in the project. For such defined positions, various categories that would depend on the level of education of an executor or any other parameter such as experience or previous results could be defined.
- **Analysis of qualification of employees:** Education of employees is analyzed according to the classification of the seven degrees of qualification. Staff MSc and PhD are classified for simplifying seventh degree in Serbian education system.
- **Analysis of the age structure of employees:** Age structure of employees is analyzed by indicators of the average, minimum and maximum age, in all organizational units. After that, there were made two classifications of personnel. The first classification divides the workers into groups by age single culture - pragmatism, existentialism, or conservatism. Age group up to 30 years (specific manifestation depends of the organizational culture) has the core value of pragmatism, seeks success and ambitions that motivate them, and is ready to work hard with the use of new technologies. The group aged 30-45 has tentatively culture existentialism, where the main motivators are quality of life, nonconformity, seeking autonomy, and loyalty of employees is directed primarily towards themselves and their own family. Age group over 45 years is characterized by conservatism, which, depending on the environment, can be manifested differently, but in our environment is often expressed through the rejection of change, desire for job security and resentment with new values that are accepted in the enterprise (Hofstede, 1990).The classification analyze workers by decades

of age, where the first covers the period up to 30 years, next to 40 and so to the last, which includes workers aged 60 and older. This analysis includes indicators of average age, then determines the difference in years between the youngest and oldest employee in the company, the average age by the organizational units that were previously defined, and the prevailing culture of the company.

- **Analysis of the overall experience of employees:** The analysis of total work experience of employees was completed by companies. Experience was analyzed by average, minimum and maximum values for all organizational units at the highest level, and in a later analysis four groups were formed: a group of up to 30 years of service, a group of 31-35 years of service, a group of 36-38 years of service and a group of over 38 years of service.
- **Analysis of the fluctuations:** Fluctuation analysis showed the total number of workers who had come and the total number of workers who had left the company in the observed period.

3.3.2. Performance analysis

Performance of the company includes its ability to achieve a certain result, under the given conditions of operation. Performance is, therefore, the ability to provide certain services or produce the products, based on what will be achieved by the income, with certain costs, by a number of people for some time.

The analysis led to the performance data of the period in which it was achieved with more or less efficiency, and identified the key causes of the achieved results. Performance management, in the context of the project, meant to determine the optimal relationship between specific characteristics of the organizational and staffing structure and the achieved results. This means that it is possible to determine in which direction some changes (rationalization) in the current organizational and staffing structure could be made, and this reduction should not affect the ability of the fulfillment of tasks. The achieved results by listed standardized jobs, which are measured on the basis of appropriate indicators, suggest that there are potential reserves for employees who perform these tasks.

Performance analysis was based on:

- **Analysis of performance by the value-creation-chain:** Performances of the organization are collectively shown in the value-creation-chain, which includes a clear distinction between the direct value creation activities and support activities. Selected structure allows the standardization of infrastructure activities and performance comparison of these activities in a variety of public sector enterprises, but also adoption of joint recommendations for all companies. Activities which create outputs represent the core business, and therefore the specificity of each company in the public sector, so the comparison is only partially possible at the group level, but is possible at the level of industry activity, even with companies that operate in the private sector. The analysis of the value chain in all public and public-utility companies shows the total number of employees in the observed public and public-utility companies, with total reserves in the observed group, the number of employees on support jobs and on jobs that carry the basic activity, as well as the largest reserves.
- **Performance analysis of the mass standardized jobs:** This analysis shows the twenty standardized jobs with the most employees, sorted by number of employees. Effects and reserves for standardized jobs with the largest number of employees are presented in tables. A negative value indicates that there is a lack of workers in a particular workplace, while positive value in this column indicates that there are reserves in the observed workplace.

3.3.3. Analysis of basic earnings

Analysis of basic earnings included basic earnings distribution within each enterprise and between enterprises. This analysis determined the relative relationship between different kinds of work being carried out in whole public service, as well as differences in wages for the same jobs in different companies, for which was used introduced standard model. As a result of this analysis, a summary of the current state and possibility to consider the need of making a unified payment system for public service at the level of the observed group were received.

3.3.4. Theoretical background

Assumptions for job classification are based on the theoretical basis of Henry Mintzberg and Michael Porter. For the purpose of creating a standardized model Porter value chain has been used as a well known in the

literature and in empirically proven model. According to that model, sharing of the overall organization's task is based on the different contributions of specific activities to competitive ability of the organization (Porter, 2001). This standardized jobs matching activities that are identified by modifying the Porter's value chain and Mintzberg's model (Čudanov et al, 2010), each part of value chain or organization block corresponds to one or more typical jobs. The functions are divided into 2 groups - support activities and primary activities - and then can be divided to the subgroups integrating a partial set of activities by functions (Dulanović & Jaško, 2009). Porter value chain is combined with Mintzberg's model, which divides organization into the 5 elements, namely the strategic apex, middle line, operating core, techno structure and support staff (Mintzberg, 1983). The presented inter-company standard of job classification is presented in (Jaško et al., 2010) and can be extended in each company for more specific jobs in the operational area if there is need for that. Connection of existing positions with standardized jobs was carried out on the basis of existing jobs systematizations and description of tasks on each specific workplace. Thus, for example, position of "Engineer GIS", "Specialist Analyst - Programmer", "Engineering Analyst - Programmer", "Engineering Information Technology", which have similar descriptions of the different companies in the typical model associated with the position of "IT Support Designer". In this way comparison among companies by the standardized jobs was enabled. Also, analyses described later in this paper were made enabled.

CONCLUSION

Growing importance of so called "de facto" standardization can be seen in many areas because companies can not operate in isolation, matching problems have to be resolved and processes of formal standardization processes are time-consuming. More and more standards are "de facto" standards - developed by parties other than formal standards developing organizations. However, many organizations are aware of matching problems, but are not informed or knowledgeable about usage of concept of "ad hoc de facto" standardization (Mijatovic, 2008, 2011). The main intention of this paper is to present example of "ad hoc de facto" standardization in area of organizational sciences. The aim of this paper was to show development of non-public standard related to job classification in 21 communal and public-utility companies operating in Serbia based on the staff structure analysis, performance analysis, analysis of basic earnings and theoretical background. This case is based on ongoing process of standards development and implementation. Results of this innovative practice in communal and public-utility companies operating in Serbia and standard effectiveness have to be explored in future research. In our future work we intend to examine potentially influential factors on adoption of "ad hoc de facto" standardization in management of communal and public-utility companies operating in Serbia.

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RISK MANAGEMENT IN SOCIETAL SECURITY

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Abstract:

Accumulated issues of societal security demand a complex and comprehensive approach to organization of society for their solution. The focus of security has been transferred from state to real society factors, which makes room for security science to investigate conditions and interactions of society's security and organizational context. The paper is focused on societal security approach from the point of view of risk existence and analysis for the existing and supposed dangers with the goal to organize society for preventive action, but also to be prepared for rapid and efficient response for protection of societal values. Specific highlight is put on standardized approach to risk management as the assumption of efficient identification of dangers and implementation of management process into society's organizational context.

Key words: challenge and threat, risk, societal security, management

1. INTRODUCTION

The last years of the 20th century brought new context and positions in international relations. The state as the basic form of society's organization lost its significance as the basic and the only security factor. Different conflicts in international relations pointed out the individual and the society in the whole as the inevitable security objects. The society became the object of security science interest from the aspect of factors which define it and solve more and more complex problems of societal security. In security studies there are two notions, *societal security* and *social security*, and between the two there is no clear distinction. Although those are synonymous, the development of societal security concepts is a consequence of the fact that traditional *national security* concept did not solve all the tensions which exist in society viewed as the most complex human collectivity. Thus, the society became a significant security object threatened by different phenomena and situations. All of these imply that there is a necessity of acquaintance and management of old-new threats, with the goal of prevention, but also response, in situations with threatening attributes.

2. NOTION AND SIGNIFICANCE OF SOCIETAL SECURITY

Eternal human pursue for secure life resulted with generation of different security approaches. One thing is certain; man has the ultimate need for living and creating in a secure environment. What was clear during the early beginnings of human society is that man was more vulnerable if he was alone. This fact caused the creation of different groups, formal and informal, which provided people with the achievement of different needs, and overall the need to be secured. Thus, the security became one of the priorities of development and progress of those organized 'groups'. The variety of needs and attributes which directed people towards organizing were a sufficient trigger for multiplying the problem, as well as for differentiating new organizing criteria. Namely, it was not significant if group just secures enough food or other life needs, but there was a question of origin, custom, affiliation, etc. This approach brought new and more complex groupings in social groups which now had a need for higher level of security achieved through the existence of its own territory and state. The existence of state understood the existence of different mechanisms which would secure the survival of the state itself with intention of progress, but also the society located at the territory of that state. For a long period of time, the state was pointed out as the exclusive object which should be secure. However, the sources of state instability were multiple on different bases, and the existing approaches to security did not solve problems. It became clear that challenges and threats to state security do not come only from the exterior, but from the relations within the state itself. The fact stated opened completely new approaches to security, namely the issue of state security segments related to the individual, social groups, and society in the whole.

In security arena the societal security showed up, which was not the same as the state security. With this fact, the state and social subjects became aware of opening of new security horizons. Besides the state and

supranational organizations, there is also a private sector which shows, with its capacities, knowledge, and capabilities, that it possesses the power of influence on security streams in society and state, and that it is significant security factor (Drennan, McConnell, 2008).

Changes in the environment, technical and technological development, and demographic expansion caused more complicated relations between peoples and nations, which increased their needs for even larger security of their own values. The efforts of society for building secure conditions for development and progress are becoming dependent from external and internal factors (Keković, Kešetović, 2008).

3. CHALLENGES AND THREATS TO SOCIETAL SECURITY

Contemporary society, set on the crossroads of global changes and internal needs and conflicts, is becoming very vulnerable on every change of the existing condition. There are different challenges in front of which the society can be found, from natural, through technical and technological, to social, economical, and military. The common characteristic of all challenges to security of society is the pursuit for a state different from the state of secure society (Aqirre, 2004). Regarding the fact that society or individual within society in most cases is not aware of the existence of challenges to his security, it is necessary to develop the awareness of all subjects of society about the existence of situations, events, and activities in which the security of society could be disturbed or questioned. Challenges, no matter where they come from, are potential elements which under certain circumstances can cause negative consequences to society's values. The configuration of challenges as phenomena, activities, or events, understands the existence of constructive elements that make the essence of every challenge and define the way of its action. The analysis of these elements and determination of the level of influence to society's values is the estimation of possibilities for certain challenge to be materialized through negative consequences to society's values. Every challenge which is determined to have great possibilities to result with negative consequences to society's values has a threat status. Causes of threats to society's values we can put into following groups:

1. Man-made threats,
2. Natural threats, and
3. Technical and technological threats.

Man-made Threats

In focus of majority of activities in one society, there is man. Regarding the imperfection on different bases, man in its engagement in work and production processes comes in situation that he acts conscientious or unconscious mistakes. Man-made mistakes could be observed on micro, middle, or macro levels.

On micro-level this kind of approach is focused on the role of individual. The biggest part of problem is directed to "how and why" people make mistakes.

Observation on middle-level leads towards the interest about organizational factors and processes which could have the role in causing the event with negative consequences. The key question is whether organized system can compensate human limitations and environment factors which facilitate the occurrence of negative events.

Through macro-level observation we can see the existence of possible causes which make negative events as more or less inevitable and unavoidable characteristics of modern society (Keković, Kešetović, 2008).

Natural Threats

The influence of natural forces on society's security is more and more explicit. Natural forces show their action through concept of natural disasters and other emergencies. The number of these disasters is constantly rising. Man is also contributing to the increase of number of natural disasters with his need to develop more secure society. Namely, intending to create more comfortable and secure living conditions, man is uncontrollably and unconsciously changing natural forces' streams. Consequences of natural forces' actions are seen in the loss of human lives, material destruction, and permanent changes of life functioning in environment.

Technical and Technological Threats

Technical and technological sources of threat mean the existence and development of technical and technological infrastructure as a subject of threatening of people's lives, their health, and environment. They include large chemical complexes, incidents and accidents in chemical plants, accidents in production warehouses and during transport of hazardous materials, nuclear power plants and other nuclear facilities, then stockpiling of radioactive waste, as well as other complexes that pollute the nature.

Fast development of information and communication technology, satellite communications and Internet had a negative influence on change of our perception of timely and spatial limitations. This technological development has consequences on both causes and characteristics of risk events. Technology became so complex that users often don't understand how it works, which is making finding and correcting the mistakes in functioning harder. Successful design of technological systems demands close connection of elements, which is increasing chances for the occurrence of cumulative effects of negative events (Keković, Kešetović, 2008).

4. RISK MANAGEMENT

In terms of existence of a vast number of challenges to society's security, the need for systematic dealing with their management arose. It means that the selection of the existing and future challenges which have potential to cumulate the negative effects is needed. Risk management is actually the tool which allows that. In order to be successful and sustainable, risk management has to be integrated into organizational processes of society and supported by social subjects. Risk management concept helps social organizations and society in general in efficient risk management through the application of standardized risk management process on different levels and within specific areas of society's activity. Such concept should provide that all information about risk that appeared within this process are properly processed and used in decision making on relevant level of society's organization.

Contemporary theorists are consent that organized and systematic risk management process in the area of societal security should have the following phases: context definition, risk assessment, risk treatment, monitoring and revision, and consultations and communication (ISO/DIS 31000:2008).

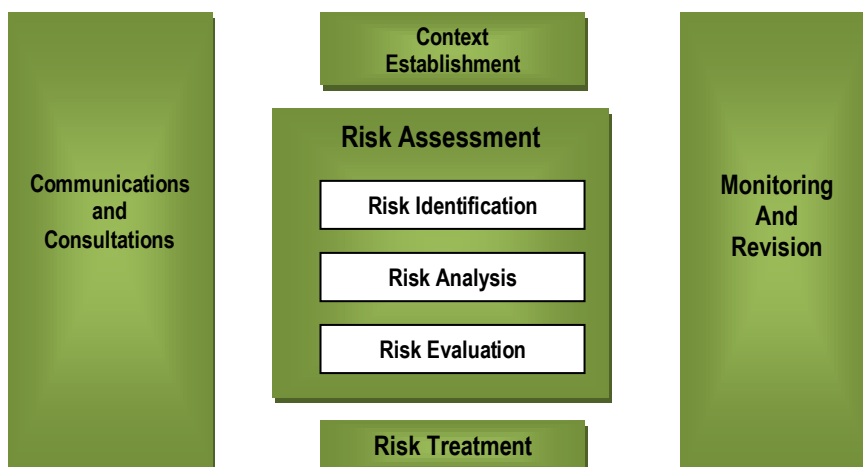


Figure 1: Risk Management Process

Source: ISO/DIS 31000:2008

Defining the Risk Management Context

The risk management process should be adjusted with culture, processes, and structure of organizing in one society. Through context definition the basic characteristics for risk management are determined for risk management, and also the scope and criteria for the rest of the process is set. The context can also include internal and external parameters relevant for social group. By defining the risk management context the goals, strategies, scope and parameters of society's activities or parts in which the risk management process is applied in should be established. Risk management should be done with full recognition of need for justification of sources used in risk management. Needed resources, responsibilities, and authorities should be specified according to real needs with respect to the existing threats, but also to those which could happen. For complete defining, the risk management context should be observed in relation to the internal and external factors.

The external context includes all the factors outside the subject which could influence to implementation of set goals. Understanding the external context is important for securing that external stake holders, their goals and interests are considered when risk criteria are developed. The external context is based on observation of the whole society, but with specific details from legal and regulatory conditions, understanding needs and

recognizing the stake holders and other risk aspects which are specific for the area of application of risk management process (Keković, Komazec, Glišić, 2009).

External context should consider the following:

- Cultural, political, legal, regulatory, financial, economical, and competitive environment, whether international or regional;
- Key initiators and trends which influence the society's goals;
- Perceptions and values of the exterior stake holders.

The internal context includes all the factors within the subject which could influence in a way in which the society is managing risks. Internal context should be determined because:

- a great risk for society or its parts means failure in achieving the strategic, project, and business goals with risk influencing on the ongoing organizational and political engagement, credibility, and society's values,
- goals and criteria of certain project or activity should be considered in light of society's goals as a whole, and
- Risk management is happening within projected society's goals.

Usable form of internal context depends on:

- abilities as resource of knowledge (capital, people, expertise, processes, systems, technologies),
- flow of information and decision making process,
- relation with internal stake holders,
- goals and strategies for achievement of planned goals,
- policies and processes,
- standards and referent models adopted by society, and
- structure (leadership, roles and responsibilities).

Risk Assessment

Risk assessment (Figure 1) represents comprehensive process of identification, analysis, and evaluation of risks. Risk assessment is of process character, and integrated within the organizational context of society (Keković, Savić, Komazec, Milošević, Jovanović, 2011).

Risk identification is recognition of risks relevant for projected society's goals. Society should identify risk sources, events or series of circumstances, as well as their potential consequences. The goal of identification is making of comprehensive risk list based on those events and circumstances which could help, prevent, decrease or slow down the implementation of goals. The comprehensive identification and risk registering is of essential importance, because the risk which was not identified in this phase is excluded from further analysis. Identification should include all risks no matter if under society's control or not.

In risk identification very important things are relevant and timely information. It is also related to appropriate first information about risk, if it is possible to get such information. Experts with appropriate knowledge should also be included in risk identification. After identification of what could happen, it is necessary to take into account the causes and scenarios showing what consequences could happen. All major causes should be considered.

Risk analysis is related to understanding of risk. It provides the input about the risk evaluation and decisions whether certain measures for risk mitigation or elimination should be undertaken, and which are the most suitable (the most acceptable) risk treatment strategies.

The risk analysis includes consideration of interdependence between risk cause and source, their positive and negative consequences, as well as the likelihood of occurrence of these consequences. Also, the factors that influence on the occurrence of consequences and likelihood of their occurrence could be identified. The risk analysis is focused on determination of consequences and likelihood of their occurrence, as well as on other risk characteristics. Special attention should be devoted to events or series of events that could have multiple consequences and could influence on large number of goals, specifically on those which are causing cumulative and synergetic effects and waterfall effects. Also, the consideration should include the existing risk control and its efficiency. Risk analysis is resulting with calculation of risk level.

$$RL = f(L, C) \quad (1)$$

RL-Risk Level, L-Likelihood, C-Consequence

Risk level is categorized into five degrees, e.g. categories: 1-insignificant, 2-minor, 3-moderate, 4-major, 5-catastrophic. Likelihood and consequences are also put into five degrees (Table 1).

Assurance with risk assessment and its sensitivity to preconditions and assumptions defined in risk management context should be considered in analysis and effectively transferred to decision makers and other stake holders if necessary.

In accordance with standard ISO 31010, in risk analysis there are various methods that can be applied for analysis of data identified during risk assessment process. Regarding the possibility of quality criteria definition for risk analysis, the matrix risk analysis method showed large applicability. The convenience is shown in precise criteria and risk elements relations definition, e.g. the quantification of primarily quality data. This possibility of defining the criteria from the view of risk management subject's needs is the true advantage. The criteria are defined by experts from given field with respect to standpoints of persons implementing the technological process.

Table 1: Risk Level Matrix

CONSEQUENCE		Insignifi cant	Minor	Moderat e	Major	Catastro phic
LIKELYHOOD		1	2	3	4	5
Rare	1	1	2	3	4	5
Unlikely	2	2	4	6	8	10
Moderate	3	3	6	9	12	15
Likely	4	4	8	12	16	20
Almost Certain	5	5	10	15	20	25

Risk evaluation includes the comparison of risks discovered during analysis process, and of criteria for risks determined within the consideration of the entire context. The final result of risk evaluation is determination of priorities of risk treatment (Table 1). Priorities are risk with level from 20 to 25. The goal of risk evaluation is help during decision making on basis of risk analysis results about what risks should be treated and what are risk treatment priorities. Society's goals and the scope of circumstances which can occur should also be the subject of circumstance analysis. In situations in which the choice should be made between options, it will depend on the social situation context. The decisions should consider the wider risk context and should include the consideration of risk tolerance defined by other social groups. Decisions should also take into account the legal limitations accepted by social structures.

Risk Treatment

Risk treatment is a choice of one or more options for accession to risk or application of those options. It can include cycle process of risk treatment evaluation, conclusion that residual risks are not able to be treated, creation of new risk treatment option and estimation of their effects until the achievement of appropriate degree of residual risk which can be reduced by society according to risk criteria.

Risk treatment options do not exclude one another, and they are no applicable in every circumstance, which depends of defined risk management context.

Risk treatment has to result with the construction of risk treatment plan. The goal of risk treatment plans is registry of ways in which the chosen options will be applicable, of resources, and timely and other limitations. Information which is entering into risk treatment plans can include:

- expected benefit,
- action and limitation measures,
- persons responsible for plan approval and persons responsible for plan application,
- suggested actions,
- monitoring and reporting demands,
- source demands, and
- time adjustment.

Monitoring and Revision

Monitoring and revision relate to:

- analysis and lessons learned from events, changes, and trends in society;
- detection of changes in exterior and interior contexts, including changes of the risk itself which could require a revision of risk and priorities treatment options; and
- checking if risk and treatment control measures are efficient both within plans and implementation.

The real improvement in implementation of risk treatment plans is showed by the achievement measure, which can be installed in management, measure and activities of internal and external reporting.

Monitoring or revision could include regular checks or controls of what is already present, which can be periodical or sudden. Both aspects should be planned and adjusted with defined goals (Kurtz and Browne 2004). It is not enough to count only on periodical reviews and controls. The results of monitoring and revision should be registered and sent internally and externally as reports when needed, and can also be used as input for revision of risk management concept. Responsibilities for monitoring and revision should be clearly defined.

Consultations and Communication

In every phase of risk management process the communication and consultation with interior and exterior stake holders should be undertaken. That is why in early phase the communication and consultation plan should be developed. This plan should identify problems connected to the risk itself, its consequences and measures which have to be taken when dealing with risk.

Efficient internal and external communication is necessary for securing that those responsible for implementation of risk management process, understand bases on which the decisions are made, as well as the reason why certain activities are necessary so that society's culture significant for risk management process would be improved.

Team approach to risk management has advantages in:

- risk analysis from aspect of different competence fields,
- development of communication plan,
- enabling appropriate changes in leadership during risk management process,
- securing that different views and thoughts are appropriately considered when assessing risk,
- taking care that interests of stake holders are understood and considered,
- helping during appropriate context definition,
- helping in appropriate risk identification, and
- securing improvements and support for risk action plan, from leadership's side.

5. RISK MANAGEMENT STANDARDIZATION

The variety of approaches and acting in finding solutions which are sustainable in terms of contemporary challenges, risks, and threats, is inevitably leading towards creation of security environment based on national capacities. One of basic characteristics of contemporary threats and crises is transnationality, the independence from national borders. Globalization trends, supported by modern technologies, Internet and lack of energy created the environment in which the society became vulnerable to threats made in distant parts of the world. It means that the need for creation of supranational security organizations has showed up. However, such organizations demand the adjustment of goals, methods and working language, as well as the approach to societal security (Landol, 2006).

International organization which enables the creation of such conditions and the adoption of international standards in the area of societal security is International Standardization Organization.

The basic idea of creation of international standards is based on participation of national standardization organizations, acceptance of global societal security principles, and implementation of agreed and adopted documents for national development strategies.

In forthcoming period, the survival of nations and social groups will depend on security and maintenance of society's critical functions, before the classic directing to the security of territories, and that means the ability for securing the functioning of government, economy, and civil society institutions, sustainability of critical infrastructure and democratic principles of state institutions' functioning which are under a great pressure in conditions of occurred crisis situations.

Society's response to risks and threats, with goal of decreasing their influences to the minimum and diminishing the social loss, has to be promoted and recognized as a social responsibility. When the incident occurs, society should understand that cooperation with other social groups and organizations in allocation of human and physical resources is necessary for continuity of its own operations because the resources demanded for emergency response and recovery could be deficient and dislocated.

6. CONCLUSION

The necessity of the existence and implementation of risk management related to security of contemporary society is connected with fast development and progress, primarily in technical and technological field. The price of higher living standard and easier life is paid through disturbed environment condition, ecological problems, increase of accidents, etc. The warning presence of mentioned dangers makes the subjects of society to increase the number of activities directed to their own security. Timely, realistic, and comprehensive analysis of present and future dangers gives the advantage to society structures in relation to

negative events. Regarding the globalization trends, influence to dangers, even on a local level, can demand the engagement of regional and world organizations, which demands a certain level of understanding with those organizations. Acceptance of standardization postulates in the area of societal security overrides the problems in communication and action, and facilitates the efficient direction of resources towards the goals set.

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STANDARDIZATION IN SERVICE OF HUMANITY

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Abstract: Standardization has influenced improvements in many areas, from the quality of products and services to the quality of processes and systems. Moreover, it has contributed to the changes in the business philosophy that is not concerned solely with generating profits but also to having the responsibility for the influences that the economic entities have both on each other and on the other people, the environment and the society in general. By applying standards to a certain aspect of the management system (quality, the environment, occupational health and safety, etc.) economic entities accept the responsibility for their influences and bring not only profits, but also people into the focus of their attention. The paper discusses the identification of the management systems standards that have the greatest contribution to spreading the idea of humanism. The elements of humanism are reflected as effects in various segments and activities, which is discussed for each standard of the presented management systems, established on the international level. In this paper were used a general scientific method, and other general and special methods, such as: descriptive methods, methods of scientific observation, analysis, synthesis, concretization, generalization, and analogy. In accordance with the observed facts upon certain phases of research the results presented in this paper should challenge similar studies from all that are involved with standardization but also with any technological or scientific development.

Keywords: humanism, standards, effects, society, economy

1. INTRODUCTION

Experts in the area of standardization have been trying for many years to mathematically explain how the application of standards generates profits. What is in the world of economy called added value, in the area of standardization has yet another dimension. A very important, but so far neglected, value added to standardization is also humanism.

The improvements that come through saving time in the operating activities, better usage of the available funds, increasing customer satisfaction, reducing the costs of idle time, scrap, etc., are only the first level of positive effects of the application of standards. Essentially, the effects of standardisation can be viewed in three dimensions (figure. 1).



Figure. 1 : The spiral representing the effects of applying standards

Although most organizations find the main motives for applying certain standards to their management systems first and foremost in **Profits** that, among other things, come from good business and open markets and **Status** that ensures customer loyalty, but willingly or unwillingly as a side effect they achieve certain elements of **Humanism**.



2. BASIC ELEMENTS OF THE STANDARDS FOR MANAGEMENT SYSTEMS AND THEIR HUMANE ASPECTS

International Organisation for Standardization (ISO) has developed a great number of standards in all areas of human activity. As a rule, one of the consequences of applying the international technical standards is the globalization in the production area, resulting in a high level of universality of products so they can equally be used anywhere in the world. That is why the international standardization contributes both to the customers that can always have functional products at their disposal, and to the sellers that have markets for the products.

However, such technical standards are usually supported by the standards that define the quality management systems, environmental, occupational health and safety and other management systems (figure. 2). One of the common qualities that all the standards for management systems share is the existence of certain elements that directly or indirectly cause the appearance of some humane effects in their application, which tend to have the ability of being permanent. Which elements of standards have the explained qualities and how they generate the elements of humanity is explained in the rest of this paper.

Figure 2: The analogy of the connection between technical standards and management systems

2.1 Humane Aspect of Requirements Related to Management Responsibilities

One of the initial requirements of each standard related to the management systems is the requirement for organizational responsibilities and authorities. Numerous successful business systems show how important it is to adequately define the ways to satisfy such requirements. Since the central part in the humanism belongs to humans, clearly defined responsibilities contribute to their more devoted work, which results in certain satisfaction emerging from the acknowledgement and acceptance in their own working environment. Furthermore, by fulfilling this requirement of the standard a clear responsibility framework is defined for each individual and the possibility of conflict among the employees is avoided. This means that the employees cannot be in a dilemma about their responsibilities while making business decisions or about who to address in order to solve certain business problems, etc.

By further consideration a conclusion can be made that this requirement of the standard may even have a considerable influence on reducing the anomaly of the modern business era called mobbing. Mobbing is usually manifested in the atmosphere of non-defined responsibilities of the employees, which may produce negative consequences. Specialists in the field of psychology have made some assessments that mobbing can cause some serious psychological problems that can reduce working ability. Fulfilling this standard requirement can reduce the problem of mobbing to the minimal level, or can even eliminate it, since responsibility framework is strictly defined for each employee.

2.2 Humane Aspect of Requirements Related to Communication

The importance of communication, from the viewpoint of humanism, is reflected in the need of each human to be a part of the community, to contribute to a common goal and to prove their abilities. When such human needs have been fulfilled, an individual can achieve psychological stability and can freely develop in every possible sense. After all, such individuals direct their behaviour in a positive way, and continually work on improving their skills and knowledge.

The lack of good communication first causes the problems related to work efficiency. Such atmosphere further increases the number of conflicts that can lead to a growing number of unfulfilled work tasks on the side of the employee, which can cause some sanctions. Therefore, wrong communication can gradually cause chaotic atmosphere, inefficient business and general dissatisfaction of the employees.

Therefore, it is not a coincidence that each standard for a management system must contain the requirement for defining communication. It implies that the standard consciously demands communication on all levels of hierarchy as each organization represents a specific business system that functions through the constant exchange of information among the employees and all interested parties.

2.3 Humane Aspect of Requirements Related To Resource Management

The standards for resource management systems include people, infrastructure, working environment, etc.

2.3.1 Human Resources (competencies, awareness, training)

If we reconsider the fact that no business system can function without humans, we can easily come to the conclusion that human resources represent the most important resource for each organization. For a long time the human right to education and development has not been just a part of some manifest on human rights, but also a part of many laws applied on both national and other levels. Moreover, international standards indisputably demand all business systems that apply them to continually plan and realize the training and improvement for their employees. Although the first visible effect is the benefit of the employer because of the better company functioning, new ideas and working methods, the covert effect is of humane character because the central role belongs to an individual that develops his abilities, widens his knowledge, thus achieving both personal and professional satisfaction.

2.3.2 Infrastructure and Working Environment

It is well-known in specialist psychological circles that certain external influences, if continually exerted on people, can cause significant changes in their consciousness and behaviour. Even inadequate light conditions in the working environment, according to numerous researches, can cause less productivity, mild forms of depression, insomnia and other psycho-physical problems.

Unfortunately, even today we can witness that in many countries, as the result of poverty, there are serious abuses and inhumane working conditions. It is fully legitimate for every organization to be profit-oriented, but on the other hand there is an explicit requirement, in each management system standard, that demands meeting certain criteria related to the working environment and the infrastructure. From the humanism viewpoint, it could be interpreted as creating a suitable microclimate where each individual can efficiently and effectively conduct all his working activities. The consequence of all this is better functioning of the organization as a whole.

3. SYSTEMS (STANDARDS) THAT DIRECTLY CONTRIBUTE TO SPREADING THE IDEA OF HUMANISM

3.1 Standard ISO 14001 - „Environmental management“

The development of civilisation and technologies for exploitation of the natural resources has almost erased the line between making better life quality for people and endangering their environment. This is obviously a quite paradoxical situation, since without adequate environment it is not possible to have a quality life. Endangering the environment is continuously in progress through the exploitation of forests, water resources and the soil that endanger the survival of flora and fauna of the area in return. Moreover, the environment is endangered by industrial plants that release dangerous pollutants into water, air and soil thus endangering human health. Most countries formed so-called Black and Red books. Black book registers the irrevocably lost plant and animal species that, on the global level, are estimated to a few thousand species, while Red books register endemic species that have to be protected in order to survive. Since humans as individuals can survive only in a complete ecosystem it is necessary to make a great effort to sustain its equilibrium.

According to one of the divisions, the third generation of the human rights is the right to piece and clean environment. Carel Vasak that in the late 1970's established this division, considered these human rights as being most endangered because they did not have a legal and political confirmation of the time. If we bear in mind that the idea of the standard ISO 14001 was produced as early as 1972, it can be stated that this standard greatly contributed, above all to spreading the awareness of the environmental protection, and to managing business according to the principles of responsible behaviour towards the environment. (Three generations of human rights, http://en.wikipedia.org/wiki/Three_generations_of_human_rights)

If we compare the population increase, new technology development and the ever diminishing environmental space, it can be concluded that the role of the standard ISO 14001 is almost a missionary one. The application of environmental management system directly produces humane effects because the main objective is to provide the environment adequate for the survival of humans. Immediate effects are - a more rational exploitation of energy resources, reducing the risk of ecological incident occurrence, control management of all the aspects that influence the environment, as well as many other effects that in addition to humane, have various positive economic effects on the very organization.

Although the application of this standard cannot guarantee total absence of the environmental endangerment, each organization that applies it maximally reduces the negative ecological influences, or keeps under control the processes that can cause some serious consequences for the environment.

Such reduction of the negative influences on the environment provides people with time necessary to, along with the development of science in general, develop some new and better systems and technologies that will help people to use natural resources in a more responsible fashion and to keep the balance necessary for the survival of all the species including humans. Accordingly, the growing awareness of the environmental has created some new organizations that, through their activities, help the preservation of certain environmental segments. One of them is *Forest Stewardship Council* that has established an internationally accepted standard dealing with the lungs of our planet, the forests and how to manage them in a responsible way.

3.2 Standard OHSAS 18001/SA 8000- „Human safety – life“

Human beings start learning and developing early in their lives in order to be well-prepared for work throughout their lives. Work should provide them with adequate life quality but also with the possibility to develop professionally. However, we live in the world where people rarely find the job they were educated for and where the majority of population have jobs that, as a rule, destroy human dignity or even directly destroy the health and lives of people that do them.

However, the right of every human being is to work safely. According to the report on work injuries presented by The Ministry of Labour and Social Policy, the Republic of Serbia in 2009, a great number of work injury reports was recorded (Table. 1).

Table. 1. The recorded work injury reports in Serbia in 2009

(Serbian Government, Ministry of Labour and Social Policy, Annual work report 2009)

Rb	Injury type	The number of the recorded injuries
1.	Injuries at work	9.391
2.	Professional diseases	7
3.	Work-related diseases	3

The mentioned report analyzes the records dealing with the fatal, collective and severe injuries at work that happened at the very work premises under the close supervision or indirect control of the employer. Council for Safety and Health at Work performed the analysis of 876 work injuries (9 fatal injuries and 867 severe injuries at work) that occurred in 2009. It should be noticed that these are official, reported records and that, as in any other area of life, the unofficial records are far more disturbing.

According to the previous and considering the situation in other countries it can be concluded that the situation is similar. Problems exist everywhere in finding adequate solutions related to the safety at work, and coordinating organizational objectives for the greatest possible production and profits volume and the objectives concerning safety of the employees in such organizations.

Luckily, many subjects are being involved today in the battle for attaining the right for safety, including the organizations that establish standards. The requirements of such standards concern, above all, the

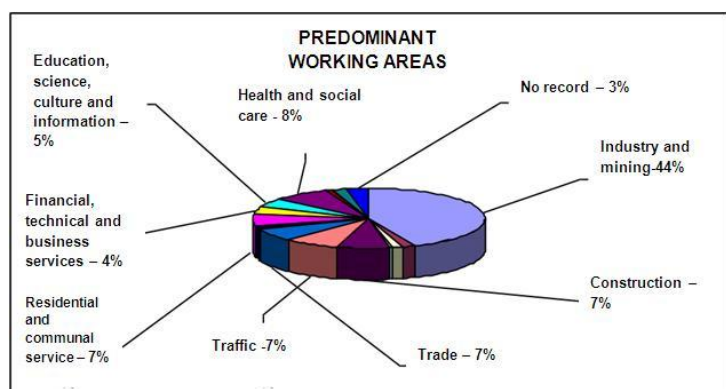


Figure 3: Work injury recorded in 2009 according to predominant working areas

(Serbian Government, Ministry of Labour and Social Policy, Annual work report 2009)

conditions and factors that influence or may influence the health and safety of the employees and all those present at the working environment.



Figure 4: Working conditions in a factory in India

OHSAS 18001 system has been designed to be compatible both with the generic system ISO 9001 and ISO 14001 and to help each organization that applies it to efficiently meet the requirements concerning occupational health and safety. The crucial areas defined by the standard are: a) making plans for danger identification, estimating and managing the risks; b) defining occupational health and safety management programmes; c) defining responsibilities; d) organizing training and raising the levels of awareness and competence; e) improving communication; f) emergency readiness and adequate response; g) measuring, monitoring and improving the performances of the system. (BS OHSAS 18001 Occupational Health and Safety/ Benefits, BSI) All this

requires the organization to responsibly and professionally demonstrates its readiness and commitment to apply the occupational health and safety measures, which demands certain investments. In order to further motivate the organizations to invest in application of the mentioned measures there is an identified range of the positive effects resulting from applying the occupational health and safety measures, including: a) reducing the number of incidents, b) reducing idle time costs and the similar costs, c) demonstrating accordance with the law, d) making the interested parties familiar with the fact that the organisation cares about occupational health and safety, e) showing the innovative and progressive thinking, f) easier approach to new customers and business partners, g) better health and risk management, both now and in the future; h) reduction of the costs related to non-compliance with the legal obligations concerning the occupational health and safety. In addition to all the motivational factors, there are also some legal frameworks in this area that oblige all the organizations to meet the requirements of such documents. Moreover, since there is a growing awareness among people of how important it is to treat the employees in a more humane way, organizations have started to create their image on the market in this sense, too.

Therefore, besides the system OHSAS 18001 other similar systems have been created like ISO 31000 dealing with risk management or SA 8000. The SA 8000 system has been created by the International association for Social Responsibility (SAI) and rests on the international human working rights and the improving work conditions. Unlike OHSAS 18001 system, where official records on the number of certified organizations is hard to find, there is an official record that the SA 8000 system comprised 2.478 certified organizations in 65 countries throughout the world, with more than 1.421.035 employees in year 2010 (Human Rights at Work, 2010 Annual Report, Social Accountability International).

Positive effects of this system application are recognised in the following: a) **improved reputation**: enables the organisation to show the basic values of the company and convinces the interested parties that it is serious in providing equitable and fair working conditions; b) **competitiveness**: in tender processes it becomes more and more important to provide evidence that the organizations are socially responsible. Certification provides evidence that working conditions are fair and that the organization is oriented in that direction; c) **independent acknowledgement**: increased credibility gained through independent audit by an organization approved by the Social Accountability Accreditation Service (SaaS) that is competent to provide detail and unbiased audit of the organisation; d) **transparency**: publicly available information about receiving SA8000 certificates; e) **involving all the interested parties**: all crucial participants, including the employees, union and employee representatives, companies, investors, nongovernmental organizations and the government are included in the SA8000 system (How can SA8000 benefit my organisation? <http://www.lrga.co.uk/standards-and-schemes/corporate-governance/sa8000.aspx>).

3.3 Other Standards with Humane Aspects

Organizations for standardization have established important standards that contribute to the achievement of humane effects in other areas, as well. Above all, these include the standards dealing with health issues, being a fundamental determinant of the survival and development of humanity, and consequently the society in general.

Unfortunately, globalisation in food production and marketing has accelerated spreading of the diseases caused by defective foods. World Health Organisation (WHO) has found out that millions of people die every year as a consequence of defective food consumption, 1.2 million of which die in the south-east of Asia and Africa alone. (Defective food as a serial killer, <http://www.stetoskop.info/Pokvarena-hrana-serijski-ubica-4528-s1-news.htm>) Therefore, the issue of food and its safety has become very important on the global level. The standards and systems whose objective is a full control of the production processes and the safety of finished products include the most frequently used **ISO 22000** i **HACCP** systems, are the standards that through their requirements keep safe both health and life of each individual.

Not all the cases of food poisoning are fatal, so we also have to take into account the factor of quick reaction and adequate diagnosis that doctors need in order to prescribe the most efficient therapy. In that case, human life can sometimes depend solely on the precise laboratory analyses. In order to prevent the possibility of error in laboratory analyses, **ISO 17025** standard for the quality management system in testing and/or calibration laboratories has been developed. Apart from the elements compatible to ISO 9001 standard an ISO 17025 standard system also contains the technical elements related to applying certain laboratory methods for testing, laboratory equipment and the qualifications of the testing staff.

Medicine is doubtlessly a science where an immense technological progress has occurred within a relatively short period of time. Besides the new diagnostic and treatment methods, a whole range of medical appliances invaluable for the treatment today, has been developed. Such a rapid development has resulted in the fact that certain diseases that used to be considered as fatal are now treated as routine surgical procedures with a simple postoperative recovery. The success of treatment heavily depends on the reliability of medical equipment. Therefore, medical equipment producers have a high responsibility to raise the level of reliability as much as possible, so they tend to use **ISO 13485** international standard that defines quality management system requirements for the medical equipment industry. The fact that many countries have decided to include this standard into their legal systems thereby fully regulating this segment of production show how important it is.

Technological progress has greatly contributed to the car industry that now produces a really impressive number of vehicles. Millions of passenger and heavy goods vehicles are used in traffic every day. Feeling the obligation to keep traffic participants safe in their car or lorry, International Organisation for Standardization has established **ISO 16949** standard that defines quality management system in car industry. Increased car reliability increases the safety of traffic participants in return, which results in protecting human lives and avoiding severe injuries.

ISO 26000 is a standard that directly concerns people. The concept of socially responsible business stems from the need of economic entities to coordinate generating profits with responsibility for people, the environment and society in general. A socially responsible business needs to establish: vision, leadership, a communication oriented community, efficiency and social responsibility demonstration, a system for measuring and analysis of its influence on people, profits and the environment and reporting. The basic items ISO 26000 deals with are: organisational management, human rights, work, the environment, responsible business, consumer issues and the involvement in work and development of the community. This standard practically supports the sustainable development related to the growth and changes that sustain and improve the environment, human resources and the society we depend on. The right that the current generation enjoys of exploiting the available resources and the environment cannot deny the same right to the future generations.

4. CONCLUSION

According to the facts given in this work, the initial hypothesis that the humanity is an integral part of each management system can be confirmed. Therefore, it can be concluded that the purpose of all the standards for management systems is not only the management of business but also the securing of all the main postulates of civilisation, which can be seriously shattered by the imperative of profits.

Humanism, as a way of thinking and action, is not only an obligation but a responsibility of us all. Unlike other activities, where humanism is practically a non-operating activity, management systems represent a business strategy that simultaneously sets the conditions for gaining both profits and humanism. The notion of humanism is finely interwoven into the most important elements of management systems in standardization. Clearly, the very nature of standards is voluntary, but having in mind the modern society awareness of the importance of humanism, certain legal frameworks have been set to stimulate the development in that sense.

Even the numerous opponents of the universality and standardization idea cannot ignore the fact that the effort to achieve more humane life and work conditions throughout the world is one of the main objectives of humanity, besides scientific and technological progress. Perhaps such approach and interpretation of the standardization mission can be a good argument for changing their opinion.

Owing to the limited space, this work does not discuss all the considerations related to humane aspects of the standards for management systems of organization, nor does it discuss all the standards where the mentioned aspects can be recognised. Nonetheless, the objective of this work is to encourage further research in the area that will have positive effects on the progress of society in general, particularly on the aspect of humanity.

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IMPLEMENTATION OF EN 13850:2011 AND MEASURING POSTAL SERVICE QUALITY IN SERBIA³

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Abstract: *This paper examines the implementation of the European Standard EN 13850:2011 for postal operators in Serbia, in terms of importance that it plays in raising the quality of postal services, given that its importance is even greater since the implementation of this standard is inevitable in the direction of further inclusion of our society into the European mainstream. At the same time, will be presented the UNEX system for measuring and improving quality of international postal services (UNipost EXternal monitoring system), introduced by the International Post Corporation (International Post Corporation - IPC), provided that the system is the basis for the implementation of EN 13850:2011. This paper will also discuss the indicators of postal service quality, and special attention will be paid to the transit time as a primary indicator that this standard implies.*

Key words: *quality, postal services, measurement, UNEX, transit time*

1. INTRODUCTION

As a precondition for further integration of Republic of Serbia into the European Union (EU), is set the alignment and adjustment of our legislation and standards with European. The European Commission emphasizes the need to have common rules for the development of community postal services and the improvement of Quality-of-Service (QoS). The Commission has identified requirements for postal QoS-Measurement systems that include:

- Independent end-to-end measurement capabilities;
- A focus on national and cross-border distribution service performance;
- A single, uniform and reliable system for monitoring distribution service performance within the Union.

European Commission has acknowledged that the different postal traditions and cultures in Europe would not allow for the establishment of one common unified European measurement system and that national systems should have sufficient freedom to reflect national needs and peculiarities. On the other hand, they should fulfill a defined set of minimum requirements to satisfy the information interests of the Commission, the regulatory authority, postal customers and postal operators themselves.

The objective of the measurement is to estimate the end-to-end transit time QoS given to the customer domestically in each European country and cross-border between the European countries.

The regulatory basis of EN 13850 is laid out in the Postal Directive 97/67/EC, as amended by Directive 2002/39/EC and Directive 2008/6/EC. Main guidance is given in Chapter 6 Quality of Service. Article 16 states: "Member States shall ensure that quality-of-service standards are set and published in relation to Universal Service in order to guarantee a postal service of good quality". Furthermore, EN 13850 is mandatory for measuring the performance levels of single piece priority or first class mail which falls under the universal service.

This European Standard specifies methods for measuring the end-to-end transit time of domestic and cross-border Single Piece Priority Mail (SPPM), collected, processed and delivered by postal service operators. It considers methods using representative end-to-end samples for all types of single piece priority mail services

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for addressed mail with defined transit-time service levels offered to the customer. This standard is applicable to the measurement of End-to-End⁴ priority mail services. (EN 13850 (2011))

The standardized QoS-measurement method provides a uniform way for measuring the end-to-end transit time of postal items. Using a standardized measurement method will assure that the measurement will be done in an objective and equal way for all operators in accordance with the requirements of the Directive 97/67/EC and its amendments.

EN 13850:2011 relates to the measurement of the SPPM services given to household and business customers that post mail at street letter boxes, over the counter at post offices or have pick-ups at their offices.

Benefits of implementing EN 13850 can be:

- Improving the quality of postal services,
- Improving the automation of postal processes
- Improving the management processes in the postal system,
- Improve communication, planning and administration.

Some of the advantages of EN 13850 are:

- Spotting and discovering weak links in the chain of mail transfer through the postal system,
- Getting a clear picture of the effectiveness of the postal system,
- Increase the reliability of transfer of postal items,
- Increase the speed of transfer of postal items.

2. UNEX MEASUREMENT SYSTEM AND POSTAL SERVICE QUALITY INDICATORS

International Post Corporation (IPC) has introduced UNEX (UNipost External monitoring system) in 1994, in order to measure and improve the quality of postal services in the international postal traffic, specially for verification the quality of postal services from end-to-end. The Post of Serbia joined the project of UNEX measurement system on 25/04/2011.

UNEX measurement system provides important data to be used as a basis for further actions to improve service levels. Within the European area, it is used for performance measurement of mail delivery. The objective of this measurement is to improve the quality of services, by pointing to areas where problems and congestion (bottlenecks of the international postal system) occur and reduce the time from admission to delivery of the postal item. This measurement is carried out continuously. The obtained statistics reflect real flows, trends and characteristics of the mail in international postal traffic. In accordance with EU directives in the field of postal services, key indicators for establishing international standards of quality are:

- The percentage of mail that was delivered to its final addressee within three days of posting (J +3) - speed indicator,
- The percentage of mail that was delivered to its final addressee within five days (J +5) - an indicator of reliability,
- Average number of days required for delivering the item.

These indicators relate to the delivery of international first class mail on European area. "J" is the date of receipt of item, while the parameters "+3" and "+5" express the required number of days before final delivery to the addressee during which time collection, sorting, national and international transport, and delivery take place. EU Postal Directive in 1997 set objectives for letter mail service on 85% or more of the items delivered to its final addressee within three days of posting (J+3, J for Jour (Day) + 3 days) and 97% or more of the items delivered to its final addressee within five days of posting (J+5, J for Jour (Day) + 5 days).

The chart below shows the trend over the years since 1997. Each bar represents the average proportion of international priority mail that was delivered within J+3. The number of countries included in the IPC UNEX system was 18 in 1997, 29 from 2005 to 2008, 34 from 2008 to 2010 and 35 in 2011. Last year the transit times in Europe had suffered from adverse conditions in both air and ground transport (i.e. the eruption of the Icelandic volcano Eyjafjallajökull in the first half year 2010 and the bad weather in December). In 2011 J+3,

⁴ Routing from the access point to the network up to the point of delivery to the addressee

the speed indicator, was up to 93.0%, recovering 1.3 percentage points out of the drop of 2 points in 2010 compared to 2009. (UNEX report, 2011)

The UNEX-18 category includes the 15 EU countries before the May 2004 enlargement, together with Iceland, Norway and Switzerland. In 2005 the UNEX monitoring was extended to 29 countries with the addition of Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia (called UNEX-29 above). Since 2008 UNEX has covered all 27 EU countries together with Iceland, No-

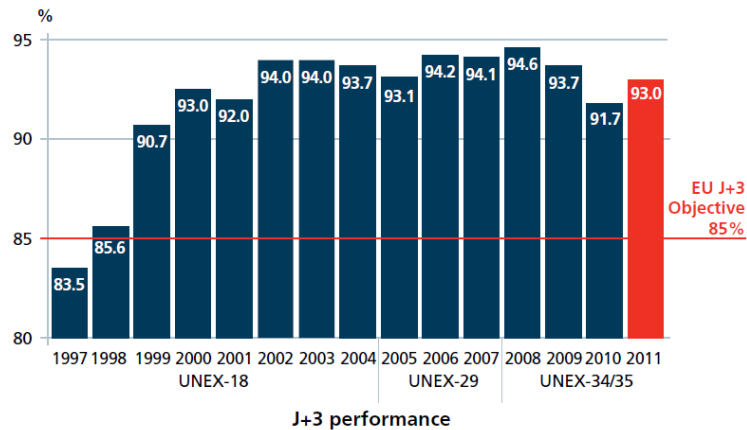


Chart 3: J+3 performance from 1997 to 2011

rway and Switzerland as well as Bosnia & Herzegovina (part), Croatia, the Former Yugoslav Republic of Macedonia and Turkey (UNEX-34). Lastly, Serbia was included as of April 2011 (UNEX-35).

The measurement is end-to-end, from posting in the origin country to delivery to the final addressee in the destination country, including the time for collection, sorting and transportation.

Chart 2 shows a comparison of aggregated 1994 and 2011 results, covering respectively 18 and 35 postal operators. For 2011 the average performance of the full group of 35 countries reached 93.0% of European cross-border first-class/priority letter mail delivered within three days of posting, J+3 (the speed indicator), and 98.1% within five days, J+5 (the service reliability indicator). Both indicators continue to exceed the objectives set in the EU Postal Directives of 85% in three days, and 97% in five days, and have gone back up compared to 2010, by 1.3 point in J+3 and by 0.5 in J+5. (UNEX report, 2011)

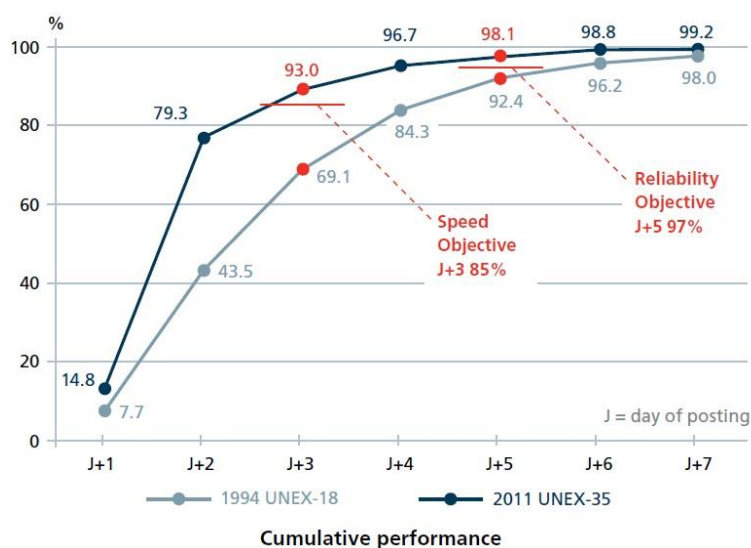


Chart 2: Comparison of results in cumulative performance in 1994 and 2011

In 2011 the average delivery time for the 35 countries was 2.2 days, an improvement of about half of a day since 1998, and of one day since 1994 when the UNEX measurement started, while extending the coverage at the same time. (UNEX report, 2011)

The design for UNEX Measurement System is overall in compliance with the current CEN standard EN13850 Postal services – Quality of service – Measurement of the transit time of end-to-end services for single piece priority and first class mail which specifies the methodology for monitoring of quality of service in Europe. Conformance to this standard is mandatory for the 27 posts in the European Union and those of Iceland, Norway and Switzerland.

After decades of successful application of bar code, emerged the need for advanced technology for tracking and identification of items through postal system that is not limited only to the identification of types of items. The answer is found in the RFID technology that is experiencing tremendous growth in recent years, although its fundamentals are present for several decades. (Peković, O., Tričković, I., Pajković, I., 2011) Each test letter in UNEX Measurement System contains a Radio Frequency Identification (RFID) device, so that as the test letter moves through the mail pipeline, the time of its arrival at specific points can be recorded automatically by radio receivers located in postal facilities. These radio receivers are linked to a global RFID Network run by the International Post Corporation. In a fully anonymous manner, they help to identify any delays which may occur along the postal process, from origin country to destination country.



Picture 1: Process of measuring from sender to receiver

The following table shows key performance indicators: the three indicators presented in this table are the speed indicator (J+3), the reliability indicator (J+5), and the average number of delivery days taken to deliver mail in the countries in the UNEX-in.

Table 5: Percentage of mail delivered in J+3 and J+5 and the average number of days required for delivery

Origin Country	Destination Country (ISO alpha-2 code)																																			
	AT	BE	BA*	BG	HR	CY	CZ	DK	EE	FI	FR	MK*	DE	GR	HU	IS	IE	IT	LV	LT	LU	MT	NL	NO	PL	PT	RO	RS*	SK	SI	ES	SE	CH	TR	GB	
Austria (AT)	J+3	93.4	78.7	88.4	97.0	85.1	97.6	98.0	89.1	96.1	97.7	19.3	98.6	90.6	99.2	95.2	86.0	95.6	97.3	95.3	98.8	93.3	97.4	96.4	94.5	96.3	86.1		100.0	97.9	88.6	98.0	97.9	11.5	95.2	
	J+5	99.7	96.3	96.6	100.0	98.2	99.5	99.6	98.9	100.0	99.2	78.1	99.7	98.9	100.0	100.0	99.2	98.8	100.0	99.4	100.0	99.4	100.0	100.0	97.7	99.2	99.4		100.0	99.6	98.3	99.6	99.4	43.1	99.2	
	Days	2.2	2.7	2.6	2.1	2.7	2.0	2.0	2.6	2.1	2.0	4.9	1.9	2.3	1.9	2.2	2.6	2.3	2.0	2.1	2.0	2.3	2.0	2.1	2.2	2.2	2.5		1.9	2.0	2.6	1.9	2.0	7.0	2.1	
Belgium (BE)	J+3	96.5			72.3	86.0	68.6	98.4	95.4	83.3	94.0	96.4		97.7	89.5	96.7	87.2	96.0	95.9	89.1	87.5	98.4	89.7	98.9	90.5	91.1	98.3	86.9		94.7	94.5	95.6	95.7	98.7	12.3	94.8
	J+5	99.4			97.3	97.7	96.7	99.7	99.5	90.9	99.6	99.4		99.4	98.5	99.6	98.3	98.8	99.3	97.8	97.9	99.6	100.0	100.0	96.8	98.4	100.0	97.0		98.2	97.2	98.2	99.6	99.1	40.2	99.1
	Days	2.0			3.1	2.7	3.2	2.0	2.0	3.1	2.1	2.0		2.0	2.5	2.1	2.8	2.2	2.2	2.6	2.8	1.9	2.8	1.9	2.4	2.4	2.0	2.6		2.3	2.2	2.2	2.2	1.9	7.1	2.1
Bosnia & Herzegovina (BA*)	J+3	77.5											8.6	32.8																86.3			55.7		11.8	
	J+5	95.8											39.8	71.9																97.6			87.8		46.5	
	Days	2.6											6.5	4.9																2.8			3.6		6.7	
Bulgaria (BG)	J+3	78.3	61.0			52.3	71.6	62.7		57.3	55.1		67.6	33.8	69.7		29.5	5.9						58.3	41.0	64.0	53.0	52.4		58.8		47.7	52.9	51.7		6.5
	J+5	95.8	93.2			84.9	92.0	94.7		89.9	88.4		91.3	79.2	92.4		76.3	34.8						90.1	83.3	93.3	81.9	85.7		92.2		85.3	87.1	90.6		33.9
	Days	2.7	3.5			3.9	3.2	3.4		3.7	3.9		3.5	4.5	3.3		4.7	6.6						3.7	4.7	3.3	4.1	3.9		3.6		4.0	3.8	3.8		6.8
Croatia (HR)	J+3	90.9	82.0			77.3	73.6	87.9	23.3	57.4	86.7		38.8	53.8	84.1	53.8	50.0	0.0	22.0	42.2	91.8		91.7	59.6	83.3	75.0	60.0		89.6	95.9	35.8	72.7	84.8		19.2	
	J+5	97.7	96.0			78.2	96.6	94.9	85.0	97.9	97.8		59.2	90.4	97.8	84.6	92.0	27.6	78.8	88.9	100.0		95.8	95.7	95.8	97.7	88.9		100.0	98.8	81.1	100.0	100.0		59.6	
	Days	2.5	2.7			4.5	3.1	2.7	4.5	3.5	2.6		4.8	3.7	2.8	4.0	3.7	8.6	4.5	4.0	2.4		2.7	3.5	3.0	3.0	3.4		2.5	2.2	4.5	3.0	2.8		5.4	
Cyprus (CY)	J+3	84.0	67.2		72.5	36.2		82.1	82.0	62.1	60.5	61.3		80.0	59.5	79.5	13.5	70.5	34.6	56.4	69.6	25.2	64.4	78.4	71.4	66.4	71.9	66.7		19.5	68.3	64.8	77.0	61.2	71.2	
	J+5	98.5	96.0		100.0	91.5		96.2	99.6	86.4	95.3	94.6		98.3	91.1	95.3	52.4	96.1	72.9	95.7	98.9	85.2	93.3	96.8	93.8	91.4	96.7	95.0		69.5	87.6	95.3	98.7	94.6	94.7	
	Days	2.7	3.4		3.0	4.0		2.8	2.7	3.3	3.4	3.4		2.8	3.5	2.8	6.3	3.3	4.6	3.4	2.9	4.4	3.0	2.8	3.2	3.3	2.9	3.1		5.0	3.3	3.2	3.0	3.4	3.1	
Czech Republic (CZ)	J+3	97.2	96.7		78.6	83.9	76.4		94.7	97.4	90.5	93.6		97.2	48.2	95.2	87.8	80.4	86.5	94.1	91.0	86.1	74.3	97.1	86.4	94.0	78.3	87.9		97.9	90.1	88.2	95.7	97.3	71.1	
	J+5	99.6	99.2		96.4	95.4	97.1		97.8	99.3	99.5	97.1		99.0	86.7	98.8	94.8	98.8	95.3	100.0	99.2	99.1	96.4	98.9	99.6	98.3	96.4	98.2		99.8	100.0	97.1	99.6	100.0	94.9	
	Days	2.0	2.3		3.1	2.7	3.0		2.2	2.1	2.4	2.3		2.1	3.9	2.2	2.8	2.9	2.8	2.1	2.4	2.5	3.1	2.1	2.7	2.3	3.0	2.5		2.0	2.4	2.5	2.4	2.0	3.2	
Denmark (DK)	J+3	98.6	97.4		80.9	71.8	69.4	95.8		97.9	97.2	95.6		98.6	80.6	96.0	94.6	97.9	95.0	95.7	90.0	96.3	71.5	99.1	98.0	90.6	96.8	69.7		91.1	77.7	86.0	98.1	98.6	97.2	
	J+5	99.1	99.6		100.0	97.3	90.0	99.7		100.0	99.2	99.1		99.7	95.6	99.6	98.1	100.0	98.8	99.5	97.0	99.5	95.0	100.0	100.0	98.2	98.2	90.9		97.0	95.5	97.7	99.8	99.5	99.6	
	Days	2.0	2.0		2.8	3.2	3.4	2.2		2.0	2.0	2.0		1.9	2.7	2.1	2.1	2.1	2.3	2.1	2.5	2.1	3.2	2.0	2.0	2.3	2.1	3.1		2.3	3.0	2.6	1.9	2.0	2.0	
Estonia (EE)	J+3	95.2	92.3		69.5	42.5	60.0	93.5	97.1		97.4	91.5		79.4	54.9	81.4	90.2	88.6	85.7	98.3	93.4	89.5	86.8	93.8	89.6	91.9	92.9	65.7		94.7	86.5	67.4	96.8	95.2	62.6	
	J+5	100.0	100.0		96.3	90.0	82.2	100.0	99.6		99.5	95.7		92.2	89.0	100.0	100.0	95.5	95.2	99.2	100.0	100.0	95.6	95.8	98.1	100.0	100.0	92.9		100.0	98.6	93.5	100.0	100.0	89.8	
	Days	2.0	2.7		3.3	4.2	4.3	2.3	2.0		2.0	2.7		3.2	3.6	2.8	2.7	2.9	2.5	1.9	2.1	2.7	2.6	2.2	2.3	2.3	2.3	3.3		2.2	2.8	3.3	2.0	2.2	3.6	

...

Romania (RO)	J+3	88.5	78.6		56.3	2.4	39.8	71.1	73.2	10.7	49.3	67.1		83.1	37.7	80.2	9.3	56.9	37.5	12.9	11.6	62.2	0.0	89.5	53.7	72.3	78.9			53.4	22.4	70.8	56.9	58.9		38.9		
	J+5	97.4	98.8		91.3	29.3	94.5	96.1	97.3	89.5	91.8		96.7	86.1	97.7	59.9	90.8	86.8	73.4	62.5	97.4	21.9	98.0	90.6	96.0	92.9			92.0	80.3	95.1	95.0	97.0		83.2			
	Days	2.6	2.9		3.5	6.8	3.9	3.1	3.0	5.0	3.9	3.3		2.8	4.1	2.9	5.5	3.5	4.1	4.9	5.4	3.4	7.3	2.7	3.8	3.0	3.0			3.6	4.5	3.2	3.4	3.3		4.3		
Serbia (RS ¹)	J+3											94.1												97.8										90.6	75.0	55.4		
	J+5											98.8												98.9									100.0	97.8	84.8			
	Days											2.2												2.0									2.6	3.1		3.8		
Slovak Republic (SK)	J+3	99.5	83.9		67.5	82.5	34.4	97.2	95.9	48.4	83.3	90.3		93.2	47.4	84.4	61.0	80.3	87.1	43.7	87.5	95.1		91.9	85.3	84.3	79.3	78.1			94.8	47.1	92.2	95.6		63.2		
	J+5	100.0	98.3		97.5	95.0	77.0	99.6	100.0	92.6	99.2	99.4		99.4	87.9	97.4	98.4	96.7	96.1	81.6	100.0	99.2		98.8	97.2	96.1	99.2	97.3			100.0	90.1	100.0	99.1	87.4			
	Days	2.0	2.7		3.1	3.1	4.6	2.0	2.4	3.6	2.8	2.4		2.4	3.8	2.6	3.5	2.8	2.7	4.1	2.5	2.6		2.5	3.8	2.7	2.9	3.0			2.5	3.8	2.5	2.4		3.6		
Slovenia (SI)	J+3	98.4	95.7	78.6	76.1	92.0		97.7	94.2	74.3	90.5	86.5	32.4	92.3	69.4	96.4	63.7	86.3	81.6	82.6	74.7	95.5		96.8	74.5	84.0	95.4	71.6			97.5		85.3	93.1	97.5	62.0		
	J+5	99.5	100.0	95.5	95.5	98.7		100.0	100.0	99.0	99.2	96.0	80.6	98.5	94.2	99.1	94.4	98.4	90.5	98.9	95.3	99.2		99.2	99.1	96.0	99.1	96.6			100.0		97.7	99.4	98.3	93.4		
	Days	1.9	2.0	2.9	2.9	2.3		2.1	2.0	2.9	2.5	2.5	4.4	2.1	3.3	2.2	3.4	2.7	3.0	2.9	3.2	2.3		2.0	3.0	2.6	2.1	3.0			2.0		2.7	2.4	2.1		3.5	
Spain (ES)	J+3	99.1	85.2		60.2	60.5	3.0	89.0	90.3	70.2	73.4	91.2		81.8	62.4	82.5	43.3	80.3	86.3	73.7	60.3	87.7	72.6	89.1	62.6	56.7	95.6	74.2			66.5	60.6		90.6	93.4	87.4		
	J+5	97.6	97.0		94.7	87.8	44.0	96.5	96.9	97.6	94.0	97.9		98.0	91.0	97.8	90.4	93.7	96.2	98.0	87.7	98.0	95.1	97.0	90.3	91.3	99.6	95.8			89.4	87.4		98.9	98.1	96.9		
	Days	2.4	2.7		3.4	3.7	6.7	2.5	2.3	3.3	3.2	2.4		2.4	3.4	2.7	4.0	2.9	2.6	3.0	3.7	2.5	3.2	2.3	3.6	3.6	2.1	3.0			3.5	3.7		2.4	2.2		2.4	
Sweden (SE)	J+3	99.1	93.9		74.3	80.5	53.2	95.1	99.5	99.6	97.9	96.6		98.0	72.0	95.5	95.5	97.4	95.3	97.1	88.5	97.6	83.9	98.3	98.0	99.4	97.2	76.7			64.6	84.2	87.0	87.2		97.4		
	J+5	100.0	98.7		98.1	95.1	77.5	100.0	100.0	99.5	99.4		99.2	93.4	98.6	99.0	99.9	97.8	99.0	97.9	100.0	98.4	99.6	99.9	98.0	99.2	96.6	100.0	94.3			94.3	98.4	97.8		100.0		
	Days	1.9	2.2		3.0	2.8	4.3	2.1	1.6	1.9	2.0	2.2		2.1	3.1	2.1	2.1	2.1	2.3	2.1	2.5	2.1	2.9	2.1	2.0	2.3	2.1	2.9	3.1			2.6	2.8	2.6		2.0		2.2
Switzerland (CH)	J+3	97.0	96.5	23.3	79.7	77.8	72.4	97.7	97.5	88.8	98.1	98.2	3.3	99.0	90.8	95.8	89.8	95.4	94.9	84.4	73.1	98.9	87.6	99.3	98.7	94.4	96.2	91.2			48.5	96.6	99.3	95.4	100.0		17.5	
	J+5	99.8	99.6	80.2	95.6	94.4	95.7	99.5	100.0	100.0	99.7	99.7	50.8	99.7	98.3	99.2	97.6	99.6	98.5	97.0	96.6	100.0	96.6	99.7	100.0	99.6	99.2	98.6			96.6	96.8	99.2	100.0	99.4		42.8	
	Days	1.9	2.0	4.5	3.0	3.3	3.2	2.0	1.9	2.7	2.0	1.9	5.7	1.9	2.3	2.1	2.4	2.1	2.2	2.4	3.1	1.9	2.9	1.9	2.0	2.1	2.0	2.4			4.0	1.9	2.0	2.1	1.8		6.7	
Turkey (TR)	J+3	65.0	62.4									65.7																							12.8	39.3	32.2	24.1
	J+5	86.6	85.2									88.2																							44.5	79.2	76.2	70.8
	Days	3.6	3.9									3.5																							6.0	4.4	4.8	5.1
United Kingdom (GB)	J+3	93.0	96.0	17.7	44.0	7.3	51.2	72.6	96.3	45.2	91.3	94.9	1.6	96.7	76.4	92.4	84.5	97.2	91.3	58.2	54.0	92.5	77.3	90.5	97.9	78.9	94.2	70.2			31.2	84.0	55.4	84.9	91.8	96.6	10.9	
	J+5	95.9	99.3	57.3	79.7	82.9	85.3	94.1	99.2	80.1	98.0	99.4	20.0	99.6	93.4	98.0	97.3	99.4	97.6	85.3	93.3	99.2	93.9	93.8	100.0	93.2	99.2	94.9			80.0	99.6	94.1	96.3	98.4	99.5	37.6	
	Days	2.3	2.0	5.5	4.5	4.5	4.0	3.1	2.0	4.1	2.4	2.2	7.7	2.1	3.0	2.4	2.6	2.0	2.5	3.7	3.5	3.3	3.1	2.5	2.1	2.9	2.2	3.0			4.5	2.7	3.5	2.6	2.3	2.1	2.5	

¹Bosnia & Herzegovina (BA): the postal operator monitored in UNEX is "JP BiH Posta" d.o.o. Sarajevo. There are two other public postal operators in this country but in areas other than the one covered in UNEX.

²F.Y.R.O.M. stands for Former Yugoslav Republic of Macedonia.

³The Serbian Post, PE PTT communications "Srbija", joined the UNEX measurement and of April 2011.

Source: www.ipc.be

IPC publishes the UNEX end-to-end results for international European priority letter mail annually.

Method of calculation: based on the posting date for a five-day business week; that is to exclude Saturdays and Sundays, and to exclude national and regional postal holidays in the destination country. In 2011 the following countries had Saturday mail delivery: Bosnia & Herzegovina (partly), Bulgaria (partly), Denmark, France, F.Y.R.O.M., Germany, Lithuania, Malta, the Netherlands, Norway, Switzerland, Turkey and the United Kingdom. (UNEX report, 2011)

Statistical design: the UNEX measurement is carried out continuously over the year and covers both urban and rural areas in Europe. Yearly results are based on test items posted in that year. It mirrors the patterns and the characteristics of real international letter mail such as methods of posting (mailbox, post office, pick-up), methods of franking (stamp, meter, PP), weight (20g, 50g, 100g), size (C6, C5, C4), and addressing (machine typed, hand written). The statistical accuracy of 54 percent of the country-to-country results is lower or equal to 5%, within a 95% level of confidence, while 46 percent reach accuracy above 5%, mainly on small volume mail flows. (UNEX report, 2011)

The validity and independence of the statistics are guaranteed by the UNEX external measurement contractor, TNS Research International Ltd (London, United Kingdom). The UNEX quality management system at TNS Research International received the ISO 9001:2008 certification in May 2010.

3. TRANSIT TIME AS A QUALITY OF POSTAL SERVICE INDICATOR

The overall transit time QoS level is to be expressed as the percentage of mail distributed within J+n days end-to-end according to the Directive 97/67/EC and its amendments. It specifies a set of requirements for the design of a QoS measuring system for SPPM (Single Piece Priority Mail), involving the selection and distribution of test items sent and received by selected panellists. The sample design gives the specifications for the panellists and items to be representative of the chosen design basis. The design basis is the most appropriate structural information available to characterize all real mail distributed in the field of study.

Transit time calculation. The transit time of a postal item shall be measured in units of days and expressed as J+n days. The day of induction J is the date of the next collection after posting.

Continuity of measurement. The measurement system shall be continuous. Posting shall cover all months and weeks of the year and at least all collection days of the week in accordance with the definition of the measurement unit and the transit-time calculation rule. All periods of the year shall be included as well as Christmas, Easter and summer holiday periods.

Non-functioning of the postal operator and days of strikes or industrial disputes shall not be discounted. However, in case of "Force Majeure" events, deduction of corresponding periods may be considered. Any deduction shall be indicated in the reporting and be subject to audit.

Any intended deduction shall be reported to the regulatory authority without delay. Agreement with the regulatory authority on all planned deductions due to force majeure is required prior to the calculation of the annual report.

Calculation of the transit time. For the purpose of this European standard, transit times for domestic and cross-border mail shall be calculated according to the working week calculation rule. Published regional holidays may be subtracted in the calculation of transit time.

The calculation of the transit time takes into account test items posted before the last collection time of the day for the type of mail in the field of study. The last collection time is taken as stated on the postal letterbox, published at the post office or otherwise announced by the postal operator. Test items posted after that time shall be considered as posted on the next collection day.

If a test item is posted after the last collection time, then the day of induction J should be adjusted to the next working day for this type of mail.

Service performance indicators. The following indicators shall be used in the presentation of the transit-time service level result. Only valid test mail items shall be included in the calculations. All postal items delivered up to J+30 shall be considered in the calculations. Postal items not delivered by J+30 may be excluded, because they may be deemed as lost or are not detectable in the system any more within the reporting period.

- On-time performance: The percentage of postal items delivered within the defined service standard. The result shall be presented as the percentage of postal items arriving within the transit time J+n, where n represents the number of qualifying days for the service standard. All reports shall state the level of on-time performance accuracy achieved in the measurement period.
- Cumulative distribution of delivery days: The cumulative percentage of mail delivered within a given period from J+1 to J+10 shall be reported.

Methodology. The measurement shall be carried out by an independent performance-monitoring organisation. The test mail method shall consist of a process in which panellists act as senders and/or receivers. Senders induct test items into the postal operator's mail network and register date and time of posting; receivers register the date of delivery. Senders and receivers shall be spread over all the field of study based on the panel size and the corresponding minimum number of postal areas to be covered, in order to fulfil the specifications of minimum sample size, maximum panellist workload, stratification and geographical coverage. The sending and receiving process shall be organised in order to fulfil the specifications of the sample design. The test mail shall be manufactured in order to fulfil the specifications of the discriminant mail characteristics. A representative sample design may be realised either by a strict proportionality of the test mail flows with respect to the design basis, or by an over-representation or an under-representation of some strata. The latter requires corrective weighting, which allows restoring the proportionality. (EN 13850 (2011))

4. CONCLUSION

Republic of Serbia, which aspires to EU membership, is adapting to European laws and standards, and so the field of postal services is not an exception.

Current situation in our country, according to UNEX results of quality measurement in Post of Serbia, in international postal traffic is shown in Table 2, the results are for the period 25/04 – 30/11/2011 for J+3 and J+5.

Table 2: Achieved end-to-end transit time (Outbound and Inbound) for J+3 and J+5 by Post of Serbia

Serbian Post	J+3	J+5
Outbound	69.10%	86.20%
Inbound	53.20%	91.00%

Source: www.posta.rs

Taking into account that the EU postal Directive stipulated the obligation of receipt, transfer and delivery for 85% of international letters in J+3 and 97% of international letters in J+5, we can clearly see from Table 2 that achieved level of quality in Post of Serbia is below the required level which justifies the reason for implementation of EN 13850.

The reason for improving the quality of provided postal service of international mail, in addition to meeting customer demands for timely delivery and safety of letters, is that according to future system of calculating terminal dues, delivery postal operator will not be paid the full amount of the terminal costs for delivery if quality of delivery is below the prescribed quality standards.

All stated activities show the importance of the adoption of national standards and related documents based on European standards and related documents in the field of postal services.

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COMPARATIVE REVIEW AND IMPLEMENTATION OF THE STANDARDS ISO 14001 AND ISO 50001

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Abstract: *This paper presents comparative review of two international standards issued by the International Organization for Standardization, ISO 14001:2004 i ISO 50001:2011. Both standards contain requirements with guidance for use and their implementation is explained through a PDCA model. The advantages and disadvantage of implementing both standards were pointed out. Online survey is conducted about presence and level of maintenance standards for environmental management system in companies in Serbia. Thirty companies participated in the survey, from all four sectors of the economy.*

Key words: *Environment, International Organization for Standardization, PDCA cycle, environmental management system, energy management system, survey, cost savings.*

1. INTRODUCTION

Since there is a human life on Earth, there is a link between nature and man. Together, they progressed and developed, and that balance has existed for centuries. Unfortunately, the time has come when the man "jumped" a few steps forward and because of that industry, science and technique has been developed and he totally forgot about the nature. To this day, nature did not forget that and it is warning us every day. Of course, the solution is not to go back in time when we didn't know what electric circuit is and when we knew much less about laptop and cars. What we can do is to emphasize that environment around us needs to be customized to the nature, and also that we need to restore balance that is lost a long time ago. As the years passed, people enjoyed in wealth that nature gave them and they weren't thinking about consequences. Industrial zones have been created and colossal factories were opened, but on the other side rivers were contaminated, trees were cut down and air was polluted. As the society modernized, nature was giving more intense signals that something is wrong. An increased number of earthquakes, eruptions, disrupted order of the seasons, extreme temperatures, tsunami and other catastrophes have led to the point where we need to sit down and ask ourselves, what have we done? Because of those worrying informations, International Organization for Standardization (ISO) decided that in addition to many standards adopt two more of great importance for society and nature, ISO 14001:2004 and ISO 50001:2011, which are seen as a possible solution for problems about environment and nature.

2. ISO 14001 : ENVIRONMENTAL MANAGEMENT SYSTEM

"People affect with their activities on environmental characteristics, and the effects of those characteristics negatively affect on physical and mental health."

Gary W. Evans

2.1. Environmental problems and standards as solutions

People concern for the protection of nature has always existed. It was reflected in secondary influence, spontaneity and unplanned activities. Starting from preindustrial period, environmental pollution was of minor importance than today, and major problems were related to human hygiene in urban areas. Beginning of the theoretical considerations about environment was related to the middle of the 18th century. As the degree of environmental pollution began to grow, the man started to plan the activities for protection of the environment and nature. Today we live in a World characterized by information technology, rapid and continuous development of society, but mentioned degree of environmental pollution is several times higher than in the preindustrial period, when it was at a sustainable level. Due to increased concern about environment, it was organized a United Nations Conference on Environment and Developmen on june 1992. in Rio de Janeiro which was the largest of all conference on this topic ever held. Near 10.000 official representatives from

about 150 countries including 116 national political leaders attended the Conference. This Declaration is one of the turning points in environmental protection. Declaration consists 27 principles (*Heleta Milenko, 2010*).

Constant grow of the degree of environmental pollution, which is reflected in several indicators, is the problem for decades for man. On global level, there are many organizations that are dealing with this problem. One of them is International Organization for Standardization. In the field of environmental protection, ISO issued a series of international standards for effective and efficient environmental management system. Standards can be applied in organizations of all kinds and sizes, can be adapted to different geographical, cultural and social terms and they provide elements for EMS (Environment Management System) that can be integrated with requirements of other management systems (ISO 9001, OHSAS 18001...). This series includes 15 standards, and because of their importance we present four of them:

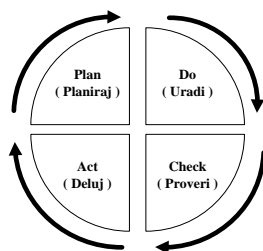
- 1) ISO 14001:2004 – Environmental management systems - Requirements with guidance for use
- 2) ISO 14004:2004 – General guidelines on principles, systems and support techniques
- 3) ISO 14020:1996 – Environmental labels and declarations - General principles
- 4) ISO 14031:1996 – Environmental performance evaluation - Guidelines

Implementation of standards issued by International Organization for Standardization is voluntary. Implementation means establishing a system of organization according to the requirements specified by the standard. Requirements are designed to allow effective environmental management systems, and basic two elements of this requirements are documentation and training. Requirements for documentation define which documents organization must possess, implement and manage. Requirements for training are related to establishing and reviewing competence of employees who work in organization, concerning environmental management system.

2.2. PDCA model and ISO 14 001

Organizations who choose to implement management system according to standard ISO 14001, need to identify the environmental aspects which are arising from past, present and planned activities and base on their evaluation, need to determine the priority tasks of minimizing or eliminating the threat to the environment. As with many standards, organization must establish the environmental policy which contains general and specific objectives. Those objectives are implemented with the appropriate programs for their implementation and through the defined indicators organization monitor the way how they fulfill. Base on the environmental policy, organization makes environmental action plans. With planning, objectives are set, processes are established and necessary resources for the fulfillment of objectives are defined. As the system is established through the environmental policy and plans, it is very important to establish the mechanism of managing that system that consists corrective actions and checking. Management review refers to determination of the appropriateness and effectiveness, based on results of the review (*EN ISO 14001:2004*).

The activities of defining environmental policy and planning are the first phase of the PDCA⁵ cycle – **Plan**. Implementation and use are phase **Do**, checking, monitoring, measuring, analysis, defining corrective and preventive actions and internal audits are phase **Check**, and in the last phase **Act** are corrections, implementation of corrective and preventive actions and improvements. In the last phase all the elements initiate review of the environmental policy, and because of that PDCA model is circled and organization starts again from the beginning, from the first phase **Plan**. PDCA cycle is shown on figure 1. (*Filipovic & Djuric, 2010*).



⁵ PDCA – Plan, DO, Check, Act

Figure 1: PDCA model

3. ISO 50001 AND ENERGY AS A FACTOR OF INFLUENCE

"The most effective used energy is one that is never used"
Edwin Pinero

3.1. Energy management

Energy is involved in all areas of society. It is an important initiator of the business processes and the method of its consumption affects the environment in which we live. As an influential factor, the energy must be planned, distributed, directed and its spending must be controlled. Therefore, energy and its management could be considered in three main aspects: business, environmental and social aspect. Energy management, from the point of business, is activity that is a priority for many organizations because it is a significant segment of their business where it is possible to increase the efficiency of the entire system, and reduce costs. Environmentally speaking, we look at energy management through the reduction of emission of harmful gases that have adverse effects on the environment. As for the social aspect, energy management is a socially responsible activity, because in this way the organization demonstrates an awareness to society in which it operates, and wider, that energy must be managed because it causes adverse effects on the environment. The problem of energy management, is present at the global level for many years. As one possible solution of this problem, the International Organization for Standardization has set the model for effective power management through standard ISO 50 001, which was published in June 2011.

3.2. PDCA model and ISO 50 001

ISO 50001 is an international standard. Through its demands it influence the companies to use the PDCA model (Plan, Do, Check, Act) in the management of energy which they use as part of their activities. The main objective is to establish a system of companies, more precisely the processes within the system, which are required to continuously improve energy performance in terms of efficiency, usage and costs. Energy efficiency refers to measures that are implemented to reduce energy consumption, usage refers to the way energy is used and the costs are the amount of actual energy which is used in some of the processes. Standard follows the processes of PDCA model in order of continuous improvement of energy management systems, because this model has shown positive results in field of quality and the environment. In energy management it is started with defining the energy policy, energy planning that is based on previously adopted policies, through implementation and operation, to verify and management review (EN ISO 50001:2011).

Energy policy refers to overall intentions and direction of the organization in terms of energy it uses. The first step when editing management system according to ISO 50001 is to define the basic directions of the organization in terms of energy management. Energy policy should be a written statement by management that applies to all employees in the organization and that precisely defines the objectives to be achieved over time, and which refers to energy efficiency or energy management. The objectives, which are defined in the first step, are getting decomposed and parcelized of operations, through the tasks, to the activity. This second step is the planning of energy and despite of the breakdown of basic goals, it includes planning of resources that are necessary for achieving the objectives, then the methods and ways for monitoring the fulfillment of these goals and indicators and timeframes too. The third step is implementation of plans related to energy. These plans include the operations to be undertaken, the necessary resources for implementation and timescale to which certain activities should be completed. The review consists of monitoring, measuring and analyzing the results. Through the planned internal checks of system and in connection with the fulfillment of the requirements of ISO 50001, discrepancies are defined and corrective and preventive measures for their elimination are determined. These measures are listed in the report drawn by the team of auditors and the organization's top management approve their implementation. Through the corrections it is affected on discovered discrepancies based on reports of corrective and preventive measures. With corrective measures are eliminated the causes of conflict, and prevention is eliminating possible causes of conflict.

Based on the description of the model of system for energy management, it could be concluded that the activity of making energy policy and energy planning includes the first phase of the PDCA model – Plan ;

application and implementation phase includes the Do ; review , monitoring , measurement, analysis, defining corrective and preventive measures and internal checks are in the phase of Check, and the last phase of Act includes corrections, the application of corrective and preventive actions and improvements. In this last phase, improvements, corrections and other elements initiate a review of energy policy, with which is rounded the PDCA cycle and when it should start again from the planning stage (*Filipovic & Djuric, 2010*).

4. COMPARATIVE REVIEW

Considering possibility of implementation and the form of standards ISO 14001 and 50001 are very similar. They are applicable to all types of organizations, they are compatible with certain standards (ISO 9001, ISO 18001, ISO 22000), relating to the management systems. They may be subject of certification and they use a process approach for establishing and maintaining processes in the organization's management system. (*Heleta Milenko, 2010*).

The implementation of standards is not mandatory and there are many misconceptions that the standards ISO 14001 and ISO 50001, like all other standards, carry with them certain technical and other barriers. Certainly, the ISO 14000 series of standards not create barriers to trade, not impose new legal regulations and obligations or changing existing. Implementation of ISO14001 and certification as evidence of its application clearly shows that the organization cares about the environment which contributes to customer loyalty and business partners who can be confident in the organization contribute to sustainable development and the local community. This makes reputation of organization much better and market positioning easier. Communication with all stakeholders is improved and obtaining permits and authorizations is much simpler. The application of the standards ISO 50001 and ISO 14001, should not be necessarily based on certification. If an organization decides to regulate a system with this standard, it could expect cutting costs, which is achieved by saving the energy which is used in process. Regulation of the system does not have to initiate certification. Advantages and benefits of planning system by the standards of ISO 50001 and ISO 14001 are shown in Table 1.

Table 1 : Advantages and benefits of standards ISO 14 001 (*Heleta Milenko, 2010*) and ISO 50 001 (*EN ISO 50001:2011*)

ISO 14 001 : 2004	ISO 50 001 : 2011
Gaining the trust of stakeholders that the organization meets the requirements of the environmental policy	Cost savings and reduce greenhouse gas emissions
Gaining the trust of customers that there is a requirement of environmental protection	Increasing the awareness of employees regarding to rational use of energy
Maintaining good relations with the community	Greater insight and increased knowledge about the equipment and the overall energy impact
Increasing market share and reputation	Increased efficiency of production
Reducing the number of accidents	Improving maintenance procedures
Savings of primary materials and energy	Improving the image of the organization

Model of management system for protection of the environment is very similar in their activities to model of energy management system. As in Figure 2 is shown, the model of the ISO 14001 standard is based on the defining environmental policy, and model of the ISO 50001 standard on defining the energy policy and energy management policy. Other activities are based on these two policies, and the cycle is closing by reviewing, updating and re-defining the new policies.

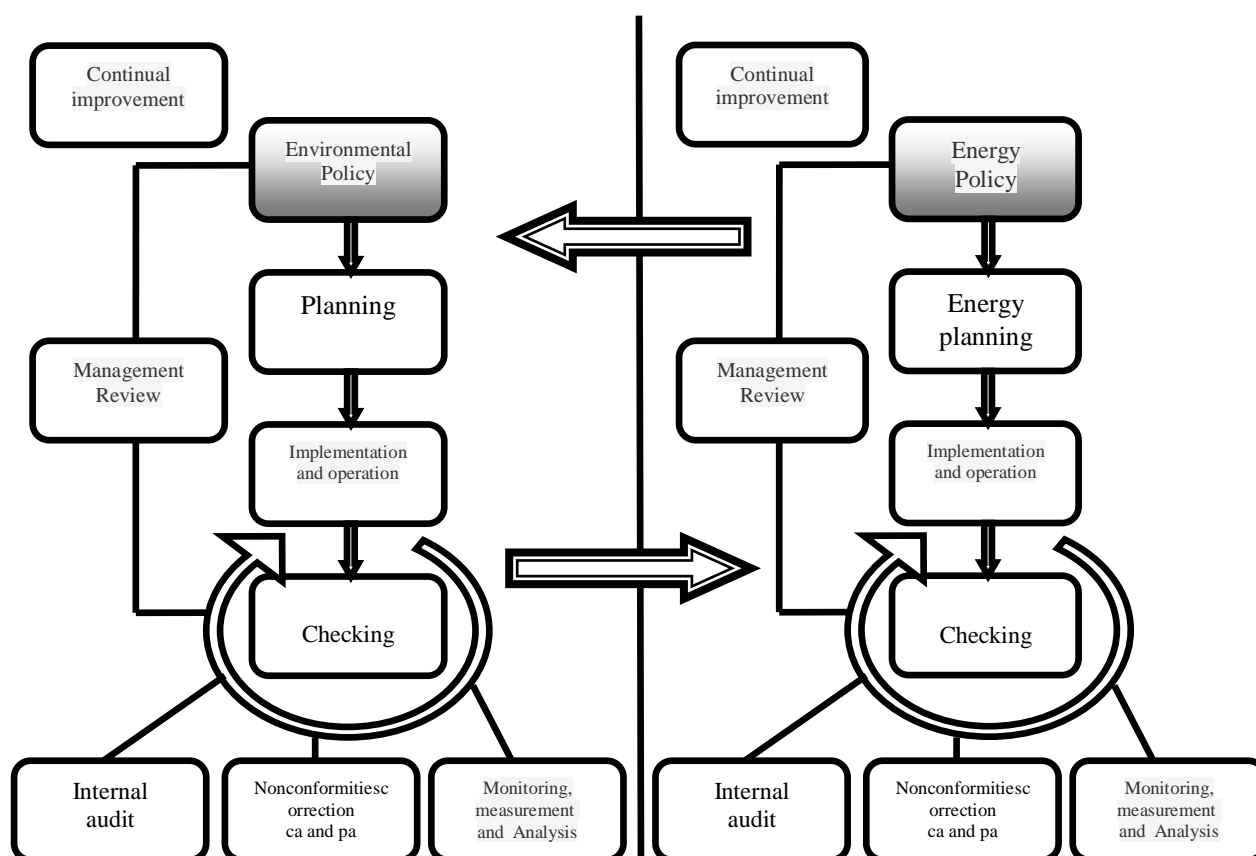


Figure 2. Comparison of models of management system of environmental protection and energy management systems (EN ISO 14001:2004 & EN ISO 50001:2011)

5. PRESENCE AND MAINTENANCE OF STANDARD ISO 14001 IN COMPANIES IN SERBIA – SURVEY

In order to determine the level of presence and maintenance of standard ISO 14001 in companies in Serbia, an online survey was conducted. Thirty companies who responded were the population for this survey. Depending on their main activities and economic sector, a classification is made and presented in Table 2.

Table 2 : Classification of companies in population by economic sectors

Sectors	Frequency	Percent
Primary sector - <i>Involves the retrieval and production of raw materials</i>	1	3.3
Secondary sector - <i>Involves the transformation of raw materials into goods</i>	14	46.7
Tertiary sector - <i>Involves the supplying of services to consumers and businesses.</i>	6	20.0
Quaternary sector - <i>health, culture, research, information, consultation, education, research, development, other knowledge-based services.</i>	9	30.0
Total	30	100

Questions were divided into two groups. The first group was related to standard ISO 14001, and the second group to standard ISO 50001.

From the population, 17 companies arranged their system according to standard ISO 14001, and 11 of them belong to secondary sector. The average time of maintenance ISO 14001 in their system is 2 years. The implementation has positive impact to their business, to a certain level, and 50 percent of those companies said that the implementation reduced their operating costs. Most of companies (88 percent) organize training for their employees approximately every 6 months. Also, from the population, number of companies who are informed about standard ISO 50001 is much lower than number of them who are not informed (9 companies who are, to 21 who aren't informed). Secondary sector is the one from where the most companies are. Only 2 of 9 are from different sector, one from tertiary and one from quaternary sector. All 9

companies who are informed, have implemented ISO 14001, and 8 of them think that implementation of ISO 50001 will reduce their operating costs. The results show that, 20 against 10 companies would accept an invitation to a seminar where the main topic would be introduction of ISO 14001 and ISO 50001 and their requirements. Also, the companies were asked to specify the type of energy that is used as a primary energy in their system. Results are shown in Table 3.

Table 3 : Type of energy that is used as a primary energy in companies in Serbia by economic sectors

Sectors	Water	Electric power	Oil	Natural gas	Other ⁶
Primary sector	0	0	1	0	0
Secondary sector	4	12	5	3	0
Tertiary sector	1	5	2	1	0
Quaternary sector	2	8	0	1	1
Total	7	25	8	5	1

Note: Most of companies specify several types of energy

From this survey, it is clearly that most of the companies, 83 percent of them, are using electric energy as a primary energy.

6. CONCLUSION

Implementation of environmental protection and energy management requires that funds, guidances and resources are available to organizations in order to provide them to effectively deal with these issues. However, resources and guidance can not be obtained from national institutions because in modern, global economy market crosses national boundaries and modes of regulation. International standards offer some solutions in this area. They are created by the same organization that will use them, they are adaptable to different types of organizations and their application is easy and outside of national frameworks.

In times of economic crisis, a necessary goal of planning system of management of an organization does not have to be a certification because it requires additional costs. The introduction of these standards can significantly reduce costs in certain fields, and this especially refers to the standard ISO 50001:2011, because it is focused on energy management. Companies need to understand the requirements of standard in order to provide significant savings.

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⁶ One company from quaternary sector uses reagents for laboratory diagnostics as a primary energy

INNOVATION AND TOTAL QUALITY MANAGEMENT

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Abstract: *In this paper we discussed about synergy of innovation and total quality management in reaching competitive advantage. We presented innovation and total quality management as very complex processes. Since good understanding of these processes is needed, we tried to discover the impact of quality on innovation, if it is an obstacle for innovation process or it helps innovation to be realised. We concluded that TQM dimensions, such as customer focus, training, empowerment and teamwork, rationality in the analysis of production processes and benchmarking can assist an organisation to be more innovative in its business activities. This paper should be an overview of importance and influence of TQM on innovation.*

Keywords: *innovation, TQM, competitive advantage, organisational climate, quality*

1. INTRODUCTION

Innovation but also quality can help company to increase competitiveness. Competitive advantage as innovation is defined as company's opportunity to achieve competitive advantage according to innovation and company's ability to manage successful innovations' projects. (Porter 1990) On the other hand, quality as competitive advantage is defined as need of businesses to recognize that providing a quality user experience is an essential, sustainable competitive advantage. It is user experience that forms the customer's impression of the company's offerings, it is user experience that differentiates the company from its competitors, and it is user experience that determines whether your customer will ever come back. (Jesse James Garrett 2002). Many authors view quality and innovation as two separate disciplines. Although this separation may be accurate in some respects, the two fields share quite a few philosophies and methodologies.

The entrepreneurial context of organizations today is characterized by growth of international competition, rapid technological evolution, and more demanding customers with changing and mature expectations, in short, a dynamic environment with unpredictable changes (Hashim et al., 2010). Firms have different strategies and courses of action that enable them to respond to such changes in the environment (Hitt et al., 2000). One of the main strategies is the creation of new products, services, or processes or the modification of existing ones (Brown and Eisenhardt, 1995; Dougherty, 1992). Innovation enables organizations to change as their environment changes. They have two alternatives: to innovate or to die (Storey, 2000; Hussain and Ilyas, 2011). Innovation can also improve organizations to make them more competitive, helping them to obtain competitive advantages in both global and international markets (Hitt et al., 1997; Tidd, 2001; Wang et al., 2008). Innovation increases competitiveness because it enables the organization to offer the market new and unique products/services and to make it difficult for others to learn about the resources needed, creating entry barriers and shaping the competitive game rules, thereby creating new values.

The implementation of a total quality management (TQM) system is another strategy that firms can use to respond to the demands of an increasingly turbulent and unpredictable environment (Khan et al., 2011). Quality is a crucial way to improve the firm's profits and ensure competitiveness. It generates improved products and services, decreases costs, increases firms' financial profitability, improves the image of products and services, and increases customer satisfaction. Quality is also a factor that motivates and integrates workers.

Question we discussed through this paper was if innovation and quality can be applied together to obtain competitive advantage in dynamic and changing environments. This paper is overview of innovations, total quality management and their connection. We firstly tried to understand both TQM as paradigm of management and complexity of innovation and then tried to find relation between them.

2. INNOVATION

Innovation can take several forms: in products, production processes or management systems. Innovation in products is related with R&D and consumers needs. Innovation with processes relates to changes in machinery and other elements not directly related with employees and have the aim of increasing productivity (i.e. increasing quality and reducing costs). Innovation in management systems has the aim of adapting these systems to new environmental conditions and improving the way in which people are managed and work is organised. This form of innovation can become necessary by changes in the process, such as automation and the application of mistake proofing devices as typically described by Shingo (1986).

Companies tackle innovation in two basic ways: by copying or developing their own innovations. The first strategy can be useful in situations in which companies enjoy competitive advantages, such as low wages, easy access to raw materials, protected markets, etc. However, in order to obtain competitive advantage, the second strategy is a better approach. This argument is valid not only for innovation in products and processes but also for innovation in management.

Creating and sustaining an orientation to innovation is necessary to foster innovation (O'Reilly, 1989; Russell, 1990; Russell and Russell, 1992; Craig, 1995; Schneider et al., 1994; Judge et al., 1997; Filipczak, 1997; Hurley and Hult, 1998; Martins and Terblanche, 2003; Wan et al., 2003). It is not enough to talk about innovation and believe in it. One must take it seriously and ensure that it happens by developing an orientation to innovation in which management's values become employees' practices (Hofstede, 1994). From a theoretical point of view, we identify various arguments to explain the connection between innovation and orientation to innovation. The first focuses on the way individuals are socialized in the organization. The socialization process involves how individuals learn what behaviors are acceptable and how activities should be performed. Individuals' sense of shared norms in the organization helps them to identify whether innovative behavior is part of the organization's way of acting.

The second argument is that organizations disseminate orientation to innovation by establishing forms of behavior and activities reflected in structures, politics, practices, procedures, etc. For example, if the organization provides resources for the support of new ideas (Teslut et al., 1997), individuals will perceive that the organization values innovation and will act accordingly in the workplace by innovating.

The third and last argument is that successful innovation requires solving series of problems related to the ambiguity and uncertainty involved in implementing innovation (for example, low motivation to initiate and to support innovation among the organization's members). Having a set of norms for innovation (clear expression of the organization's values and behaviors regarding innovation) can, however, generate the motivation and commitment necessary for sustaining successful innovation. Because such norms guide the organization's members toward the right behavior, they constitute an effective way of implementing innovation (Zaltman et al., 1973).

Results from various research studies show that the perception that the organization values innovation affects innovation positively. Organizations should therefore develop and sustain a climate of support to achieve greater innovation capacity. Based on the literature review, we will establish four essential strategic and structural factors to determine the factors that influence orientation to innovation: cohesion, recognition, decentralization, and formalization. Cohesion and recognition are related to the organization's members and are crucial to stimulating innovation. The structural factors, decentralization and formalization, have received the most attention in the literature, as they are considered to be the main determiners of innovation.

It attempts to verify how a work context characterized by cohesion, recognition, some degree of formalization, and decentralization can create orientation to innovation and thus foster innovation accompanied by greater innovation capacity (Germain and Spear, 1999; Hartmann and Patrichison, 1996; Shani and Rogberg, 1994). The implementation of TQM also influences the different variables, encouraging greater orientation to innovation (Prajogo and Sohal, 2006, 2003;).

3. TOTAL QUALITY MANAGEMENT

TQM is a paradigm for management, it propagates some defined values, behavior and methods of work (Gallear, Ghobadian, 2004). So, if we would treat TQM as program for changing organizational culture, then one of the reasons of the failure of TQM implementation would be wrong understanding of this program, which impacts only a partial implementation of TQM (Yong, Wilkinson, 1999). It is worth mentioning that the sections of organizational culture intersect with TQM areas, including ways of work and systems of values. Because of that we can assert, that organizational culture is changing because of TQM implementation. Can TQM generally be in practice implemented? Researches show, that TQM is very rarely "all inclusive". Implementing TQM, attention is paid to the cultural workers' changes. Wilkinson (1992) separates three traditional TQM view alternatives. First view is oriented to "light" quality characteristics (personnel authorization, personal learning and etc.) and it obligates to define the style of management by delegating responsibility, to increase the independence of personnel. Second view is oriented to "hard" factors of production (system measurement, work control, usage of statistical procedures). The third view includes the elements from the first and second and is oriented to the need of scientific methods, understanding of workers as part of the team. To every cultural workers group one of these views could be applied, but only the usage of all three views will make it possible to successfully implement TQM in an organization.

Assertion can be made, that by orienting to organizations culture factor, TQM can be implemented in two ways – cultural changes or less resistant way (Kekale et. al, 2004). It is necessary to pay attention to the fact that implementation of TQM in organizations should begin from the very top of management levels (Oztas, Ozbay, Yeginhobali, 2004). Mentioned cultural factor is an internal condition of the organization, which decides the success of TQM implementation, but there are many external factors too, which are conditional – leadership, economic survival, global competition (Warwood, Roberts, 2004).

Will TQM remain essential to future companies? It is important to understand that today's business surroundings are very unstable. To remain competitive under these conditions, companies should become more flexible, transform into a suitable form. One of possible transformation forms – modular corporations. Attention should be paid to the fact that "light" TQM factors have a strong impact on organizations' activity. It is proven, that these "light" factors transform quality control system to TQM (Rahman, 2004).

We must confess that with the change of the surrounding conditions the view point to quality should also change. The connection between TQM principles and the implementation of innovations should be found in space of economic knowledge. TQM should help companies to solve innovation problems (Elshennawy, 2004).

4. RELATION BEETWEN TOTAL QUALITY MANAGEMENT AND INNOVATION

If an organization wants to implement some kind of innovations by already used quality management methods, then quality management would help to achieve the goal. But if the organization has only the knowledge about quality management methods, then the implementation of quality management method would be treated as the first innovation.

When the concept of TQM first appeared it was considered as an innovation in management thinking, but this does not necessarily mean that it is a necessary facilitator of innovation.

Companies applying TQM can more easily assimilate innovations imported from other situations due to the willingness of its employees to accept new ideas which are promoted by the TQM approach. They can also develop their own innovations by building on the work of both continuous and breakthrough improvements. The approach of TQM to process flow management is ruled by rationality. SPC and other quality management tools and techniques have as their aim decision making using real data and to facilitate the rational analysis of the problems (Deming, 1986). This is against the non-innovative way of thinking that frequently appears in companies in which things are done the way they have always being done. Therefore, a company that works and operates according to a TQM philosophy will be more willing to accept and adapt to any management innovation.

The impact of implementation of TQM on customer satisfaction in costs, improvement in profitability, and productivity has been analyzed extensively in the literature. However, the repercussions of TQM for orientation to innovation have hardly been analyzed. Our review of the literature (McAdam, 2001; Prajogo and Sohal, 2001, 2003; Zairi, 1994, 1999) shows that some research considers TQM a necessary strategy to create a climate of support for innovation. TQM helps to identify which processes must be renewed or replaced by new, more efficient ways of doing work in the organization. Thus, quality supports the creation of

a climate of innovation. Among TQM principles and practices that help to create a climate of support for innovation, we emphasize the the following: (1) continuous improvement, which makes employees more willing to accept new ideas; (2) orientation to the customer, which introduces changes in organizations in order to satisfy customers' needs, stimulating innovation; (3) training programs, which develop employees' basic knowledge and abilities so that they are better prepared to understand and accept new systems to perform their tasks; (4) empowerment and teamwork, which help employees to generate ideas for improvement, encouraging innovation; and finally, (5) benchmarking, a thoroughly innovative practice whose goal is to discover whether other organizations do things better, to copy these methods, adapt them, and achieve the levels of efficiency of organizations that develop best practices (Alam et al., 2010). For authors such as McAdam (2001) and Detert et al. (2000), the principle of orientation to the customer and continuous improvement of TQM involve identification of customers' needs as a foundation for generating ideas for innovation and the constant search for ways to improve the organization. Both actions are necessary to construct a climate of support for innovation. Likewise, Zairi (1994; 1999) argues that TQM provides the impetus and commitment required to establish a continuous climate of innovation. Quality stimulates creativity and the generation of new ideas among employees.

5. CHANGING TQM TO FACILATE INNOVATION

Grossi (1990) states that innovation requires changes in the operating system and therefore must be driven top-down. However, many of the changes generated by a TQM policy are provided by all members of the company, from shop floor to administrative departments, in particular when a policy deployment is employed. Without a deployment using the Catch, Reflect, Improve, Scrutinise and Pass (CRISP) cycle as outlined by Lee and Dale (1998), these sources of innovations could be biased by the specific interests of the people who work in each department and function and this could hinder achievement of company vision and its vital few objectives.

Long term relationships with suppliers in a partnership approach dictate that if changes are made then these need to be implemented with the involvement of the supplier and without a change in source of supply, certainly in the short term. It could be considered that this TQM dimension could be an obstacle to changes in supplier management, since breakthrough changes could imply the need to change the supplier.

Quality management tools and techniques can be treated as "traditional" improvement instruments which have been around for some considerable time. This can imply that they are used as they have always been. In the future some of these tools and instruments may become obsolete or will need changes in how they are applied. For example, increased levels of automation may change the way in which quality-related data is collected and this may have an influence on how SPC is applied (i.e. automated devices can collect the data and intelligent and expert systems can aid the decision making).

Companies should not look at TQM as a static set of recommendations that are going to be valid for ever; just as TQM is about challenging the status quo, this also applies to the TQM dimensions. Top management have to lead this way of thinking.

6. CONCLUSION

The advantages and disadvantages of TQM to develop and facilitate innovations have been discussed in this paper. It is argued that TQM does not hinder business innovation. In fact, some of the TQM dimensions, such as customer focus, training, empowerment and teamwork, rationality in the analysis of production processes and benchmarking can assist an organisation to be more innovative in its business activities. However, for this to happen the TQM concept has to be well understood by management, in particular, the senior management team. Continuous improvement does not mean that the changes made are the sole responsibility of employees, management needs to be fully involved in facilitating process improvements and providing the requisite leadership. It should also not be forgotten that TQM is also subject to change and has to adapt to new conditions of work, competition and environmental situations, all driven by innovation.

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IMPORTANCE OF ASSESSMENT FOR DECISION-MAKING IN THE STRATEGIC DEFENSE AND SECURITY MANAGEMENT

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Abstract: *Assessment is the essence and the starting point of a planning process. Especially important is assessment which relies on the strategic level of decision-making. This document emphasizes the importance of the assessment making process for the defence and security strategic management decision-making, as well a permanent need for their updates with the appearance of new factors and trends of development. Analyses of some previous assessments¹ have been taken into consideration, from the standpoint of checking characteristic conclusions given within them. Taking into consideration global events which have already happened in the period covered by this assessment, partial analysis has been done, in other words - checking of given conclusions. That points to the uncertainty of future events in long-term assessments. This especially needs to be kept in mind in strategic management decision-making in defence and security.*

Keywords: *defense, security, decision-making, strategic crisis management, assessment, global future, uncertainty²*

1. INTRODUCTION

Decision-making is the component of daily activities which decision-makers do individually or within the team. Taking a decision precedes preparation which covers defining of problem and collection of relevant information. The every decision withdraws determined responsibility for decision-maker because it influences on the future states of system and brings necessary effects or consequences.

In dependence on which level of management are made, decisions can be: strategic, operational and tactical. The strategic decisions are made on highest levels of legislative and executive power, and are related on the improvement of strategic position in the future. The operational decisions are made on lower levels, and are related to development and realization of strategic decisions.

As the level of decision-making is higher, the importance and consequences of decisions are bigger. Because of the lack of information, on the strategic level of management unstructured decisions are much more represented, in other words decision-making realizes in conditions of a risk.

In the defense and security area strategic level is the level on which legislative and executive power establishes national security aims and makes decisions about the development of resources for their achieving.

Defining of national strategic objectives and suitable strategy requires, previously, to conduct detail research and analyses of global surrounding in which the state is, all changes which will happen in surrounding and influences which changes provoke in the state. Also, it is necessary to execute research and analysis of state potential, as bases for necessary adaptation to difficultly predictable and changeable surrounding through the defining and realization of specific strategies.

¹ „Global Trends 2015: A Dialogue About the Future With Nongovernment Experts, National Intelligence Council, CIA, December 2000“ and „The DCDC Global Strategic Trends Programme 2007-2036“ which represents „an independent view of the future“ produced by the Development, Concepts and Doctrine Centre (DCDC), within the UK's Ministry of Defence (MOD) and it is „a source document for the development of UK Defence Policy.“

² In the paper is reported a part of results of research on the project: „Effective sources of new technologies and defense concentration through social changes and strategic orientations of Serbia in 21st century (III47029 MNT RS) which is financed by Serbian Ministry of education and science.

External analysis of state surroundings and internal analysis of potentials and resources presents the framework of strategic analysis as sub process of the strategic management, which gives bases for the defining of strategic alternatives. This means that the strategic analysis, in general, covers two basic parts: analysis of factors of global and regional surroundings and internal factors. Those analyses should result as much as objective prediction of trends.

The strategic management should be turned to future. Therefore is necessary to predict, with the profound certainty, future states and future events, in order to be able to define aims which we want to achieve and define strategies with whose realization future aims could be reached.

Because of decrease of uncertainty in the security area, anticipation of future is very significant part of strategic management. Anticipation of future is very significant element in the strategic management in defence and security. Element of future presents a major characteristic of strategic management and key difference in relation to the operational management.

From all this we can clearly claim that good prediction is necessary for the implementation of national strategy and for the achieving of wanted results in the future.

Good prediction in defense and security implies making of the universal and relevant assessment, which will analyze factors and trends which influence on future events and enable to identify security challenges, risks and threats.

2. DECISION-MAKING IN THE STRATEGIC MANAGEMENT IN DEFENSE AND SECURITY

Deciding is a component of all basic functions of management and carries off on process in which manager, individual or collective body, on the situation assessment basis, predicts development of states, manifestations and events, by choosing between a several alternatives brings the decision about further directions of action of whole organization or her particular organizational units and members. Decision is the final result of decision-making process.³

In strategic management in defense and security, decision-makers has huge responsibility, because from their correct decision depends further development of events and dimensions of their consequences. Consequences at this level are significant because decisions influence on the basic values and interests of state, and the price of good and bad choices is high, in social, political, economic and human sense.

Complex analyses of security policy and development of future scenarios is the starting point for decision-making in opposing to security challenges in defence and security area. Identification and analysis of threats includes the assessment of a number of risks and analysis of different variants of scenarios.

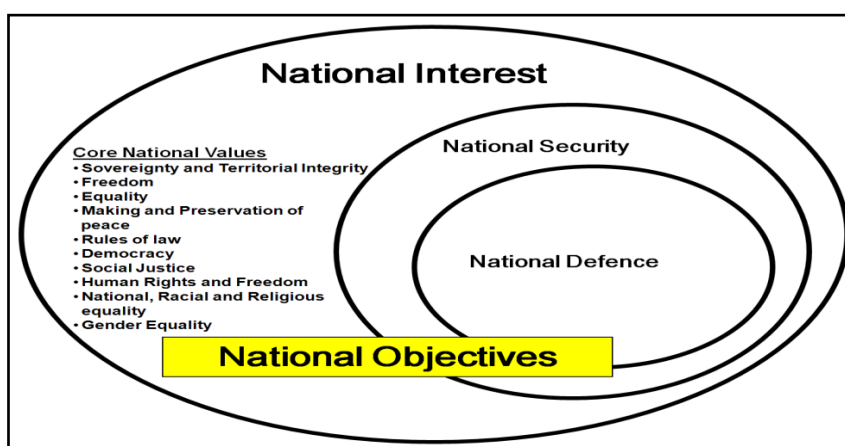


Figure 1: At the strategic level, the MOD/GS should look at contributing to the outer rings⁴ in order to formulate the policies for the inner ring

³ James Reason, Human Error, Cambridge University Press, Cambridge, 1990.

⁴ Source: National Security Strategy of Serbia

Process of forming risk assessment is exceptionally significant because it enables state bodies, in other words participants in deciding in the defence and security strategic management, common understanding of risks that the society faces.

For the analysis of complex phenomena in security, which are characterized by unpredictability, transnationality and asymmetry, it is suitable to apply the general morphological analysis which serves to identify and explore all groups of possible relationships contained in a given complex of security problems.

Morphological analysis begins by identifying and defining the parameters (or dimensions) of the complex of issues that need to be explored, and assigning the range of relevant "values" or conditions of each parameter. By crossing the parameters of n-dimensional matrix morphological box is constructed. Three-dimensional matrix is a morphological field that contains all the formally probable relationships. Each cell of the n-dimensional box contains a specific "value" or condition of each parameter. The study of all configurations on the field determines which of them are possible, viable, practical...

Analysis of socio-political problems is conducted through a specific number of scopes of conditions and quantified variables. Groups of non-quantified conditions are synthesized in adequately defined relations that represent "areas for solutions".

Three-dimensional matrix would include threats, functional tasks and technological needs, and can be supplemented by other parameters. The answer to the risks may include technical, human, operational and management elements.

In addition to morphological analysis in analyzing the security environment the other types of analysis are also being applied, notably the SWOT analysis.

Analysis and evaluation of the security environment is the basis for identifying potential scenarios for threats to the security.

The scenario is a description of a way in the future (developmental scenario) or a description of a future situation (situational scenario). The content of scenario can include: resources, technology, command and management or environment, but primary issue are conditions of conducting operations in the future.⁵

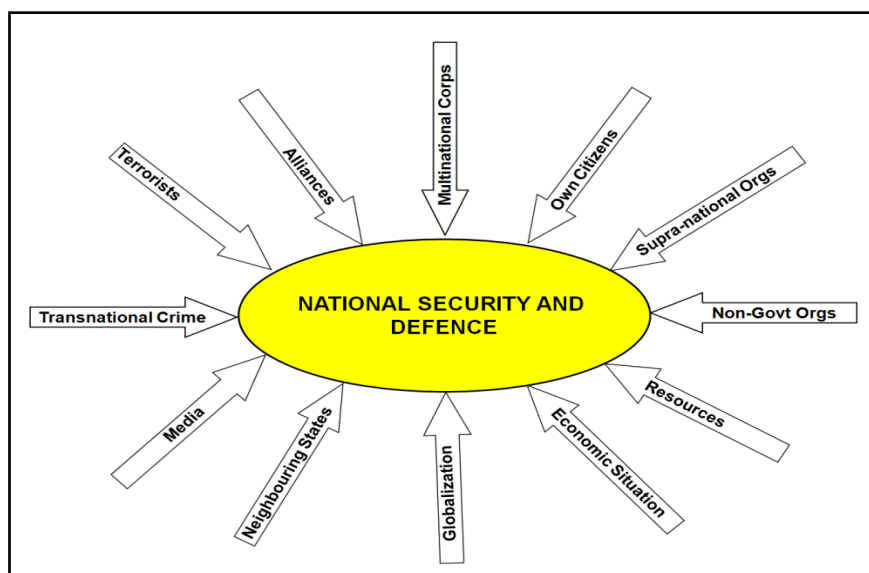


Figure 2: External factors of national security and defence

The process of scenario development involves several steps in the process of assembly, development and assessment.

⁵ Planning and Development Department (J-5) GS of SAF (2009), The Staff Study „The Planning of Development of Serbian Armed Forces Based on Capabilities - draft , Belgrade.

The process of assembly consists of identifying the purpose or the central issue for the scenario. Development is a systematic process of identifying key scenario routers with the appropriate values and the corresponding dependencies and variations between them. Phase of assessment includes a review of scenario and verification whether it satisfies some necessary conditions (review of the usefulness, completeness of required information and checking of internal consistency).

The goal is to keep the number of scenarios as small as possible. The scenarios are based on the respect of the current situation, the observation of trends and expectations of future development of the events. As time passes, the global characteristics are changing (political relations, technology, environment, demographics, social values, military structures, etc...), including the scenarios. Scenarios are developed over time.

At the strategic level scenario focuses on the political challenges in relation to national interests. Closely connected with this is a strategic-military level of scenario, which translates the political challenges in the military strategic challenges.

Formulation of scenarios requires identification of the driving factors within the raised issues for whose identification could be used various techniques, e.g. structured brainstorming technique (exchange of ideas).

Morphological analysis which is used prior to writing of scenario provides consistency in change of scenario dimensions.

The scenario should meet the criteria of credibility and relevance. Events in the scenario must make sense and be credible. Credibility cannot, however be confused with probability. Likelihood itself is not a criterion; on the contrary, the scenarios often address issues that have a low probability. Credibility, however, means that the scenario must seem "possible".

Relevance, in terms of scenarios, means the utility for its individual purpose. In terms of scenario for military purposes, it should include questions that could explain the development of conflict or other situations where military force may be used. For this purpose, the script must contain enough relevant information and be useful for analyst or planner.

Linking the assessment to decision making is allowed by the analysis of different scenarios, which should indicate the nature of future events.⁶

3. RELEVANCE OF LONG-TERM ASSESSMENT IN THE SECURITY AREA

Identification of driving factors inside the question which considers some scenario, presents the basis for making of relevant and credible scenario. Correct identification, well assessed importance and influence of certain factors and their trend in future, essentially influence on content of the scenario.

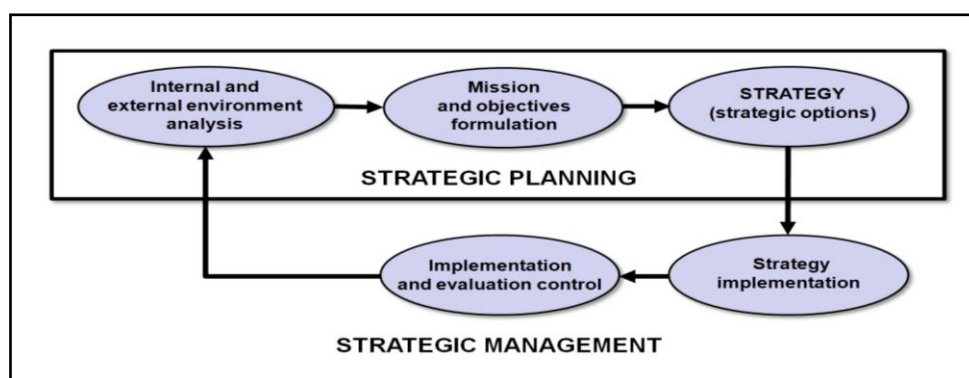


Figure 3: Strategy, strategic planning and strategic management

Considering that the decision-making process in defense and security strategic management is based on scenarios, the importance of assessment relevance in this process is clear.

⁶ Planning and Development Department (J-5) GS of SAF (2009), The Staff Study „The Planning of Development of Serbian Armed Forces Based on Capabilities - draft , Belgrade.

As illustration of relevance of long-term assessment in defense and security area is taken Study (assessment) „Global Trends 2015: A Dialogue about the Future with Nongovernment Experts”, issued on December 2000. This assessment consists of conclusions about that key initiating factors are identified; how conclusions given in previous assessment, „Global trends 2010“, have been changed; how previously identified initiating factors have been expanded and more directly tie up with trends which now are being forecast for the next 15 years; how events and trends in key states and regions influenced to considerably revise some of earlier predictions.

Protagonists of assessment making⁷ have been working on the identification of the main initiating factors and trends which will form the world up to 2015, and on that basis Report (assessment) have been composed whose conclusions we examine.

In this assesment as the key initiating factors are identified⁸:

- Demographics.
- Natural resources and environment.
- Science and technology.
- The global economy and globalization.
- National and international governance.
- Future conflict between and inside states and nations
- The role of the big powers.

According to assesment „no single driver or trend will dominate the global future in 2015, each driver will have varying impacts in different regions and countries and the drivers are not necessarily mutually reinforcing; in some cases, they will work at cross-purposes“.

Key drivers and trends will intersect to create an integrated picture of the world of 2015, about which we can make projections with varying degrees of confidence and identify some troubling uncertainties of strategic importance.

Assesment provides a flexible framework to discuss and debate the future. Judgments about demographic and natural resource trends are based primarily on informed extrapolation of existing trends. In contrast, many judgments about science and technology, economic growth, globalization, governance, and the nature of conflict represent a distillation of views of experts inside and outside the Government. About projections about natural phenomena, we can have fairly high confidence; the latter are more speculative because they are contingent upon the decisions that societies and governments will make.“

The drivers emphasized in this assesment are valid for this examination process. The Report suggests that some of the trends will persist; others will be less enduring and may change course over the time frame we consider. Essence of assesment is identification of driving factors, determination which ones matter most, to highlight key uncertainties, and to integrate analysis of these trends into a national security context, from what results identification of issues for more rigorous analysis and quantification.

In the Report is given overview on conclusions delivered in the previous assessment Global Trends 2010, published in 1997 in order to realize how given assessments are changed. Over four years, the judgments have been tested. Various audiences were energetic in challenging, modifying or confirming judgments given in assesment. The lively debate that ensued has expanded treatment of given drivers, altered some projections made in 1997, and matured autor's thinking overall.

This is some characteristic parts of Report: „Global Trends 2015 amplifies several drivers identified previously, and links them more closely to the trends we now project over the next 15 years. Some of the key changes include:

- Globalization has emerged as a more powerful driver. GT 2015 sees international economic dynamics -including developments in the World Trade Organization - and the spread of information technology has much greater influence than portrayed in GT 2010.

⁷ National Intelligence Council (NIC) with a range of nongovernmental institutions and experts.

⁸ Source: Report „Global Trends 2015: A Dialogue About the Future With Nongovernment Experts“.

- GT 2015 includes a more careful examination of the likely role of science and technology as a driver of global developments. In addition to the growing significance of information technology, biotechnology and other technologies have much more weight in the present assessment.
- GT 2015 provides a more complete discussion of natural resources including food, water, energy, and the environment. It discusses, for example, the over three billion individuals who will be living in water-stressed regions from North China to Africa and the implications for conflict. The linkage between energy availability, price, and distribution is more thoroughly explored.
- In the regional sections, GT 2015 makes projections about the impact of the spread of information, the growing power of China, and the declining power of Russia.

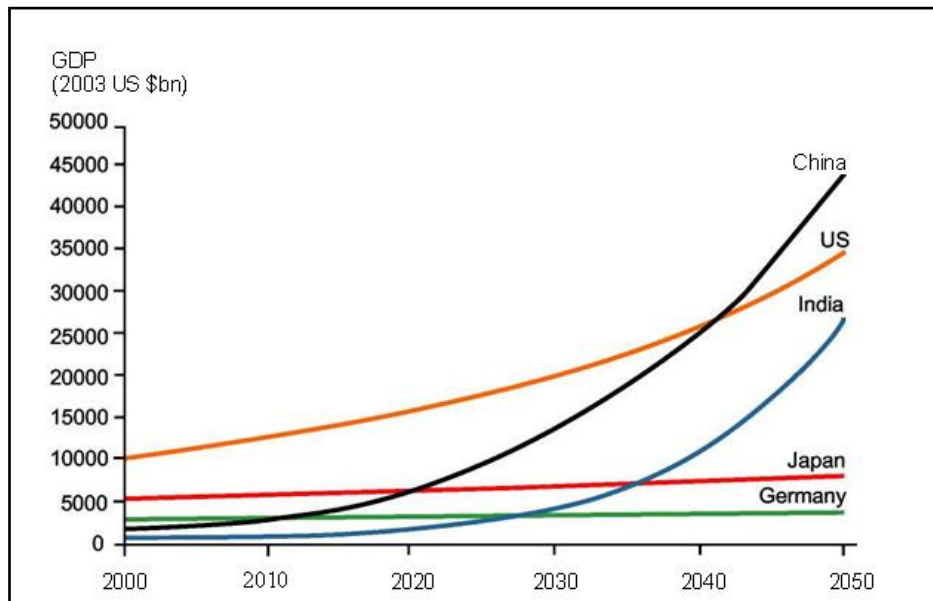


Figure 4: GDP of emerging powers showing dramatic projected growth for India and China⁹

Events and trends in key states and regions over the last four years have led us to revise some projections substantially in GT 2015.

- GT 2010 did not foresee the global financial crisis of 1997-98; GT 2015 takes account of obstacles to economic development in East Asia, though the overall projections remain fairly optimistic.
- As described in GT 2010, there is still substantial uncertainty regarding whether China can cope with internal political and economic trends. GT 2015 highlights even greater uncertainty over the direction of Beijing's regional policies“.

Research of interplay these driving factors and trends indicates some important uncertainty which will be explained only just during the proceeding of event and when leaders bring political decision which today cannot foresee. We quote transnational and regional problems for which the future is, according to our analysis of trends, too difficult to foresee with the confidence or the preciseness.

- Science and Technology
- Asymmetric warfare
- The Global Economy
 - Chinese economy in the constant growth
 - The US economy suffers a sustained downturn
 - Europe and Japan fail to manage their demographic challenges
 - Emerging market countries fail to reform their financial institutions
- Global energy supplies suffer a major disruption
- Regions and states
 - The Near East
 - China
 - Russia
 - Japan

⁹ Source: The DCDC Global Strategic Trends Programme 2007-2036

– India

This very significant issues of national security which request continuous analysis and interim audits policy in next years.

Shown assessment can serve as the example which illustrates the large dynamics of changes, present in long-term assessments. In order to long-term assessment be useful for the analyst or the planner, especially in defense and security management and to produce credible and relevant scenario, parameters which characterize specific appearance, have to be based on relevant information.

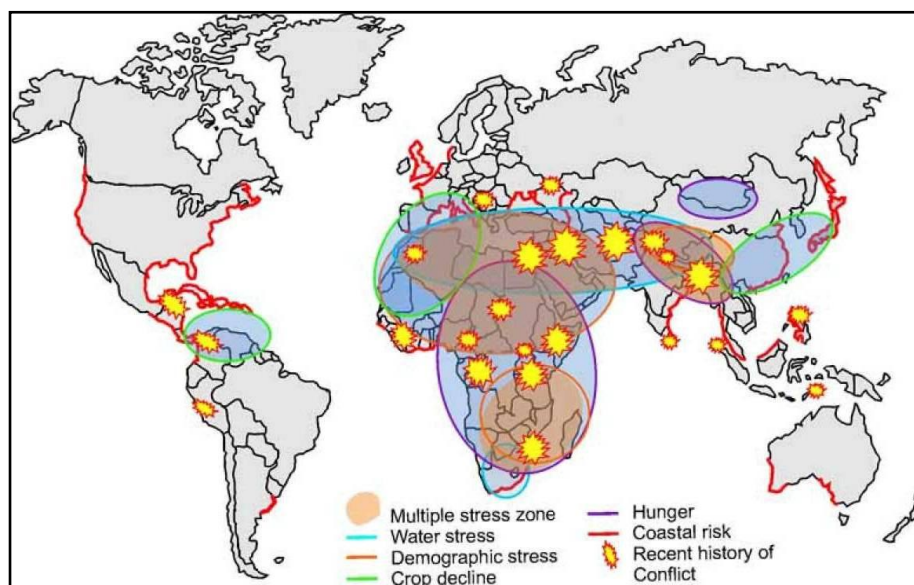


Figure 5:

Stress Zones: Instability is likely to be greatest in areas of Multiple Environmental Stress¹⁰

Consideration of shapes and intensity of influences of single parameters to long-term assessment, their correlations in the concrete situation for the concrete state and concrete moment, presents the great challenge for decision-makers.

5. CONCLUSION

An essential prerequisite for making objective decisions is relevant assessment and reliable prediction. Given the importance of decisions at the strategic level and the consequences of wrong made decisions, the conclusion that is the quality assessment of all factors that affect global and domestic environment and the proper consideration of their impact on national interests, is the question to whom should be paid great attention.

In making of assessments, whose summary is given in this paper, besides making carriers, participated and non-governmental institutions and many experts from academies and the private sector.

The benefit of working on the strategic future is not to predict the future, which is unpredictable, or to enable organizations to control it. It is about trying out options, so that they are more capable if it happens.

National security issues are important and require continuous analysis and periodic review of assessments and decisions based on them.

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INNOVATIVENESS AS A RESULT OF ORGANIZATIONAL LEARNING AND KNOWLEDGE IN STRATEGIC PARTNERSHIPS*

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Abstract: *Competitive advantage of strategic partnerships is derived from learning and acquisition of new knowledge. Through the process of efficient use of knowledge, strategic partnerships put innovations into practice. Knowledge is the basic resource that influences efficient utilization of other partnership's resources. Resources themselves do not bring competitive advantage. Ability to use these resources in a way that is superior to the one seen on the part of the competition brings competitive advantage. Faced with the pressure coming from the competition, growing numbers of strategic partnerships create special systems and procedures with the aim of collecting, memorizing, disseminating and using knowledge. The primary aim of our research is to emphasize the importance of learning and knowledge in the process of creating innovativeness and reaching competitive advantage. Namely, successful strategic partnerships stand for innovative partnerships that continuously create new knowledge and apply it at different levels. Focusing on the research hypotheses, the paper will rely on the qualitative methodology of research. It is the authors' attempt to draw relevant conclusions through the comparison and generalization of the stated theoretical standpoints and best business practices. One of the conclusions is that success of a partnership to a large extent depends on the effective transfer of knowledge between partners, which leads to the creation of innovations. We hope that the findings of our work will be useful to both theoreticians and practitioners in the field of strategic management.*

Key words: *strategic partnerships, innovativeness, learning, transfer of knowledge, competitive advantage*

1. INTRODUCTION

The primary resource and the main source of competitive advantage in the 21st century is knowledge. Seeing the process of learning as the only way in which they could survive in turbulent environment, growing number of modern companies turn into learning organizations. Companies establish strategic partnerships with the aim of expanding knowledge bases and accessing specific types of knowledge. Namely, strategic partnerships that are able to learn continuously and apply new knowledge in the process of creation of superior products and services win the advantage on the market. Encouraging of organizational learning and acquisition of knowledge significantly affects innovativeness of companies. Innovativeness of strategic partnerships determines their competitiveness on the market. Being innovative under modern business conditions is an imperative for survival, growth and development of companies and their strategic partnerships. Innovation refers to the process of utilization of new knowledge with the aim of changing organizational processes or with the purpose of creating new products and services that the market requires. The scope and result of innovative activities of strategic partnerships stand for the indicators of their total business success.

The paper starts with the hypothesis that learning and knowledge stand for the primary driving forces of innovations under contemporary business conditions. Realization of the learning process results in the creation of new knowledge that is considered a key input of innovative processes. Namely, strategic partnerships create their own internal environment that motivates partners to learn and create knowledge. Knowledge acquired in that way spurs the process of innovativeness and enables strategic partnerships to obtain and maintain competitive advantage.

* The paper is a result of research within the framework of Project No.179081, named: "Researching contemporary tendencies of strategic management using specialized management disciplines in function of competitiveness of Serbian economy", which is supported by the Ministry of Education and Science of the Republic of Serbia

Starting research hypothesis resulted in additional hypotheses. Namely, if focus of the research is taken into consideration, it can be stated that innovations stand for the basic requirement for achieving competitiveness of strategic partnerships. There is correlative interdependence between innovativeness and competitiveness. Innovations are, as we notice, the basic vehicle for achieving competitive advantage. At the same time, competition forces strategic partnerships to be innovative.

Last but not least, it can be stated that the transfer of knowledge within strategic partnerships stimulates the development of innovations. Access to new knowledge in strategic partnerships is achieved through interaction among partners and their exchange of knowledge. Transfer of knowledge increases the value of knowledge and stimulates activities that satisfy both sides, which results in the creation of strong knowledge base. Creation of a strong knowledge base results in the creation of conditions for the realization of the process of innovating.

2. IMPORTANCE OF INNOVATIONS FOR THE COMPETITIVENESS OF STRATEGIC PARTNERSHIPS

By entering strategic partnerships, companies gain access to resources, new technologies, knowledge and new markets. Moreover, they obtain economies of scale and economies of scope and they join forces with the purpose of innovating. Therefore, strategic partnerships are the favourable environment for learning, exchange of knowledge, innovating and realization of efficient strategies that provide competitive advantage within the global economy. Success of strategic partnerships on the international market increasingly depends on their innovativeness. Investment in innovations is regarded as similar to “arms race” (Betz, 2001, p. 81). Competition forces strategic partnerships to innovate. Due to the fact that no one wants to stay behind their rivals, no alliance dares to stay behind the competition when spending on innovations in the long run is taken into consideration. Namely, alliances, i.e. strategic partnerships constantly tend to increase investments in innovations with the purpose of surviving within the competitive game.

The purpose of existence of strategic partnerships is to obtain access to resources and transform these resources into innovative products and services by adding value. There is strong correlation between product innovations and market behaviour. New products add up to the process of winning and maintaining the market share, as well as to the process of increasing profitability. In case of mature and acknowledged products, increase in competitive sales stems not only from the ability of a company to offer products at lower prices, but also from various non-price factors, such as: design, quality and adaptability to customers' demands. Product lifecycle significantly decreased. For example, lifecycle of home appliances or computers is measured in months, and even the development of complex products, such as cars, takes less than three years. This trend obliges strategic partnerships to use innovations with the purpose of replacing products with their updated versions. Besides, lead time imposes additional pressure on all partnerships to take part in the market game. Namely, not only should they produce new products, but they should also do that faster than it is the case with their competition. Experiences of a great number of strategic partnerships prove that strong source of competitive advantage is achieved by creating innovation that no one else can create or by doing things better than others. For example, at the end of the 20th century, the Japanese had big advantage in some sectors of automotive industry, ship construction and consumer electronics. This advantage was based on their superior abilities in innovations and production. Significant source of competitive advantage is also reflected in the ability of a company to offer better services to customers – faster, at lower prices and of higher quality (Davenport, Leibold & Voelpel, 2006).

The idea of the significance of innovations has become widely accepted. It has become part of the culture of some countries to such an extent that it has turned into a cliché. The speed at which innovations are developed nowadays implies that the creation of one innovation usually gives birth to the idea (and the need) related to another innovation. New idea often points to other ideas, especially in situations when one invention requires another one with the purpose of becoming functional and more efficient. Innovation, as a way of achieving competitive advantage, in its broadest sense includes new technology, new way of performing tasks, new product design, new production process, new market approach and new way of training of human resources. Innovations can appear in various forms. Therefore, they are reflected in each introduction of novelty to the structure and functioning of partnership that contributes to the increase of economic efficiency and effectiveness of business. Also, one of the characteristics of the competition that is based on innovations is that it can appear from all sides. Namely, competition is not only reflected in well-known competitors whose business and moves are generally known. The competition can include unknown competitors from completely different business areas as well. Due to this fact, strategic partnerships have to be on the alert constantly and able to predict their competitors' moves.

Within global competitive environment, majority of strategic partnerships are faced with one choice – “innovate or disappear” (Lasserre, 2003). This choice is accepted by strategic partnerships, which believe in success and actively strive towards innovations in spite of the fact that innovations can be uncertain and highly risky. Strategic partnerships are ambivalent about innovations. Partners are, on the one hand, aware that innovations are necessary for the survival and growth of the alliance. On the other hand, they fear the risk and uncertainty that innovations bring with themselves. To put it simply, there is a fear of failure that might result from a single wrong step. Therefore, strategic partners accept innovations, but there is also resistance to innovative changes.

Process of learning is of extreme significance for the realization of innovation process. Existence of strategic partnerships in turbulent environment is, in fact, conditioned by constant learning and acquisition of new knowledge. By acquiring new knowledge, knowledge-based innovations are created. These innovations have the longest lead time and they are usually focused on the improvement of the strategic position of a partnership. Knowledge-based innovations involve configuration of different types of knowledge. Creation and transfer of knowledge in strategic partnerships bring invaluable benefit to all the partners within the network.

3. LEARNING AND KNOWLEDGE AS THE FACTORS OF INNOVATIVENESS OF STRATEGIC PARTNERSHIPS

Under modern business conditions, the only lasting source of competitive advantage of strategic partnerships is found in their ability to learn. Realization of the process of learning enables strategic partnerships to adapt to turbulent changes coming from the environment. In their attempts to create added value, alliances have to learn faster than their rivals in the environment and offer new knowledge in a more efficient and effective way. Research performed by Stanford University confirmed that the total human knowledge acquired up to 1900 doubled by 1950 and that it is still being doubled every 5-8 years (Lasserre, 2003).

There are numerous reasons for which learning is in the centre of attention of academic community and managers as well. Firstly, concept of “learning organization” has gained popularity among big companies that entered strategic partnerships at the moment when they tried to develop structures and systems that are generally much more adaptable to changes within the environment. Secondly, changes within the environment increase uncertainty of business and force companies to learn and do things in a different way. Thirdly, learning has a strong analytic value (Pasher & Ronen, 2011). Learning is an extremely dynamic process that enables strategic partnerships to face the threats and opportunities from the environment by increasing bases of knowledge. Learning in partnership aims at increasing business effectiveness and achieving competitive advantage. However, learning is not an easy process. It is often frustrating for involved partners. Nevertheless, it stands for the necessity for at least two reasons (Pasher & Ronen, 2011):

1. Because of devaluation of existent knowledge, and
2. Because the knowledge can be lost in case of lack of repetition and failure to memorize it.

There are two kinds of learning: learning through repetition and learning directed at finding contradictions (Bacera, & Gonzales, 2004). Learning through repetition is performed within a well-known framework and can be divided into adaptive learning and “single-loop learning”. Learning directed at finding contradictions results in examining and changing of basic assumptions and established contexts. It can be marked as generative learning or “double-loop learning”. Generative learning is of special significance for the process of reaching innovativeness of strategic partnerships. In case the environment is turbulent and marked by discontinuous changes, partners within the alliance might decide to use the concept of “double-loop learning”. Those changes influence the alliance's constant and generative learning and transformation. Contemporary strategic partnerships and strategic partnerships of the future are the ones that will apply generative learning. Adaptive form of learning can be applied by those strategic partnerships that do business within stable environment. Some of the advantages of learning within the partnership are reflected in the fact that partners are able to learn from one another.

Learning process results in knowledge. Acquisition of knowledge is a process that should be accompanied by motivation. With the help of knowledge, as the basic resource in contemporary business environment, partnerships are able to make other resources, such as labour, capital and natural resources, more productive. Productivity, which stands for the result of knowledge, must be constantly improved. Great

number of theoreticians have studied and described individual knowledge. The development of modern business pointed to the importance of collective (organizational) knowledge. Knowledge that is used, expanded and upgraded in partnerships stands for the form of collective knowledge and can be classified into two categories:

- Compatible knowledge
- Complementary knowledge (Bergeron, 2003).

Compatible knowledge refers to the process of expansion of knowledge that the employees already have. Complementary knowledge refers to knowledge that does not belong to the employees' domain. If knowledge is observed from the standpoint of cognitive dimension, it can be: explicit (that can be easily expressed) and implicit (that is difficult to express since it is usually tied to a specific context). According to some research, 42% of total knowledge belongs to the category of implicit knowledge (Bergeron, 2003).

Human knowledge is a dynamic category whose constant improvement is based on the development of science and technology, which consequently results in fast expiration of existent knowledge. Because of that, permanent learning concept's practical market application is increasing, and it has become one of the dominant strategic goals of management. Although human knowledge and expertise are difficult for quantifying, they stand for the source of creation of value for buyers and owners. Data, on the basis of which 50% of GDP in developed economies is based on knowledge, i.e. intellectual property and human expertise, points to the central role that knowledge has within modern economy (Lasserre, 2003). Knowledge-based economy relies on constant learning and acquisition of new knowledge. This is further supported by the facts about the recent trend of constant erosion and amortization of knowledge that expires up to 50% over the period of three to five years (Iyer, 2002). Therefore, learning and knowledge are significant factors of innovativeness as the source of competitive advantage of strategic partnerships.

It is characteristic of strategic partnerships that they present learning as based on the experience of others (partners in the alliance). Namely, success of strategic partnership depends on partners' mutual trust as well as on the degree to which they are ready to learn from one another. Nowadays, successful partnership is synonymous with partnership that learns, collects all accessible knowledge, experience and intellectual resources with the purpose of achieving good performances and values for their shareholders. Tidd, Bessant & Pavitt (2005) point out that "innovation in the knowledge economy is not merely the process of creating new products. Since partnerships either innovate or disappear, innovation is, in its essence, an element of production and other business processes" (p. 67). Strategic partnerships enable more efficient utilization of knowledge, which is reflected in realization of innovations, while at the same time reducing the time necessary for their implementation.

Learning in strategic partnerships can be traced through five dimensions: through environment, tasks, processes, skills and goals relative to the phases in the development of strategic partnerships (Table 1). Environment includes both internal and external environment – market, competition, culture, government, organizational culture, human resources, etc. In this context, the tasks refer to common tasks on which the establishment of a partnership depends. Processes stand for the roads towards realization of a task, which leads towards realization of defined goals (Iyer, 2002).

Table 1: Learning through phases of development of strategic partnership from the standpoint of five dimensions (adapted Iyer, 2002, p. 4)

<i>Dimensions of learning</i>	<i>Spotting and selection of partners</i>	<i>Research and meeting of partners</i>	<i>Expansion</i>	<i>Establishment of partnership</i>
Environment	External contents (cultural and national elements)	External and internal contents, corporate culture of partners and managerial practice	External contents with the purpose of utilization of new chances	External contents with the purpose of using new opportunities
Tasks	No or few tasks	Identification of common tasks	Creation of common tasks	Re-examination of common tasks, creation of new ones

Processes	No or few processes	Research and identification of common processes	Creation of common processes	Re-examination of processes
Skills	Explicit knowledge on prospective skills of partners	Initiation of the process of transfer of implicit knowledge for later phases of the development of the alliance	Transfer of knowledge and skills	Development of new knowledge and skills for common benefit
Goals	Strategic plans and initial goals of prospective partners	Partners' goals, searching for common and compatible goals	Establishment of goals of the alliance	Constant evaluation and re-examination of the goals of the alliance with the purpose of long-term competitive advantage

With the purpose of efficient realization of learning in the alliance, existence and accessibility of knowledge are necessary. Sole existence of knowledge does not guarantee efficient learning. The best results in the process of learning in strategic partnerships are achieved if:

1. Formal and informal ties among partners are strong, and if
2. Organizational culture of partners is compatible (Iyer, 2002).

Basic problems that appear in the process of learning in partnerships are the problems of integration of partial knowledge as well as methods of generation and memorizing of knowledge of individuals who belong to different organizations. The problem is reflected in systematization and memorizing, i.e. storing of knowledge. Concepts with the help of which these problems could be solved are: concept of knowledge maps, concept of management based on skills and concept of transactional memory (Lasserre, 2003). Concept of *knowledge maps* uses diagrams to present group and individual knowledge. The aim is to collect related information in the form of texts, stories, graphical displays, models and numbers and display them graphically. Knowledge maps have to be accessible to all at all organizational levels and they have to be displayed in appropriate form so that they could be useful. *Management based on skills* focuses on skills, competences and description of profiles for all positions and workplaces. This concept is focused on the creation of a clear distinction between skills that are necessary for a certain work position and the skills that an employee possesses. This concept is applicable only with respect to task-oriented and non-multidisciplinary jobs. *Concept of transactional memory* is based on the explanation of knowledge exchange, coding systems, storing and utilization of information of employees who are in constant contact. This concept is based on two components: members' individual memories and transaction process that constructs and uses individual memories with the purpose of making them accessible to all individuals. Transaction process starts when all group members start to acquire knowledge that belongs to other member's expertise. Concept of transaction memory can be descriptively displayed by division of directories in computer networks and it involves three key processes: updating of directories (when people learn what belongs to the domain of other people's knowledge), allocation of information (when new information are sent to the person whose domain they belong to) and renewal of information (when missing information are found in knowledge from similar domains).

Strategic partnerships constantly invest in knowledge and education of their employees, offering them numerous programs for acquisition and improvement of various knowledge and skills. Realizing the significance of knowledge and permanent learning for efficient business, leading international companies started the process of establishing their own schools and even universities as special centres for learning, training and development of their existent as well as prospective employees (for example, Motorola). Trend of investment in knowledge is increasing. The most successful companies invest from 3 to 5% of their revenue from previous year in different forms of learning and education of their employees (Betz, 2001). Knowledge, seen through the prism of expansion of total perceived information, possibilities, skills and abilities that enable individual decision-making, is no longer an obligation and "privilege" of management. It is becoming an obligation and a necessity regarding all employees within one business system.

Employees will have to adjust to “deep knowledge” and specialization in their field of expertise, which is going to replace “general knowledge”, where people know a little from everything but still not enough. Permanent education and training of employees with the purpose of becoming professionals occupy a special place in that system.

4. TRANSFER OF KNOWLEDGE IN STRATEGIC PARTNERSHIPS AND CREATION OF INNOVATIONS

Acquisition and exchange of knowledge and innovations are important motives for entering strategic partnerships in which partners exchange, directly or indirectly, various forms of knowledge. Fusion of innovations is another motive for the establishment of strategic partnerships. One of the partners may bring special knowledge on business process that is crucial for achieving competitive advantage and that is harmonized with existent technological resources of other partners. Acquisition of knowledge in business fields that are not close to primary business activity of a company that entered the partnership can also stand for the motive for entering the partnership. Strategic partnerships see their business logic in the support to the process of transferring and management of knowledge among partners. The aim is to connect compatible partners that will be able to create new knowledge and exchange existent knowledge with the purpose of creating innovations. Partnerships provide partners with the possibility of acquisition, development, exchange and improvement of knowledge, which results in further growth and development of partners' companies. Intangible assets are necessary for the creation of new knowledge and result in innovations.

The concept of transfer of knowledge is often used in generic sense and it stands for any kind of intentional or unintentional exchange among individuals, teams, groups or organizations. In the process of knowledge transfer there has to exist clearly defined source, recipient and goal. Knowledge is built in organizational structures, processes, procedures and routines, which is why it is difficult to transfer it and separate it from the whole (Jennex, 2008). Certainly, the ability to transfer knowledge stands for the primary source of competitive advantage of strategic alliances.

Contrary to other resources in alliance, knowledge cannot be used up. What is more, it can be expanded. Besides, transfer of knowledge cannot be regulated by contracts. Transfer of knowledge is facilitated by intense communication and social interaction among partners. Transfer of knowledge can be described as communication among employees from one company and employees from another company within the alliance regarding specific problems (Inkpen, 2008). The problem might occur among employees who are not ready to adopt new knowledge, which hinders the process of transfer. Motivation factor is very significant for the successful transfer. Employees should be stimulated to cooperate, communicate and exchange knowledge. Partners' justified fear that the process of transfer of information and knowledge might strengthen the position and competitive advantage of one of the partners creates the necessity of the creation of environment characterized by mutual trust. Moreover, partners' constant interactions are expected to build mutual trust over time, which strengthens partners' relations and facilitates the process of knowledge transfer. Partners' mutual trust is crucial for the process of knowledge transfer.

Partners cooperate with the purpose of acquiring different knowledge that they cannot create themselves. Partnerships that use different forms of knowledge on the basis of which they realize innovative activities promote the so-called innovative behaviour. However, knowledge exchange is a complex process. It involves personal contact, experience and direct interaction so that knowledge could be shared. Problems and difficulties in the process of knowledge transfer among strategic partners occur due to (Lasserre, 2003):

- Differences in business processes, which might result in difficulties in coordination
- Differences in understanding of important terms, which might result in wrong interpretation within processes of communication or knowledge exchange;
- Different organizational cultures;
- Lack of centralized knowledge in each separate organization from which employees come.

Partnership's final goal is to contribute to the increase of innovations and improve performances at the level of entire partnership. Primary task in the process of stimulating innovations is to secure transparency of the process of innovating. It is achieved with the help of tools of interpersonal communication directed at creation of information (knowledge) as well as at their further spreading. Equally important task is to secure credibility

of innovative processes. It is achieved by inclusion of all partners in the process of selection and determination of priorities regarding innovation projects. Transfer of knowledge can be achieved through different mechanisms, such as: moving of employees, training, communication and personal relations, observation and adoption of examples of good practice, transfer of products and services, obtaining of patents, scientific and technical publications, presentations as well as interactions with suppliers and customers. Regardless of the methods that are used in the process of knowledge transfer, knowledge has to be adapted and modified so that it could be successfully applied (Stefanović, 2010). By transferring and utilization of knowledge, its value increases and the network of those who possess valuable knowledge is expanded, which creates new possibilities for utilization and expansion of knowledge.

With the aim of facilitating the transfer of knowledge among partners as well as making the way of expression of knowledge easier, specific strategies were developed. When used in practice, these strategies are combined. These are: strategy of socialization, strategy of externalization, strategy of combination and strategy of internalization (Bacera, 2004).

1. *Strategy of socialization.* Socialization stands for the transfer of implicit knowledge from one subject to another. It is undertaken with the purpose of acquiring knowledge that is related to realization of employees' routine operations. In practice, this way of knowledge transfer refers to the imitation of work procedures, work processes and behaviour in the process of realization of tasks. Transfer of implicit knowledge implies that subject that adopts knowledge should always be in physical contact with the subject who emits implicit knowledge. There is the possibility of transfer of this kind of knowledge through telecommunication channels. However, in that case, there might appear problems of misunderstanding and harm as a result of misunderstanding.
2. *Strategy of externalization.* Externalization stands for the process of transfer of implicit knowledge into explicit knowledge. It refers to codification of implicit knowledge to some permanent medium with standardized physical shape. By applying this strategy, partners' acquired knowledge is protected from the loss of accumulated implicit knowledge acquired in the previous period and saved from oblivion. This strategy saves the time period that would be used for repeating past practices in the future. Moreover, costs that are necessary for reaching the level of explicit knowledge needed for realization of some operation or task are reduced.
3. *Strategy of combination.* Strategy of combination refers to transfer of explicit knowledge into explicit knowledge. This means that existent knowledge is upgraded. Knowledge written on some medium can be the subject of interest. In combination with a new idea it results in the creation of new knowledge that can be further upgraded or that can be transferred to implicit knowledge.
4. *Strategy of internalization.* Internalization refers to transfer of explicit into implicit knowledge. It refers to practical application of knowledge. Theoretically developed assumptions of problems are verified through practical testing.

5. CONCLUSION

Changes related to customers' demand, technology, new product introduction and the like oblige strategic partnerships to learn and acquire knowledge constantly. Strategic partnerships offer the possibility of acquisition and development of knowledge through cooperation of involved partners. In that way, strategic partnerships become the source of innovative ventures.

The paper pointed to the fact that learning and knowledge stand for the basic driving force of innovations under modern business conditions. It can be seen that numerous pieces of evidence unequivocally point to the fact that the survival of strategic partnerships is conditioned by learning and acquisition of new knowledge. Partnerships that want to be successful and make progress on the market have to be innovative. Expansion of innovativeness and, consequently, achieving of competitive advantage result from the realization of the processes of learning and acquisition of knowledge. It can be stated that generative learning is of special significance for achieving innovativeness of strategic partnerships.

In order to be efficient, innovation process has to be focused on its end goal, which is reflected in introduction of new products and new processes that create competitive advantage. Innovation process is complex and requires dedication of all involved partners. Management of innovations frequently represents a challenge because it involves high degree of uncertainty, which is why it is necessary to make a selection of innovations and decide about the scope and type of innovations that will be realized. Success of this venture requires identification of the domain and scope of innovations, management of innovation process and

cooperation with partners within innovation process and the like. It can be concluded that innovations stand for the basis of survival and the basic tool for achieving competitive advantage of strategic partnerships.

Level of progress of strategic alliances is in close connection with the quality and quantity of knowledge gained, as well as with the ability to exchange knowledge among its members. Adaptation to trends, new technologies, market demands and demands set by the competition also implies acquisition of new knowledge. Within that process, employees who are open to changes and ready to accept new knowledge and experiences are of crucial importance. The process of creation of knowledge involves education of all employees, as well as distribution of knowledge among employees, teams, development groups or partners. Within this process, existent knowledge is expanded through intense communication and new ideas are created. It can be concluded that the success of partnerships depends on the effective transfer of knowledge among partners and creation of innovations.

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NEW APPLICATION AT BALANCED SCORED CARD MODEL: INDEX AND STRATEGY (CASE STUDY: IRAN SADERAT BANK)

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Abstract: *Survive and success of organization at competitive environment of contemporary world is required the contentious and suitable selection and implementation of applications that is because of change, revolution, speed, lack of insurance is from most factor and feature. These important issues are realized from design and determination of goal, strategy, programming and implementation of strategy and control and evaluation of application. Most of organizations at implementation of strategies and management of application are not successful. Research shows that this issue is not only by the incomplete define of strategy but also because of lack of suitable applied evaluate system and perfect framework for integrity and compatibility at these works. At this research time preference at 5 years strategies of Iran SADERAT bank at the framework of balanced scored cards measure for the determination of highest preference aspect. Also, prerequisite of each of strategy specify for the successful implementation of strategies. At least, Weight of four – sided model of balanced scored card has determined based on importance, at this case, indexes which have more importance at the balanced scored card of Iran SADERAT bank for success of bank have specified.*

Key words: *balanced scorecard, strategy, human resources, information technology, process, market, customer*

1. INTRODUCTION

Important change and revolution at the human's life has found various dimensions, And every day has added in its speed. Patterns of balanced scored card is strategies which can be helpful and conducive at the survey and evaluate of organizations. but this model can be representative of extent of distortion of goal and is not related to the distort from goal (changes of organizational environment and features of every organizations are different from other organizations).

However every organization is familiar with automobile in this case. automobile is required the adoption of suitable strategies from the driver for reaching to goals and passing the routes of travel. at this case, most of indexes that survey at the organizations, have not directional and meaningful relationship than strategies, but, these index are representative of warrant for management of organizations until adopt new strategy and suitable applied program for organizations.

From above matters, we understand that time at the strategic thinking and strategic programming play important role. However, existence of tools can emphasize the time and importance of indexes and strategies are necessary. Survey of possible design of active tools and factors for evaluate of applications of organization's programming is one of the points that pay attention to it.

Also, at this research, try with addition of importance of (weight), preference (time) at the BSC aspect can find the cause of distortion by identifying the distortions which can help the managers and decision makers of organizations for the finding suitable routs at the short times for the changes or correction of applied strategies and tactics.

Other important points is that sometimes we face with strategic programming by using of balanced scored card with lack of balances of applications which point out us two subjects: first: adoption of wrong goal and strategies. Second: wrong implementation of strategies or misunderstanding of their correct preferences which each of them could alone or at combination with fundamental factors to be balanced aspect of BSC. This research tries to find answers to the questions.

2. LITERATURE REVIEW

Balanced scored card (BSC), is one of the suitable and applied present tactics at performing strategies and perfect applied evaluation which describe the viewpoint and mission of organizations at the cause

and effect relationship at four financial, customer, internal process, growth and learning (human resource, unrecognized capital of organizations and informational systems) and lead to understanding of missions, applied viewpoints and ideas for whole internal and external beneficiary.

Goodstein, Nolan, and Pfeiffer has expressed at the 1992: strategic management is process from which it members of every organizations visualize the future and establish the necessary process and measures for reaching to it. (MOBAYENIDEHCORDI, 1386, page 22). In the other word, strategic management is set of designed theories and frameworks for helping to working managers, at the programming thinking and strategic measures and is related to the long term success at working of organizations. Even are tools which can through it program for future. (MOBAYENIDEHCORDI, 1386, page 22)

Strategic management is kind of decision making process which can relate the internal environment of organizations with opportunity, threats of external part of organizations which value of each of factors to be specified at the realizations of this goal s. (MIRSEPASI, 1373).

For strategic programming, there are various models at the management knowledge. Which one of the most applied of them is balanced scored card models.

Kaplan and Norton make familiar the activity of manager of organizations as a practice of airport pilot: as the airport pilot is required the petroleum, speed, air pressure, temperature degree and map of rout for the safe flight, management require the various information at the different aspect of itself and other financial criteria lonely cannot provide the adequate information about key action of organizations. Based on these factors, introduced the techniques of balanced evaluate.

Viewpoint and strategy is connected with aspect of balanced scored card. Financial, customer, process, growth and learning aspects in which balanced scored cards has introduced based on it, are related to each other as complementary and integrated process and are representative of common, motivate, inductive, and controversy image of about available situation of organizations in which should be measured from four-fold aspect of balanced scored card.

This research survey the various dimension of Iran SADERAT bank by the 5 years case study by Iran SADERAT bank in which its model has designed based on balanced scored card. The model of balanced scored card has 5 aspects which are Financial aspect, Customer and market aspect, internal process aspect, Human resource aspect and Informational technology aspect.

3. RESEARCH QUESTION

- 1) What is time preferences for implementation the strategies of IRAN SADERAT bank at the 5 years program?
- 2) How is prerequisite of implementation the strategies of Iran SADERAT bank at the 5 years program?
- 3) Do the axes and dimensions SADERAT bank at the 5 years program have same importance?
- 4) What are axes and indexes of balanced scored cards?

4. RESEARCH METHODOLOGY

Present research is applied based on the goal of research method in which scientific application is considered and based on the ways and methods of accessing the related data are measured – descriptive. Statistic community is included the employed experts at the SADERAT bank. At this research expertness is related to the people who have the master of art and even 5 years job experience at the banking.

4.1. TIME PREFERENCE AT THE IMPLEMENTATION OF SADERAT BANK

Iran SADERAT bank has strategies for reaching to its goals. These strategies have designed based on the balanced scored card models. Important issues are the time preference in which should be considered. While ignorance to these issue lead to strategies could not reach the organization to its goals. At this case, questioner which is related to the dimension of balanced scored cards of SADERA bank is given to the experts. Outcome of time preference which are related to the customer and market strategies are presented at the below:

Table 1: Time preference of SADERAT bank

Weight average	Key index of success	Strategies	Aspect	Row
5.40	Suitable Rate of deposit	Attraction of cheap resource	Market and customer	1
5.40	per cent of expiry charge	Reduce the delayed charge		2
5.40	Capitation of branch income	Improvement of branch of network	Market and customer	3
7	per cent of loyalty of customers	Focus on customer	Market and customer	4
5.20	Role of market from banking deposit	Strategies of market improvement	Market and customer	5
5.60	Ratio of coverage of personal banking	Improvement of personal banking	Market and customer	6
5.60	Ratio of coverage of firm banking	Improvement of firm banking	Market and customer	7
5.40	Ratio of coverage of personal banking	Improvement of personal banking	Market and customer	8
6.20	Ratio of coverage of international banking	Improvement of international banking	Market and customer	9
7.00	Rate of outcome of facilities and investment	Focus for outcome of facilities and investment	Market and customer	10
7.00	per cent of electrical distribution	Improvement of electrical banking	Information technology	11
8.40	Ratio of coverage of electrical card	Improvement of electrical network	Information technology	12
5.80	Ratio of integrity of process and systems	Reengineering process and systems	Internal process	13
5.80	per cent of cost of research and	Innovative management	Internal process	14
5.60	per cent of quality and quantities human	Balance of quality and quantities human resource	Human resource	15
6.60	per cent of satisfaction of staffs	Insurance of working level of staffs	Human resource	16
5.00	per cent of organizational learning	Identification as a learned organizations	Human resource	17
6.00	Applied outcome of staffs	Applied and moral Elevation	Human resource	18
6.40	Market and customer		Financial	19
7.80	Information technology		Financial	20
5.20	Internal process		Financial	21
5.60	Human resource		Financial	22

As seen in the above table, average of time preferences at every strategy and even result are representative of preference of experts has specified at every low, average, high .

4.2. PREREQUISITE AT THE TIME PREFERENCE STRATEGY OF SADERAT BANK

Every of strategies has prerequisite to be implemented. At this case , there are strategies in which are dependent to other strategies and when implementation of prerequisite don't start , there aren't strategy for realizations of them . So prerequisite of strategies are important for implementation of them. In which organization should pay attention to them for better realization of goals.

At table 2: prerequisite of each strategies of SADERAT bank has presented. With attention to the below table , can understand which of strategies of SADERAT bank are precedent on other strategies of balanced scored card .

Table2: Prerequisite strategies of SADERAT bank

prerequisite	strategy	row	Aspect
14,9,8,7,4,4,3,5,4	Attraction of cheap resource	1	Market and customer
13,10,10,3,4,7,	Reduce the delayed charge	2	Market and customer
11,9,8,7	Improvement of branch of network	3	Market and customer
12	Focus on customer	4	Market and customer
13,8,5,5,4	Strategies of market improvement	5	Market and customer
13,7,5,5,4	Improvement of personal banking	6	Market and customer
12,1,5,4	Improvement of firm banking	7	Market and customer
14,1,1,2	Improvement of personal banking	8	Market and customer
13,3,12,12	Improvement of international banking	9	Market and customer
18,4	Focus for outcome of facilities and investment	10	Market and customer
15,14,14,7,14	Improvement of electrical banking	11	Information technology
16,11	Improvement of electrical network	12	Information technology
14,2,1,18	Reengineering process and systems	13	Internal process
21,15,5,15	Innovative management	14	Internal process
13,9,15	Balance of quality and quantities human resource	15	Human resource
21,15,5,15	Insurance of working level of staffs	16	Human resource
13,9,15	Identification as a learned organizations	17	Human resource
17,16,12,10	Applied and moral Elevation	18	Human resource
12,4,5	Market and customer	19	Financial
15,11,12	Information technology	20	Financial
13,124,22,20,14	Internal process	21	Financial
16,5,15	Human resource	22	Financial

4.3. RESEARCH ABOUT DIFFERENCE OF IMPORTANCE OF AXES OF BALANCED SCORED CARD MODEL

For determine of difference of importance of axes of balanced scored card model of SADERAT bank has used the FRIDMAN test.

Theory 1- axes of balanced scored card model of SADERAT bank have not same importance.

Theory H0: axes of balanced scored card model of SADERAT bank have same importance.

Theory H1: axes of balanced scored card model of SADERAT have not same importance.

Table 3 show the average of expert degree about the axes.

Table3: Table of ideas of experts toward axes

	Mean bank
Financial aspect	B1 3.81
Customer and market	B2 2.69
Information technology	B3 3.25
Human resource	B4 2.47

With attention to above table, observed that ideas of experts toward axes are different. Even presented for survey of meaningful difference between various group of experts and meaningful difference of test are provided at the table 4.

Table 4: Result of FIRMAN test about axes of balanced scored card

N	16
Chi-Square	11.327
Df	4
Asymp.Sig	.023

As you see at the above table, meaningful level 0.023 has received. And is representative of meaningful difference between different groups and theory H0 reject and theory H1 confirm. As result axes of balanced scored card of SADERAT bank have not same importance.

At this case, for determination the difference at the index of every model at balanced scored card of SADERAT bank, related theory has tested by FRIDMAN test. And in all of the theories, theory H0 reject and theory H1 confirm. At result, can say that index of each axes have not same importance.

4.4. IMPORTANCE OF INDEX AND AXES OF DIMENSION OF BALANCED SCORED CARD MODEL:

In order to determine of main index and aspect of balanced scored card model of SADERAT bank has used the proximal techniques of social curve. Because of decision matrix is not available. So couple comparison has used by experts. So gathering of questioner of couple comparison has used the geometry average for determine of elements of decision matrix.(decision matrix which resulted from geometry average bring continuously.)

For determination of rate of compatibility and weighting of criteria has used from selected expert software. And weight of aspect and index of balanced scored card model has expressed. Table 5 is representative importance of different aspect of BSC from viewpoint of SADERAT bank experts. Rate of compatibility of matrix has received by the Expert Choice software at the 0.09. Therefore recent matrix has compatibility.

Table 5: Couple comparison matrix about axes of balanced scored card

Comparison matrix	Financial	Market and customer	Internal process	Information technology	Human resource	Weight
aspects						
Financial	1	2/88	3/00	1/93	2/21	0/383
Market and customer		1	2/85	3/34	3/03	0/271
Internal process			1	2/26	3/59	0/143
Information technology				1	2/23	0/084
Human resource					1	0/119

Received Decision matrix, is related to financial index of balanced scored card model which presented at table 6. Rate of compatibility for this Matrix by using selection expert software is received at the 0.09. Therefore present matrix has necessary compatibility.

Table 6: Couple comparison matrix about financial index

FINANCIAL	A	B	C	D	E	F	G	H	I	Weight
A Outcome of rights of stock occupier	1	5.60	4.59	3.14	4.04	2.74	3.67	4.00	4.54	0.318
B Whole income		1	2.70	2.73	1.99	2.53	3.49	4.04	4.63	0.167
C Outcome of property			1	4.68	3.67	3.63	3.71	2.41	5.32	0.100
D Capitation of personnel income				1	2.35	1.99	1.50	1.68	1.81	0.084
E Margin of perfect profit					1	4.04	4.79	4.63	4.08	0.115
F Lever proportion						1	4.44	4.04	3.17	0.083
G Proportion if profitable property and whole property							1	4.44	3.75	0.066
H Proportion of visual deposit and saving to whole deposit								1	2.62	0.038
I Rate of suitable deposit									1	0.028

Decisions matrix is related to index of market and customer of balanced scored card at the table 7. Rate of compatibility for the matrix by using the selected expert software has received at 0.1. So present matrix has necessary compatibility.

Table 7: Couple comparison matrix about customer and market

Market and customer	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
A Rate of role of market	1	3.4 1	3.0 0	4.3 1	2.0 5	1.9 4	2.9 1	4.2 1	2.5 4	2.5 9	2.5 9	2.9 7	3.2 7	2.0 3	2.4 1	.15 0
B Capitalization of branch income		1	2.4 6	3.5 2	1.9 9	1.8 1	2.9 1	4.3 5	4.0 8	3.3 4	3.5 6	3.0 0	3.9 1	1.9 3	3.2 3	.12 9
C Percent delayed charge			1	2.1 5	1.4 6	1.3 6	1.9 7	1.5 3	2.1 0	2.5 1	2.4 1	1.7 9	1.2 2	1.7 3	2.0 3	.07 6
D Rate of deposit				1	1.9 9	1.8 7	2.2 8	1.9 6	2.2 8	1.6 6	1.2 8	1.8 7	1.5 1	1.3 2	2.6 8	.07 3
E Index of loyalty of customer					1	3.6 7	5.6 0	5.2 4	3.7 2	3.2 0	4.2 1	3.9 9	3.8 7	3.5 9	3.0 7	.12 6
F Rate of holding of customer						1	4.6 8	6.1 0	3.8 3	3.2 1	3.3 0	4.5 3	4.6 8	4.0 4	3.5 2	.10 8
G Rate of employing of customer							1	2.3 5	2.0 5	1.7 2	1.7 9	2.1 2	2.1 4	1.7 3	3.3 0	.05 0
H Rate of attraction of human resource								1	2.8 8	2.8 8	3.3 0	3.3 4	1.6 1	1.9 3	2.5 1	.05 2
I Proportion of liquidation to number of branch									1	2.7 0	2.4 6	2.5 3	1.6 8	1.3 5	2.0 8	.04 2
J Ratio of coverage of personal banking										1	1.5 6	1.4 8	2.1 9	1.4 6	2.5 3	.03 6
K Ratio of coverage of personal banking											1	1.3 9	1.8 7	1.7 9	3.5 6	.03 4
L Ratio of coverage of firm banking												1	1.8 9	2.1 0	4.3 5	.03 5
M Ratio of penetrate at international market													1	2.4 3	4.3 5	.03 4
N Percentage of key customer														1	3.2 3	.03 3
o Percent of implementations of relationship with customer															1	.02 1

Decision matrix is related to index of internal process of balanced scored card at the table 8. Rate of compatibility for the matrix by using the selected expert software has received at 0.09. So this matrix has enough compatibility.

Table 8: Couple comparison matrix about process index

Internal process	a	b	c	e	f	g	h	
A Percent of cost of research and development	1	2.57	3.13	3.30	2.88	3.30	3.49	.298
B Percent of integrity of systems		1	4.08	3.79	3.79	2.79	3.59	.267
C Percent of management process of reengineering			1	3.10	5.37	4.08	2.35	.157
E Percent of reengineering of fundamental process				1	4.35	3.48	2.14	.113
F Percent of fundamental support of reengineering					1	2.88	1.73	.068
G Rate of presented innovative						1	2.21	.048
H Rate of compatibility and integrity of systems							1	.050

Decisions matrix is related to index of information technology of balanced scored card at the table 9. Rate of compatibility for the matrix by using the selected expert software has received at 0.09. So present matrix has necessary compatibility.

Table 9: Couple comparison matrix about information technology index

INFORMATION TECHNOLOGY		A	B	C	D	E	F	G	H	I	J	K	L	M
A	PER CENT OF ELECTRICAL DISTRIBUTION	1	3.13	3.07	4.26	3.30	2.43	4.08	2.19	2.33	2.51	1.66	3.23	3.13
B	PER CENT OF GROWTH OF DISTRIBUTION OF ATM		1	3.23	3.07	3.64	2.51	3.30	4.63	3.10	3.45	3.34	3.56	2.73
C	PER CENT OF DISTRIBUTION OF SALE TERMINAL			1	3.79	3.67	2.51	3.27	4.21	2.88	3.49	3.64	4.99	2.59
D	PER CENT OF DISTRIBUTION OF WEBSITE				1	2.21	2.68	2.79	3.52	3.10	3.63	3.38	3.10	3.07
E	PER CENT OF DISTRIBUTION OF MOBILE BANK					1	2.68	2.91	2.68	2.19	2.88	3.41	3.20	3.10
F	PER CENT OF EMPLOYING INFORMATION INTERNAL SYSTEM OF BANK						1	2.62	3.00	2.41	3.91	3.10	2.88	2.05
G	PER CENT OF SUCCESSFUL CALLS WITH RELATIONSHIP CENTRE OF CUSTOMERS							1	2.14	3.20	2.62	1.97	2.35	2.62
H	RATIO OF COVERAGE OF ELECTRICAL CARD								1	3.13	2.73	3.56	3.83	2.79
I	TIME OF ISSUANCE THE CARD									1	2.76	3.00	3.34	2.51
J	PER CENT OF GROWTH OF FIRM CARD										1	2.07	1.91	3.20
K	PER CENT OF GROWTH OF PERSONAL CARD											1	3.00	2.82
L	PER CENT OF GROWTH OF CREDIT CARD												1	2.31
M	PER CENT OF GROWTH OF SEPEHR CARD													1

Decision matrix is related to index human resource of balanced scored card at the table 10. Rate of compatibility for the matrix by using the selected expert software has received at 0.1.

Table10: couple comparison matrix about human resource index

Human resource		a	b	c	d	e	f	g	h	i	j	k	i	m	N	
A	per cent of balance of quality and quantitative human resource	1	2.66	2.04	4.58	3.39	3.35	2.57	2.66	2.04	3.39	3.15	3.47	3.08	3.23	0/142
B	per cent of implementation of management program of human capital	1		3.27	3.23	4.42	3.39	2.63	2.73	2.11	4.02	2.86	2.89	2.73	3.35	0/128
C	per cent adaptation employed with post	1		2.86	3.00	4.99	3.51	2.09	3.51	4.99	3.39	3.19	2.36	4.76	0/129	
D	per cent relationship with retirement	1		1.35	2.27	2.09	2.54	3.27	2.76	2.76	1.74	2.19	2.63	0/074		
E	per cent relationship staffs with management system	1		2.09	3.43	2.04	2.33	4.93	2.27	2.11	1.94	4.93	0/088			
F	per cent with administrative wrong doing	1		3.00	2.36	2.17	2.79	1.72	1.35	1.37	3.11	0/064				
G	Per cent of coverage of health of staffs.	1		2.70	2.11	2.86	3.35	1.99	3.73	0/69						
H	per cent of compensate serving regime	1		2.76	1.66	2.79	3.16	3.31	4.02	0/068						
I	per cent of the tendency of staffs to staying at job	1		3.60	1.85	2.57	4.21	2.56	0/058							
J	per cent of the non – presence training	1		1.85	3.23	2.45	2.33	0/041								
K	Applied outcome of staffs	1		2.86	2.27	5.12	0/043									
L	per cent of organizational learning	1		4.32	3.73	0/040										
M	per cent of the contribution of staffs at the self- governing	1		3.92	0/036											
N	Capitation of documented experience	1		0/021												

5. CONCLUSION

Result of research of time preferences at the 5 years perfect strategies of SADERAT bank shown that between strategies of market and customer at SADERAT bank , strategies of focus on customer and focus on outcome of facility and investment have highest level of time preferences . at the information technology , information technology , strategies of improvement electronic network has highest level of time preferences.at the internal process ,of reengineering strategies of process and systems , and innovative management have same time preferences. At the human resource, strategies of insurance of working level of staffs have highest level of time preferences.financial aspect of is studied from another aspect that is according to balanced scored card model of SADERAT bank for realizing the financial goal of other aspect in which as fundamental strategies has surveyed. Based on this case, from view point of experts of SADERAT bank, information technology hashighest levelof time preferences.

With attention to related research and analysis can express the time preferences as below table. As seen at the above table, strategy of improvement of electrical network has highest time preferences between other strategies.

Table 11: Time preferences of whole strategies of SADERAT bank

STRATEGIES OF TIME PREFERENCES	12- IMPROVEMENT OF PERSONAL BANKING
1-IMPROVEMENT OF ELECTRICAL NETWORK	13- IMPROVEMENT OF FIRM BANKING
2- INFORMATION TECHNOLOGY	14-BALANCE OF QUALITY AND QUANTITATIVE HUMAN RESOURCE
3- FOCUS ON CUSTOMER	15- HUMAN RESOURCE
4-FOCUS ON OUTCOME OF FACILITY AND INVESTMENT	16- ATTRACTION OF CHEAP RESOURCE
5- IMPROVEMENT OF ELECTRICAL BANKING	17- REDUCTION OF DELAYED CHARGE
6- INSURANCE OF WORKING LEVEL OF STAFFS.	18- IMPROVEMENT OF BRANCHES OF NETWORK
7-CUSTOMER AND MARKET	19- - IMPROVEMENT OF PERSONAL BANKING
8- IMPROVEMENT OF INTERNATIONAL BANKING	20- STRATEGIES OF IMPROVEMENT OF MARKET
9- APPLIED AND MORAL ELEVATION	21- INTERNAL PROCESS
10- REENGINEERING OF PROCESS AND SYSTEM	22- IDENTIFICATION AS A LEARNER ORGANIZATION
11- INNOVATIVE MANAGEMENT	

Recent result of determination of prerequisite is seen at the table 2. From important issue should pay attention to it is that with determination of prerequisite of strategies is not shown higher time preference. and this prerequisite are time- dependent .means that if organization to be successful at one time preferences , may change the prerequisite or become prerequisite of another strategy . Even relational prerequisite are not related to the time preferences with implementation of strategies but also their relation is cause and effect.

Determination of degree of importance of five index of balanced scored card that is representative of implementation of strategy of SADERAT bank that show the time preferences of something insure the continuation of program . in which are attention to the indexes from AHP couple comparison matrix that have most degree of importance.

At this case, based on the result of degree of importance of index , fundamental index of each of balanced score card model are following:

- ✓ Most important index of balanced score card model = financial aspect
- ✓ Most important index of financial aspect = outcome of right of stock occupier
- ✓ Most important index of customer and market = rate of proportion of market.
- ✓ Most important index of internal process= per cent of cost of research and improvement.
- ✓ Most important index of information technology = per cent of electrical distribution.
- ✓ Most important index of human resource= per cent of balance of quality and qualitative human resource.

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GLOBALISATION, INTERCULTURALITY AND NEGOTIATIONS

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Abstract: *The main goal of this paper is to underline the importance of the manager's preparation for negotiations. Though negotiation can easily be considered as one of the oldest human activities which we also use today it on a daily basis, both in private and business interaction, its research in academic circles started relatively late. First research in this field appeared in the late 1960s. From then on, negotiations are in the focus of theoretical experts in different fields, who examine various aspects, such as social, behavior, communication, ethic, law, cultural and economic aspects of negotiations.*

Keywords: *globalization, interculturality, management, negotiations*

1. INTRODUCTION

There is no doubt that numerous negotiation abilities and skills are required as well as adapting to other cultures is strongly connected to human relations, especially on the international level. It is necessary for a negotiator to adapt his/her behavior to cultures of the people he/she is doing business with.

Adapting to other cultures means introducing the negotiator to the facts that may be of great importance. If the negotiator knows that he/she will be doing business with the people who belong to a different culture, he/she needs to gain knowledge about history, customs and habits of that culture.

In international negotiation we need to be aware of various elements of the culture of each country, as well as what we need to do in order to adapt to that culture, avoiding behavior which is based on false understanding or prejudices. The main reason for those false understandings of other cultures, so called "ethnocentrism", is a belief of one social group that its ways of behavior are the best possible. The transition towards market economies in countries which are closed, protectionist, and centralized economies, influences that the model collision is not formed around ideological issues, but around culture. The benefits from knowing other cultures are: maintaining relationships easier and communication with foreign clients, easier understanding of the attitudes of people that we negotiate with, assistance in understanding of the people who belong to different cultures, avoiding mistakes which might put negotiations in danger, gaining of certain identity on a personal or entrepreneurial level, motivation of the employees to work in branches in foreign countries.

2. CULTURE AND NEGOTIATION

In real life situations, it is astonishing how people of different countries can act differently. According to that fact it is not possible to do business in a foreign country in the absolutely same way as we do it in our home country. It is generally known that the perception of business is different from country to country and that there are great cultural differences which need to be overcome in order for the business to be done properly. There are many ways to find out about other cultures, for example via various literatures, or through conversations, while nowadays the main source of information about other cultures is the internet. In many companies there are different ways of training for intercultural interactions. This training encompasses introduction of facts as history and religion, social and political environment, business practices, economy, tourism, etc. Religion is very important in daily life of all Islamic countries, especially in the Middle East. In certain cultures, it is very offensive to look women in the eyes, and in some other cultures, even a hand shake is not an acceptable way of greeting.

When a negotiator gets introduced to a different culture, his/her work does not stop there, because he/she needs to get prepared to accept the differences that he/she comes across, and to be able to adapt his/her

behavior if visiting a foreign country. Therefore, he/she needs to respect the norms, to adapt to differences, but also to keep his/her own identity.

Negotiation with a foreign culture creates a better working environment and a more relaxing working atmosphere, which helps in achieving better results and reaching the business goals. It will leave a positive impression on a person you do business with if you have put an effort in finding out about the culture of his/her people and the facts that might be useful. This is one of the ways of building a style of a business negotiator, since one of the characteristics a negotiator needs to possess is the ability to adapt to other cultures. On the other hand, the negotiator needs to be motivated in order to prepare for the meeting with the members of other cultures, and to know that it will be useful for him/her, it will make it easier for him/her and the foreign partners, and that he/she will leave a good impression and gain respect from the other negotiating party.

One of the first authors who analyzed the effects of culture on international businesses was R.T. Hall. He started from the term “context”, which is a set of information which is collected during a meeting and which is closely related with the circumstances under which that meeting is held. Based on the context in which the negotiations are held, we can differentiate two cultures:

1. Cultures of “low context”. These are the cultures which use clear and specific verbal and nonverbal forms, with complete grammatical terms and with no subjective judgments. Speaker mostly speaks about what they want to say. The members of these cultures value clear, direct and precise information – the less there are dual meanings and uncertainties, the better. This type of communication is typical for the Western, Anglo-Saxon countries, like the United States of America, Great Britain and Germany.
2. Cultures of “high context”. In this group of cultures information is unclear: behavior and circumstances are more important than verbal expression itself. A greater part of information is expressed through the behavior of the speaker, than through the verbal messages he/she sends. This type of communication is focused on people and their feelings and it is typical for the cultures, such as ours, Arabic, Latin and Japanese.

The world is not divided into cultural blocks which can be clearly defined or which coincide with the country borders. Most international negotiators are more focused on geographic regions than on specific countries, especially if those countries are small. It is common to say: “I will do business in Latin America or in Eastern Europe.” In most cases the styles of negotiation are grouped in six large geographic regions: Europe, North America, Latin America, Arabic countries, Asia and Africa. Comparison of cultural models of negotiation styles is seen through five aspects:

1. Use of time (punctuality in the meetings; orientation towards past, present and/or future; the pace of negotiations...),
2. Personal/professional relations,
3. Rules of communication (how to transmit messages, is it a question of verbal communication only or is a nonverbal communication present as well)
4. Consession and agreements (the moment in which the most important concessions are made is analyzed, also the ways in which agreements are made),
5. Decision making.

In this paper the European, Asian and Arabic model of negotiation will be examined.

3. COMPARING CULTURAL MODELS IN THE PROCESS OF NEGOTIATIONS

There are numerous examples of differences in doing business while taking the influence of culture into consideration and the following review will further illustrate this diversity in examples of several countries and how their local cultures affects the business or decision-making process.

Europe

The use of time has a strictly defined meaning to northern and central Europeans. Meetings begin and end when agreed. Topics are pre-planned. When the meeting is going as pre-planned, the satisfaction is greater and the involved parties are considered more professional. In the Mediterranean part of Europe the concept of time is more flexible and meetings are not planned in such detail. The main topics are more important than the time constraints. When negotiating with people from Eastern Europe, they most often refuse to talk about long-term goals. The time span of business negotiations is mainly present, or within the next year or two.

Personal/professional relations. In Europe the quality of life is valued, consisting of family life, leisure and rest, which all comprise a person's personal life. Personal relationships are kept outside the business environment. European management does their work according to the rules of the company and do not involve their own personal issues and opinions in doing business. The business relationship between the negotiators is very important. Features such as social status, education at prestigious business schools or some knowledge of sports (especially golf) is valued.

The rules of communication. Communication style is very different from one European country to another. The British are usually indirect and cautious and use their sense of humor well. The French have a more direct style, sometimes even with loud conversations, having intellectual discussions. Germans are serious, they try to maintain a distance from all involved parties. Communication is much livelier in Mediterranean Europe, often using non-verbal communication. There are big differences between the Eastern Europeans, ranging from the indirect and shy behavior of Czechs, to the direct and emotional behavior of Russians and Poles. Generally communication in Europe is formal.

Concessions and agreements. The starting positions in the negotiations are defined depending on the power of the negotiating parties. European negotiators feel comfortable in situations of conflict. It is common to criticize the arguments of the opposing party. Concessions are made bit by bit, throughout the negotiation process. If by the end of the talks, positions have not been synchronized, the more powerful party will impose a one-sided agreement and will not make any other agreements of the great importance for further progress.

Decision-making. In Europe, decision-making is generally based on hierarchy, although the structure of enterprises is very different from country to country. In Germany the decision making process is slower because the control of the company is held by councils made up of shareholders, employees and management. In the Netherlands the company managers have greater negotiating powers which make the process quicker. In Mediterranean Europe, it is common that a company is controlled by a small number of people. Decision-making in Eastern Europe is usually a long and incomprehensible process for foreign negotiators. It is necessary to always confirm the arrangements with each level of management in enterprises.

The use of time. In developed areas of Asia executives work in M time, which means that each job is done separately. Accuracy is highly appreciated. Orientation is generally long term, so there is a great interest to know the company and the people at workplace. With reference to this the negotiations are long-term. A foreign negotiator must be patient and not to impose negotiations regarding prices and delivery conditions. In high-level negotiations much time is devoted to social activities (meals, shows, etc.), but this does not mean it will make closing the deal easier. As soon as there is a business relationship between two local companies a job being done with foreign partners will be transferred to the domestic ones.

Personal/professional relations. Achieving adequate business and professional relationships in Asia is a basic requirement for doing business. The dependence that exists between government, public companies and large companies creates a network of relationships that is difficult to get into. In Asian societies professional relationships are more important than personal ones. Introductions and making contacts are made at the official level.

The rules of communication. For citizens of Asia courtesy is the general rule of conduct, especially towards those who are not part of their group, which includes foreign negotiators. Verbal messages do not have the same meaning as in the West. In China, a "yes" does not mean agreement, but only a desire to appeal to the opposite side, in order to resume negotiations. In Japan, the term "think about it" certainly means that the proposal was not accepted. Language is controlled and indirect, a low tone of voice is used, and discussions with looking directly at the counterparts in the eyes are avoided because it can be considered aggressive.

Concessions and agreements. It is believed that negotiations make up entity more than concrete agreements. The main topics are discussed throughout the process, bearing in mind that this is usually done by large firms which wish to obtain all possible information before making a decision. Since decisions are made by consensus, it is easy to assume that the negotiation process will be long and that the agreements are made primarily at the end. Contracts signed do not have the same value as in the West. In China, a contract means the beginning of relationships that will be constantly examined and re-negotiated, rather than the highlight of the negotiation process. For the Japanese, a contract means the bare minimum of agreement that can be expanded or changed if circumstances change.

Decision-making. In large Asian companies the structure is very hierarchical, with multiple levels of decision making. Lower-level managers need to report to their supervisors and prove their ability to achieve a good agreement. Agreements are realized quickly.

The use of time. Arab culture is oriented on the past, traditions and customs are honored, as opposed to the changes and progress. During a month, all kinds of jobs are suspended, so that people dedicate their time to prayer. For Muslims time is in God's hands. Past, present and future are according to God's will. This is why there is great uncertainty in fulfilling short-term agreements. Accuracy is not a highly valued quality. Foreign negotiators must be very patient and flexible in their use of time. Any display of impatience is badly interpreted and may prevent a foreign negotiator from achieving goals and creating a network of contacts in the country.

Personal/professional relations. Arab negotiators have a value system in which personal relationships are put ahead of professional ones. For them, the most important personal relationships are family "blood ties". Making contacts within a certain enterprise through a family member of the company owners can be crucial for a good outcome of the negotiation. For Arabs, the financial gain is a consequence of establishing good and solid trade relations with foreign partners. Arabs show great hospitality at business meetings. They offer coffee, tea, soft drinks and food, which the negotiator should accept. Also, exchange of gifts is customary.

The rules of communication. The Arab culture is very formal in introduction. The meeting begins with rather complicated greetings, during which people are introduced according to titles, business cards are exchanged and inquiries made about the trip, hotel, impressions of the country, and so on. In a culture of "high context" such as this, non-verbal communication is very important. Gestures are semi-dramatic, so to speak, the language is exaggerated, as are the meaning and tone, and looking directly in the eyes is essential. People sit very close to each other and a sign of good manners is to touch the person with whom you are talking. Personal questions should be avoided in talks as well as discussions about politics and religion. The tone of voice demonstrates the social position and family influence of the person speaking.

Concessions and Agreements. Bargaining is a common way to reach an agreement in Arabic countries. Negotiators who know how to bargain are very respectable, if they are polite and do not offend anyone in the process. It is hard to evaluate verbal agreements. A verbal "yes" is very uncertain. The contracts are more of a starting point of a relationship that needs to grow stronger in the future, rather than the final step or the outcome of successful negotiations. Goals, deadlines, prices, etc., are discussed in detail based on further circumstances.

Decision Making. The structure of power in Arabic enterprises is very hierarchical. The decisions are made by the general manager of the company. Therefore, the foreign negotiators will sooner or later have a conversation with the head of the company or organisation. It should be kept in mind that the highly ranked executives do not possess the knowledge of specific fields or technical profile. They make decisions based on strategic and personal details, rather than proposals and agreements suggested. The bosses are like fathers to their employees, they look after them, in return for loyalty and trust.

Based on all of the above, we can come to the conclusion that the differences in business cultures are evident and that respect is necessary during the business negotiation process. Cultural globalization is an encounter of different cultures and customs. The flow of goods, capital and people across the borders brings also a flow of habits, customs and cultures. This process often initiates different reactions among different people. Some consider the effect of a new culture as a positive development that enriches the existing culture, while others see it as a threat to the national values and rules.

4. CONCLUSION

Though negotiation is exceptionally old social and business activity, as old as trade, throughout history it didn't receive too much space in research and expertise. Learning about negotiations as an interdisciplinary phenomenon started only in the sixties of last century. Throughout that relatively short span of time, theoretical experts have underlined different aspects of this way of social and business communication. However, in spite of different stages and change in environment that demanded different approaches in negotiating, many experts agree that negotiating is made up out of certain number of phases.

For each and every of this phases, it's possible to extract and certain elements that can lead to successful outcomes. Negotiation skills are thus not be looked at as a God given talent, because it is by itself quite worthless. Successful negotiating lays in knowing verified theory and negotiation experience. Negotiating should be looked at as one of the key business processes that add value to the company, but for both the buyers and other business partners. Such approach towards negotiating is still in a very early phase at Serbian companies. A large number of managers at high positions are members of negotiating teams, and they consider communication skills as a key asset when recruiting new team members. A large number of negotiators can use a clear and comprehensive language when negotiating. It is important that confronting parties understand each other's stand points, goals, desires, and distance to which they may be willing to go when compromising. This understanding comes out of the communication and the solid standing grounds. This position must be communicated in clear and understandable language, with no hidden meanings. Non verbal communication helps in clearing out possible misunderstandings and doubts. It is also important to read non verbal signs of both sides for successful negotiations, as it sometimes may speak more than words. All of this only confirms the staring hypothesis that communication enhances chances for successful negotiations.

There are no successful negotiations without sometimes long and thoroughly preparations. These preparations include identification of subjects and structure of negotiations. Inexperienced negotiators often think that cusses of negotiations is in the ability to persuade someone, being quick on the answer, intelligently change the way of the conversation, being eloquent, etc.

Even though all the above qualities can certainly help the negotiations process, the true key lays in preparations before the interactive process between the sides, especially in the light of understanding cultural differences.

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STRATEGIC MANAGEMENT AND HUMAN RESOURCES

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Summary: Modern business environment puts the organization to new challenges that must be included in the strategic management of the organization. The main changes are related to the process of globalization and all what it brings. By defining its strategy, the organization tries to achieve its long-term goals taking into account characteristics of the external environment, relying on its own strengths and taking into account its own weaknesses. The key resources of today's organizations are human resources. *In order for an organization to be successful, human resource management must be closely linked to business strategy.* Human resources can be a primary source of competitiveness *as well as* a key weakness of an organization. Under the present conditions, organizations that operate globally *usually* move their capital because of these resources, because they are in some parts of the world cheaper or *they have* a better quality than in others. In the future, to get quality and talented employees will be increasingly difficult. Many suggest that a battle for talent among organizations is yet to come. However, what appears as a question is how many organizations are aware of the importance of human resources and *how* many of them are thinking about it as a strategic resource *today and* in the future. Conducted studies show that many organizations still do not have necessary talent for their business strategy implementation *and that the talent gap is one of the top three risks in achieving business strategy.* In order to confirm the importance of this relationship, the paper will rely on a part of the research conducted by Manpower Inc. during 2010.

Key words: *strategic management, globalization, human resources, competition*

1. INTRODUCTION

In each organization human resources should be managed in a way that is congruent with organizational strategy. The major objective of the human resources management should be to integrate decisions about people with decisions about the results an organization is trying to obtain or with the strategic objectives of the organization.

For company is crucial to identify skills necessary in the future and then rapidly develop a critical mass of employees with those skills. In order to survive in a competitive market, companies will need to ensure timely development of new skills of employees, or to attract qualified workers (Cvetkovski, Cvetkovska Ocokoljić, Babić, 2010).

In the new economy, everything becomes global. Employees move and work is moving too. Organizations set up operations near new markets and sources of supply. Unemployment is persistently high in developed and even in many developing countries, yet organizations worldwide report difficulty filling key positions. Simultaneously, employers are seeking ever more specific skill sets and combinations of skills that will help drive the organization forward. Propelling the movement of talent around the world are widespread demographic changes—in particular the big gap in population growth between developed and developing countries. So how should employers respond to the forces of talent mobility? Many see it as an opportunity to cut labor costs and elevate their skills mix. Others see it as a threat to their hold on their best talent. Of course, employers have only limited control over the factors that determine where workers work, and why (www.manpower.com).

The pressure to find the right skills in the right place at the right time will increase in the future. This will happened because working age of populations will decline, emerging markets will farther rise, and the nature of work will change. Therefore, it is considered that the greatest treasure of an organization would be its employees, their knowledge, abilities and skills and the process of forecasting and talent mobility planning will become an integral component of the business planning process.

2. STRATEGIC MANAGEMENT AND NEW ENVIRONMENT

Derived from the ancient Greek word *strategos*, the word „strategy“ originally referred to the „art of the general“. Strategy has very strong military roots, the word itself dating back to around 500 BC with the work of Sun Tzu, a Chinese military strategist. The application of the principles of military strategy to business competition, known as strategic management is a more recent phenomenon, developed since the 1960s (Peng, 2009).

Some authors say that the strategy is the company's game plan. In the broadest sense, the strategy is the term used to describe someone's long-term plan and activities aimed at achieving a certain goal. A good strategy takes into account all relevant internal and external elements of the business.

Figure 1 presents the basic elements of mission and strategy, formal structure and human resource management as interrelated systems that are embedded in the turbulent environment. Today, firms should include human resource management as an integral tool in defining and implementing their strategy.

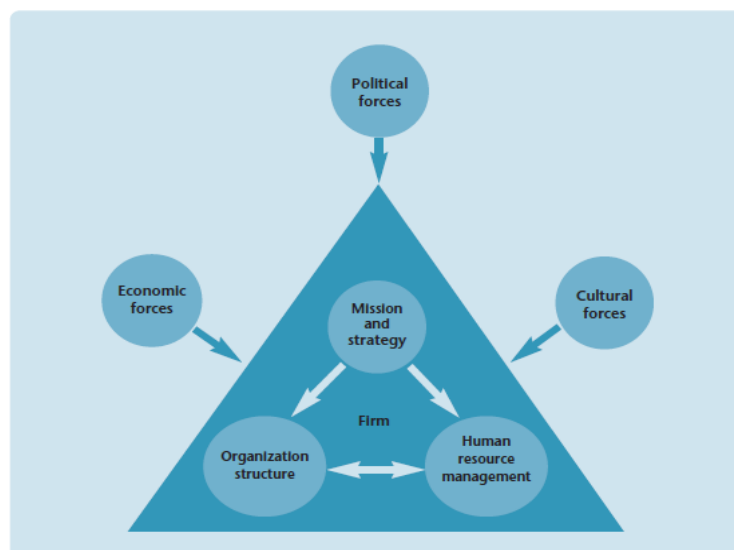


Figure 1: Strategic management and environmental pressures (Fombrun, Tichy, Devanna, 1984)

Internet and information technology have changed the nature of the business and competition, because the information can be easily exchanged, there is electronic commerce, it is possible to conduct meetings, although participants of the meeting are not in the same place etc. Power of buyers has increased. They influence the reduction of prices, demand higher quality or better service and they are turning competitors against each other.

Knowledge and continuous learning are critical elements of success today. New economy led by those who effectively manage knowledge - who create, discover and combine the knowledge in order to create new products and services faster than competitors. Because of that companies require special skills of employees. Also, the state borders are not a problem for companies looking for the best employees so here we can talk about the global labour market. All this increases the mobility of employees.

Various aspects or segments of the environment that should be analyzed are: demographic, socio-cultural, political-legal, technological and economic segment, but globalization is present in all of these segments and it is considered as a basic characteristic of today's business environment.

Being strategic, means have clear organization's objectives, being aware of the organization's resources and responsive to a dynamic environment.

3. CONNECTION BETWEEN STRATEGIC MANAGEMENT AND HUMAN RESOURCE MANAGEMENT

The basic goal of human resource management (HRM) is to have the right man, on the right place, at the right time. To have something like that, it is necessary to conduct activities such are: human resource

planning, recruiting, selecting, socialization and orientation, training and development, performance appraisal, compensation and benefits, career development etc.

The importance of the effective management of people as a source of competitive advantage, encouraged people to talk about strategic role of human resource management in today's business organizations. All organisations on the global market compete in order to be more successful, and their success depends to a large extent of their capabilities to attract, develop and keep the key employees.

Human resource planning is considered as an integral part of strategic business planning process. Actually, between human resource planning and strategic business planning exists a strong link. Providing the necessary number of people with appropriate skills and qualities enable achieving the strategic goals of the organization (Jovanović Božinov, Kulić, Cvetkovski, 2008).

In the HR planning it is important to mention the internal and external labour offer.

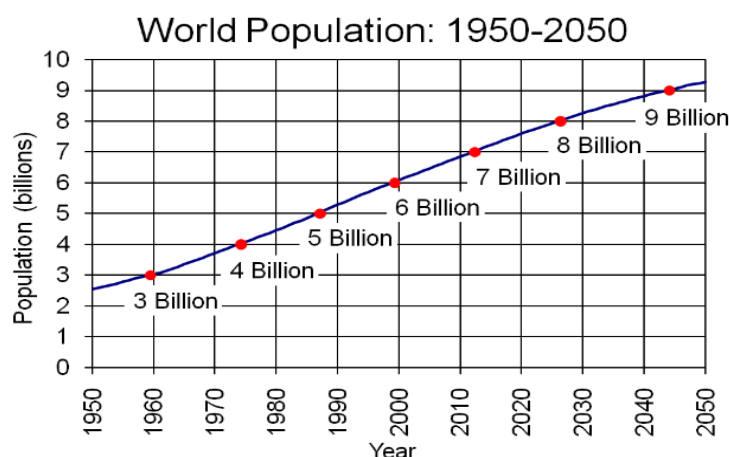
- ❖ Internal offer includes all employees in one organization. Internal labour offer is constantly changing because new people come into the organization, and the other are leaving for various reasons.
- ❖ External labour offer is related to the labour market from which the employer normally recruits professionals for positions in the organization.

Today, in order to highlight the strategic importance of human resource in practice is in use the term strategic human resource management. The main objective of strategic HRM is to link HR practices with business strategy. But in practice is also in use the term International HRM, linked to the globalization of business and focused on issues associated with the cross-national transfer of people.

4. WHY ORGANIZATIONS NEED GLOBAL APPROACH TO HUMAN RESOURCES?

People are the main resource of any organization. A dynamic workforce, made up of skilled and educated individuals fully involved in their work, will certainly facilitate the organization's ability to achieve and sustain high performance and achieve its goals (Cvetkovski, Langović Miličević, Cvetkovska Ocokoljić, 2011).

World population is constantly growing, but its growth has been slowing down since 1970. This decline refers to the world as a whole, but the decline in growth rate among the more developed countries is larger than it is among the less developed countries.



Source: U.S. Census Bureau, International Data Base, June 2010 Update.

Figure 2: World population (1950-2050)
(<http://gsociology.icaap.org/report/demsum.html>)

The population structure is also significantly changed. Up to 2050 more people over 60 than children less than 15 years will live on the earth. In Europe this is already the case. According to Eurostat in 2010 in the EU-27 there were 15.6% people under the age of 15 years and 17.4% older than 65 years (http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/population_structure_and_ageing)

Africa has the youngest age distribution today, with 41 per cent of the population under the age of 15 and just about 5 per cent of the population aged 60 years or over. In contrast, in Europe the number of older persons has already surpassed the number of children. In 1950 almost 12% of the world's population lived in the present EU states. In 2050, according to Eurostat, it will be just 4%.

The median age of 37.3 years in more developed regions in 2000 is well above the median age of 24.1 years in less developed regions, but both more developed and less developed regions can expect these median ages to rise. In the 50-year projections, the median age for Europe rises ten years, from 37.7 to 47.7 years. The median age for Africa rises almost as much, from 18.3 to 27.5 years. The other major areas are all intermediate between these extremes

(<http://www.un.org/esa/population/publications/longrange2/WorldPop2300final.pdf>)

Emerging economies are becoming increasingly common in the international arena. In terms of human resources, initially they are competing mainly with cheap labour, but today the situation has changed. Their work force is becoming better and better and now slowly attracts investors with quality as well. It is also related to the fact that the number of potential students is growing, especially in countries like China and India. These are changes that strategic management must take into account.

5. BUSINESS AND HR STRATEGY IN PRACTICE

It is interesting that relationship between business and HR strategy was investigated in *Workforce Strategy Survey* conducted by Manpower Inc. during 2010. Survey included 37,866 employers (human resource executives and senior managers from small, medium and large public and private organizations) across 36 countries (Workforce Strategy Survey, Manpower Inc., September 2010).

When asked if they had the talent necessary to execute their business strategy, 84% of employers affirm that they do, but employers were focused on present. However, 10% of employers said they didn't have the talent they needed, and 6% wasn't sure if their talent could execute their business strategy or not.

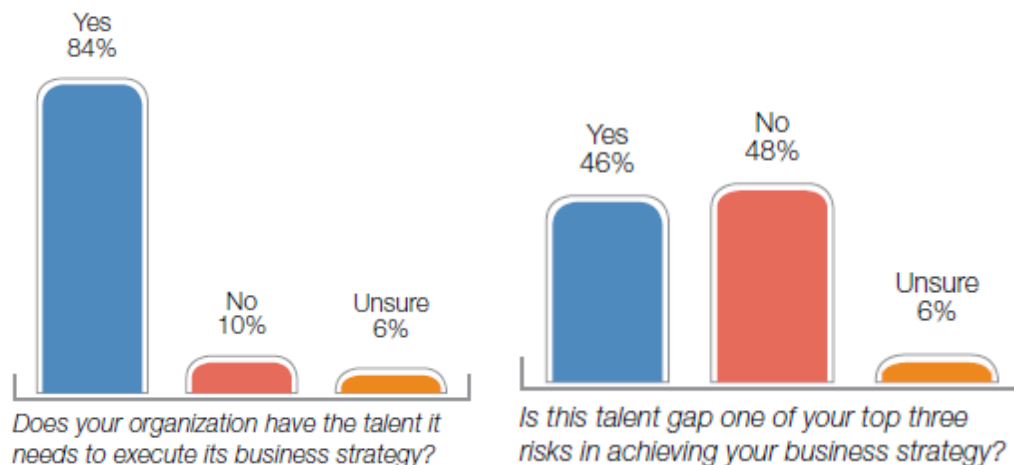


Figure 3: Research results about necessary talents and business strategy
(Workforce Strategy Survey, Manpower Inc., September 2010)

Of those employers who know that their talent isn't adequate for their business strategy, 46% said that this talent gap is one of the top three risks to their business strategy. Another 6% was unsure, while 48% said that they didn't believe that talent gap is a primary risk to achieving their objectives.

They also made a regional breakdown and results are as follow. Employers in the Americas are the most satisfied with their talent, with 92% reporting that they have the talent they need to execute their business strategy, while only 84% of employers in the Europe, Middle East, and Africa region (EMEA) and 76% in the Asia Pacific region feel they have the talent necessary. One striking regional difference is that of the employers who state that they don't have the talent necessary to execute their business strategy, 61% of employers in the Americas see it as one of the top three risks to the strategy, while only 46% of employers in Asia Pacific and 37% of employers in EMEA consider it as a primary risk.

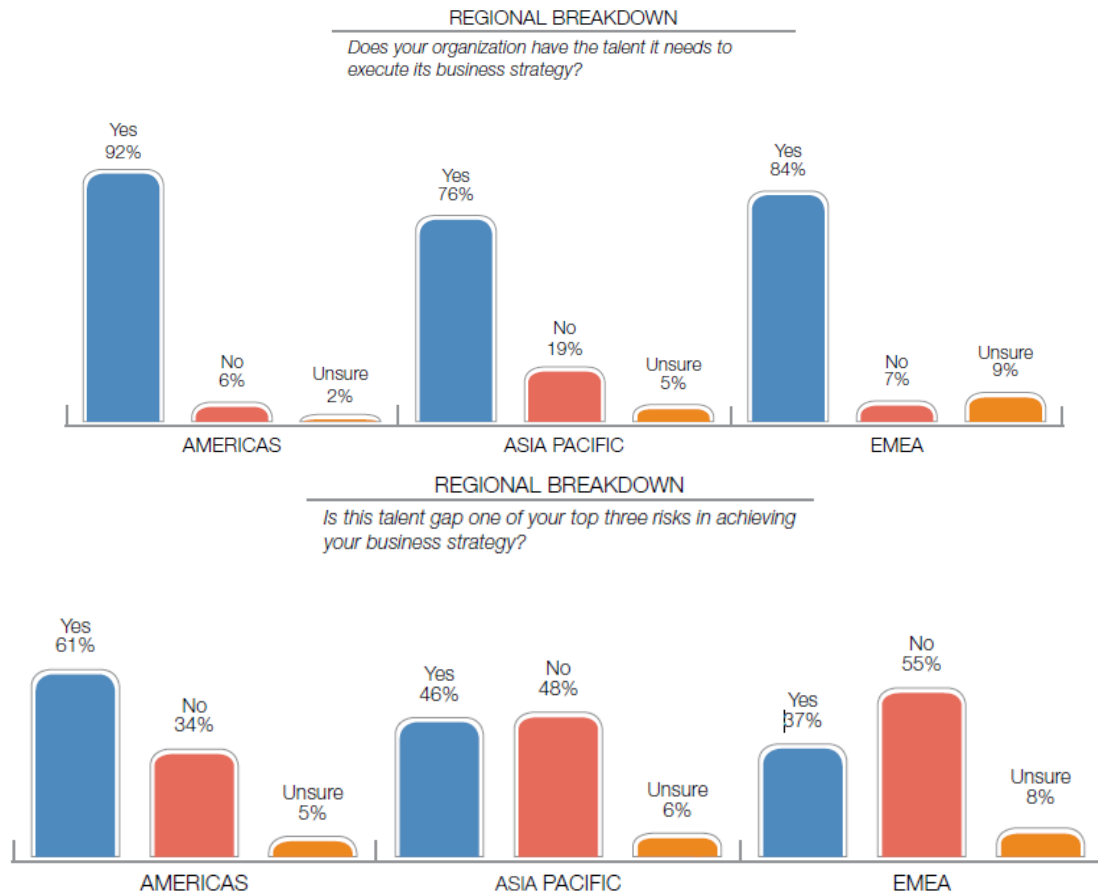


Figure 4: Research results: regional breakdown about necessary talents and business strategy (Workforce Strategy Survey, Manpower Inc., September 2010)

It is interesting that among other issues, employers were asked if their organization had a workforce strategy that aligned with their business strategy, and while 77% of respondents report that they do, 9% are unsure of their workforce strategy and 14% report they lack an aligned workforce strategy.

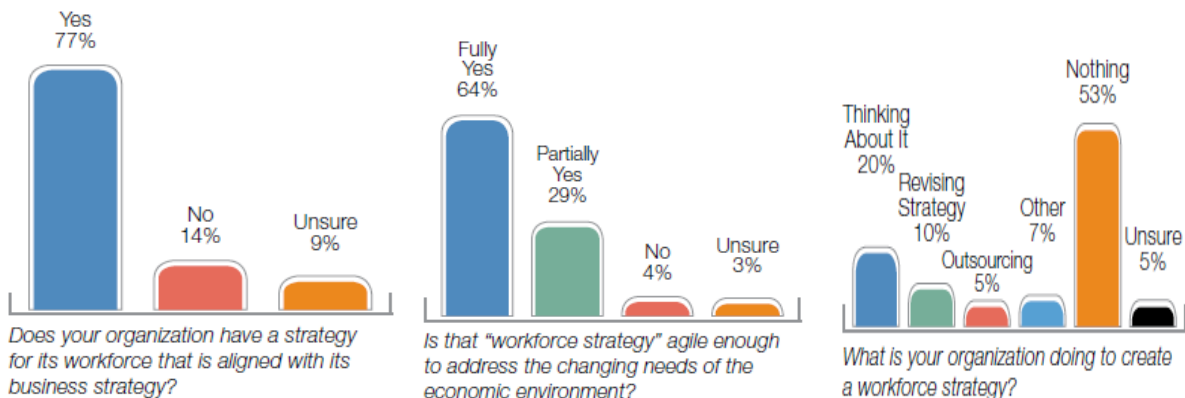


Figure 5: Research results: HR strategy, environment and business strategy (Workforce Strategy Survey, Manpower Inc., September 2010)

Of the 77% of employers that have aligned workforce and business strategies, only 64% believe their workforce strategy is fully agile enough to address the changing needs of the economic environment, 29% believe that their workforce strategy is partially able to meet changing needs, while 4% say it is not, and 3% are uncertain of its agility.

Of the 14% of employers who say they don't have a workforce strategy aligned with their business strategy, 53% said they were doing nothing to create one and 5% weren't sure what they were doing about it. Other said that they were thinking about it (20%), revising their current strategy (10%), outsourcing the work (5%), or taking another approach (7%).

In second part of the research, the 14,385 employees surveyed in Canada, France, Germany, Italy, Japan, the United Kingdom and the United States were asked if they have a clear understanding of their companies' business strategies and how their roles support them, and 79% report that they do clearly understand both the strategy and their role. In contrast, 5% said they either don't understand the strategy or their role, 5% said they do understand the strategy, but not their role, while an additional 11% are unsure.

While the majority of those surveyed say they understand both the company business strategy and their role in it, there's a discrepancy between the level of understanding of those in India, where 91% indicate they understand both the strategy and their role, and those in Japan, where only 56% understand both the strategy and their role.

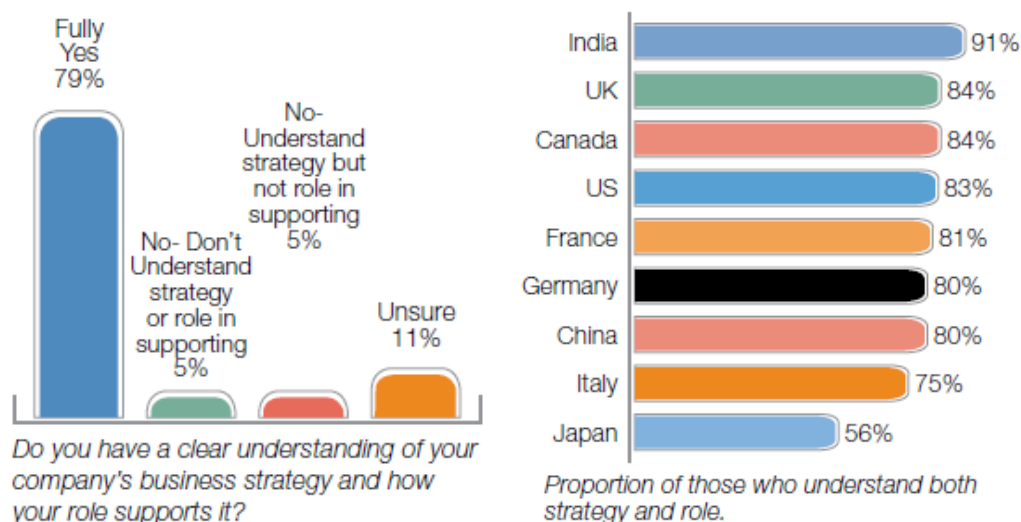


Figure 6: Research results about understanding company's business strategy and employee role (Workforce Strategy Survey, Manpower Inc., September 2010)

6. CONCLUSION

The strategy of each organization has to be closely associated with planning and recruitment of human resources. Jobs cannot be realized without people, and quality and cheap workforce is what every organization is looking for.

Employers need to transform their strategies in the face of growing global competition. They must respond quickly to a rapidly changing marketplace. In the World there is a growing disconnection between where labour is needed and where it is available. Globalization provides access to large potential markets and provides access to raw materials and labour, well-trained managers and other experts.

Today, organizations in order to fulfil their strategy must develop more flexible and talented workforce. The workforce ensures the implementation of the strategy but it could be also a factor that limits the organization's strategy.

Organizations may say their workforce strategy is aligned to their business strategy, but Manpower finds that most of them are thinking only about the here and now and are not positioned to build the workforce they need to achieve the company's business strategy in the future. HR strategy has to be aligned to business strategy and agile enough to address the changing needs of the economic environment. Employees must understand their company's business strategy and how their role supports it. Organizations must be focused on the professional development of their workforce. Talent shortages will worsen during the time and replacements for those exiting the workforce will become more difficult to find.

The HR planning will have to be an integral and key component of the business planning process in the future.

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STRATEGIC MANAGEMENT OF BUSINESS SYSTEM AND RECOGNITION OF INTERCULTURALITY

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Abstract: *One big challenge for all organizations in strategic management today is that they must be global and must direct their human resources towards global business if they want to reach any stage of development, to gain and maintain a competitive advantage in the coming years. The global environment has not changed the way business is made, but it has created the need for organizations to manage human resources in a global context, and implement information technology that can help this way of doing business. Regardless of economic conditions, organizations large and small, public and private have come to realize that the strategic management of business systems needs to take into account a factor of intercultural relations both in human resources management and in the implementation of information technologies.*

Keywords: *strategic management, globalization, business systems, intercultural relations, human resources, information technology*

1. INTRODUCTION

With increasing levels of multiculturalism strategic management of business systems should be considered in light of cultural factors that affect their usefulness. Many scientists in their research include complete findings of intercultural dimension in business in the last two decades. With a growing national diversity in today's business environment culture is still an important factor. The results of research which will be shown in this paper imply that there is still a scientific difference in the measure of values with cultural background which is crucial sign for international cooperation the inflexible management on human resource will not succeed. So, research has proven the existence of different values between different cultures and being aware is major significance for international cooperation. Different needs and expectations of employees in different countries require HR managers to implement a policy that is flexible enough to respond to local requirements and to meet personal expectations at higher level. On the other hand the development of information technologies is faced with numerous challenges, such as cultural diversity and intercultural management. Cultural diversity is strongly connected to the global development due to team members having different national, organizational and professional cultures (each and every business task requires project team and project approach). The very diversity can have a positive impact on the promotion of creativity but it can be also obstacle in communication and knowledge sharing. Even though different cultures cause different ways of business communications, using of new technologies in daily business and private life leads to universal pattern of behavior. This evolutionary process allows individuals in different locations, different cultures, expectations and goals to be part of a virtual team. So, this paper research will point out a link between cultural heritage of a country, on its modern business culture on the development of information technology, human resources management and therefore on the strategic development of business systems.

2. STRATEGIC MANAGEMENT OF BUSINESS SYSTEMS AND TALENT MANAGEMENT

In a global economy, if the development of business systems is to be ensured must invest in human resource. The vision of global leaders is to attract, develop and retain talent. In the terms of global talent management new trends must be seen such as demographic changes, aging workforce and increasing global mobility. Only by investing in talent, they will be in a position to succeed in a highly competitive market. In addition, organizational culture and leadership development has a significant impact on the keeping of talents. Considering all these factors, access to global talent management enables the development of business systems. The responsibility for managing talent management is shared across the organization - from CEO to first line managers - to identify and develop the optimal strategy of engagement of employees, loyalty and retention. In addition, the Department of Human Resources must develop an

integrated and proactive strategic approach to relation to talent management. Another problem faced by the companies is how to keep talented employees. Awards and prizes also help and it is necessary to create an atmosphere of togetherness, teamwork and conditions for their further development and improvement. It is very critical to attract and retain talent. In addition, companies with good reputation have an advantage in attracting talent. Another effective strategy for hiring talent is directing the specific source of talent. For example, at IBM, employs 42% of people with disabilities have the key skills in marketing, IT architecture and software engineering (*IBM Corporation, 2005*). Strategies can be developed in accordance with the objectives of the company, following careful evaluation of current and future needs of organizations in the human resource management, and thus making conditions for further development. At the same time, organizations need to plan the development of talented leadership. It is important to 1) determine whether a program of talented staff development allows an organization to be competitive, 2) to assess whether employees see leadership programs as legitimate. For example, should they be considered seriously? Do these initiatives really affect business decisions? Therefore, the need for talent creates a movement between countries. The United States rely on foreign talent, especially in certain industrial areas. At American universities, for example, there are not enough graduates in science and engineering. By 2012, 28% of the nation's scientists and engineers will reach retirement age. These changes already reflected in 2000, so that today 22% of positions in the world of science and engineering are occupied by foreign experts, as opposed to 14% in 1990. By contrast, countries such as China and India have a wealth of talent in science, engineering and technology. Every year, China produces 350,000 engineers and India 120,000, compared with 63,000 in the United States. (*Langović Milicević, Cvetkovski, 2010*)

A recent study of global companies, for example, has stated that companies are concerned with the development of future leaders and skills to manage the global business environment. Key findings show that the most important factor in the global talent management (GTM) is the level of participation of the Director General, the board of directors and leaders of global talent management. On average, for example, managers spend 16% of their time speaking publicly about the GTM, mentoring and participating in elections of talent. Board of directors in 46% of companies participating in the assessment of key employees and 39% meet with selected talented workforce during the year. (*Langović Miličević, Langović, Pažun B., 2010.*)

The study of global talent management has shown that 43% of the companies see the retention of key talent as an issue that will have the greatest impact for the further development of business systems. Furthermore, 72% of organizations are concerned with the negative impact on the final result due to inadequate skills of workers. The study emphasizes that a lack of talent or developing and retaining of the talented labor force is a threat to many global companies. For example, 33% of companies state to be 11% of their workforce to retire within the next two or three years. However, only 50% of organizations have defined a list of necessary skills for the future. (*Dell D., & Hickey J., 2002*)

Executives from six countries in 15 different were interviewed for the study purpose 2004, emphasizing that the assessment of high- performance employees should be the future of the companies. The research indicates that significant improvement of employees, performance influence further development of business systems. (*Lawler, III. E. E. 2005, Summer*)

The most effective process for identifying talents is open and honest discussion. Yet, all companies do not have the same approach due to cultural differences. 80% of U.S. companies have this approach, compared with 55% of European companies (*Corporate Leadership Council, 2003*). The global talent management emphasis encouragement of diversity in the development of talented manpower. The emphasis is on the business outside the home country and learning about cultural differences in the talented workforce development.

Looking to the future of companies, various kinds of labor relations, employment and non-standard models of relations among employees will be increasingly used, but all companies need to think about the global talent management if they want to maintain the excellence at the global level. Companies that have already raised the issue of talented workforce will be well positioned for the long-term growth.

3. TALENT MANAGEMENT AND THE SITUATION IN EUROPE

The Boston Consulting Group (BCG) and the European Association for Personnel Management (EAPM) conducted a survey of 1350 managers from 27 of the European Union countries. (*Langović Miličević, Langović, Brankica Pažun, 2010*) The conclusion reached by that European companies will faced with lack of

manpower, especially talented workforce. This problem is already acute in Germany, Austria and Switzerland. Business environment is era of intellectual property and - industries based on knowledge, in society of aging, and top managers need to understand that human resources are a major source of competitive advantage. The research highlighted the importance of human resources. Only 30 percent of respondents said that they begun to tackle the first few challenges in human resource management. The report highlights specific steps that should be taken in this regard. There is a problem of the lack of talent, both in Europe and new markets abroad, so that companies must take steps now if they want to continue their further development. Companies must have a global approach, i.e. they have to ensure the recruitment of people from around the world in order to fully benefit from the resources of talented workforce and ensure continual development. Companies should also strive to meet needs of different ethnic groups and nationalities.

The workforce in Western Europe is characterized by loss of skills and knowledge as well as loss of productivity. It is necessary that companies become learning organizations. Corporations must prepare their employees to deal with complex and accelerated pace of global economy. Simply investment in training programs will not automatically improve productivity. Instead, managers must clearly define and measure the return on investment. In order to attract and retain highly talented individuals from around the world who will be required to have the ability to perform in new markets, corporate governance and cultural change, companies will need to offer flexible work arrangements. Respondents in Italy admit that they are going through rapid modernization, rising immigration, and that they are under conditions of increased global competition. Therefore, change management and cultural transformation, are problem they face. Corporate responsibility management in Russia emerged as a major priority, largely because local authorities are putting pressure on companies to make up for deficits in local budgets and Russian companies. The reason for this is fact that companies want to show the world that they can be good corporate citizens. Executives in Spain are primarily concerned with the lack of talented workforce because they want to transform their companies in learning organizations. They face a large influx of immigrants, and employees will have to be able to manage in different cultural settings. Executives in United Kingdom in human resource management face the problem of adjusting to the global environment. Their executives set two issues as priorities on the national agenda: the global talent management and leadership development.

4. THE CULTURAL IMPACT OF INFORMATION TECHNOLOGY IN BUSINESS SYSTEM

The culture of business has been in focus in the last two decades. Culture is still an important dimension with a growing national diversity in today's business. Culture is important for many aspects of business life, especially in terms of design, development and management information systems, protocols and infrastructure. The design and management choices in information systems are the result of individual values, and these values are the product of socio-cultural background. The designer values are the product of professional designers, social and organizational context which includes education and experience of the individual. According to that, their choice of design is strongly influenced by socio-cultural environment. The impact of cultural factors on IT results has not been explored enough by researchers of information systems despite the universally acknowledged importance. When people deal with information technologies in information systems, human cultural values must be taken into consideration. Many cross-cultural researchers, including Hofstede, were criticized for not providing clear guidelines. Geert Hofstede's research has had a profound influence on academics and practitioners. Hofstede's model has a critical role in the implementation of many business systems, including: entrepreneurial behavior, conflicts, dynamics and effectiveness of the working group, innovation, leadership styles, management control systems and many other cross-cultural issues. It is necessary for the researchers to overcome many factors that are not common in typical research tasks. (*Jones M., Alony I., 2007*)

- Definition problems
- The methodological simplicity
- Equivalence - four different dimensions: functional, conceptual equivalence of measurement instruments

As a result of Hofstede multinational studies, four dimensions of cross cultural diversity that influence the development of information systems can be distinguished (*Patel L., Patel S., 2009*)

- power distance - distance can impact information systems and it has been studied by many researchers. Power distance also has a run-in web page design and user interface. For example, the website of the university in Malaysia highlights the symbols of power, while the website of the University in the Netherlands

focuses on the students and shows how they have the ability to be trained (there is a possibility of a virtual tour of the Faculty through the camera).

Using information technology for interpersonal communication can be interrupted in various ways which is, caused by cultural differences. As the e-mail communication is considered the least intrusive, the use of information technology can promote communication between employees at different hierarchical ladder / positions in the companies.

The negative social effects of using e-mails, despite the individual efforts of individuals, training and other types of training and looms, can lessen the importance of this communication "tools". Also, communication through information technology could be considered as too "remote", which might be less popular.

- individualism / collectivism - This scale measures whether people prefer to work in groups or alone. It indicates the degree of social / communication integration. The U.S. has the lowest value on this scale, i.e., they prefer individual results. These individual aspects or results arise from the cultural values as it is expected from people to be independent at an early age. On the other hand, for people in Guatemala it is the most important to work in groups and their performance is attributed to cooperative achievement. Life in Guatemala would probably be based on close family ties, with strong community support.

Promoting cooperation is one of the main goals of information systems. Tools such as the internet and forums, *shared drives and Group Support Systems*, are some of the tools that support collaboration. They provide new ways for knowledge sharing, reuse and expansion of cooperation. These tools support group discussion, decision making and assist in networking. Within the framework of Hofstede cultural (*Jones M., Alony I., 2007*), it is possible that individual culture is resistant to the collaborative efforts of support, while collectivist cultures will adopt it more easily. It is possible that the development of such common information systems is more pronounced in individualistic societies, whereas collectivist societies do not require additional support.

- masculinity / femininity - This scale does not apply to the dominant sex. It depicts the degree to which male features such as power, assertiveness, performance and success are more preferred over female characteristics, such as personal relationships, quality of life, services and welfare. Japan ranks as the lowest on the scale of Hofstede (*Jones M., Alony I., 2007*) and shows that they are very paternally oriented. On the other extreme of Hofstede research are Sweden and Norway. People in these two countries are likely to show more empathy for your colleagues.

Interpretation of "fatherly" approach to IT management can be interpreted as a controlled, centralized approach. With regard to standards, architecture, settings and processes, centralization involves top-down approach. Developers who work in the "masculinity" are more oriented to target and process, and developers who work in the "femininity" are more oriented to long-term relationships. Some researchers suggest training as a solution to the developers with distinct "effeminate" characteristics, to be closer to developers with outstanding features "masculinity." It has been proven that good relations between people promote trust exchange of knowledge, contributing to better organizational performance. It therefore seems that an employee with a marked trait "feminine" contributes significantly to the organization.

- avoidance of uncertainty - cultural dimension of uncertainty avoidance is the degree to which people feel threatened due to lack of structure or uncertainty of events. It refers to the way that people in future will act according to a situation, and have a complete control over events or beyond their control. People with low uncertainty avoidance will require a structure with clear rules and guidelines. Hofstede (*Jones M., Alony I., 2007*) found that Greece has the lowest degree of uncertainty avoidance. Since the people in Greece would be willing to make decisions and they will require a very structured work routine. Swedes, on the other hand, can do well without structure and they have a high tolerance for ambiguity. The researchers found that uncertainty avoidance plays a major role in small technology companies form alliances. Small companies are faced with two types of uncertainty: relational uncertainty, which is derived from the risk of partnership and technological uncertainty, which is derived from the risks of new technology on its own. The researchers found that companies and medium level of uncertainty is likely to access the technological alliances, to avoid uncertainty. It has been proven that avoiding uncertainty has an impact on the planning and implementation of ERP systems. In a comparative study of American and Chinese implementation of ERP systems, it is noticed that there is more planning and attention to detail in Chinese companies. Much emphasis is placed on the accuracy of the new ERP system with Chinese companies. In a study of technology acceptance

model across cultures, it was found that uncertainty avoidance is different in different cultures when they have to adopt new information technologies.

Dependence on information systems brings another dimension of uncertainty and risk. Possible threats include thieves, loss, misuse, destruction, and denial of service. Consequences can include inaccessibility, legal liability and financial losses. They can be detrimental to the survival of the organization. All these risks can be reduced / mitigated, but the cost is associated with this reduction. It is expected that companies with low risk tolerance invest more in mitigation of these processes. Further research on how different cultures influence these threats can provide additional information.

5. CONCLUSION

The result of studies made by the Institute of Prognoz AG suggests that Germany will already have the shortage of three million people in the labor market in 2015 (*Langović Miličević, Langović, Pažun B., 2010*). The study states that in five years, German companies will lack a million people with higher education. In addition, there will be the shortage of 1.3 million craftsmen and people with secondary education and even 550, 000 people without professional qualifications. The conclusion of the authors of the study is that the lack of labor force will be evident "at all levels, from unskilled workers to university graduates." There will be even the shortage of lawyers for whom it has been stated for years that there have been too many on the labor market. Unmet needs for skilled labor force will increase even to five million people by 2030. This will, for the German welfare, mean the loss of 3800 billion euros, according to a study (*Randall S. Jackson Sch., 2010*). Trade associations have already asked to make a bigger effort in solving this problem. They require the opening of more all-day schools, better offers for additional training of employees as well as measures that would ensure their fewer young people, especially students, leave schools without diploma. However, economists believe that all these measures are not sufficient to overcome the threatening lack of millions of labor force and not to mention the lack of talented workforce.

In fact, world companies already faced a major threat to the global shortage of talent in the late 1990s. Finding talent, retention and management has become a key challenge for the development of business systems in the global environment. Talent management is a strategically important issue for companies that and to ensure their further development. Among the factors that shape the specific challenges and responses of some companies there are: which include: (a) globalization, (b) demographic changes, (v) the demand for workers with the necessary competencies and motivation, and (d) the supply of the necessary competencies and motivation.

Conceived broadly, the global talent management (GTM) refers to the systematic use of certain policies and practices of human resource management. This includes various aspects related to the location and relocation management, planning and forecasting, training and development, and evaluation of employees in accordance with the development problems of workers and regulatory requirements.

In terms of globalization, new jobs open up which require higher levels of competence, broadly defined as "basic and advanced skills, knowledge and skills," or "right" know-how. In addition to the increased need for basic skills and advanced skills, there is a number jobs that involve "knowledge work" and that therefore there is an increased demand for so-called "knowledge workers". They include managers, leaders, technicians, researchers, accountants, computer scientists, consultant, medical and pharmaceutical professionals. In multinational companies, talented workers often work together in teams that cross cultural and geographic boundaries: "In the 21st century, knowledge creation, integration and coordination are considered a base of successful operations of multinational companies."

Today organizations face much greater challenges in finding workers with the competencies they need to perform various tasks, regardless of location in the world. In fact, workers at all levels are more important than ever for the development of multinational companies that hope to be competitive both, globally and locally. As a result, they have to be attractive.

However, companies that develop the competencies necessary for global success have good reasons to invest significant resources in talent management., but the success of this venture is still elusive. Based on response of more than 1,300 managers around the world, one the most important obstacle were identified. That main problem for further development of business systems is when managers do not want to recognize the differences in performances among employees due to cultural differences.

What is also imposed new conditions of globalization is the development of business software that constantly pushes the limits that are placed by companies or countries. Available to the media become more sophisticated. Advanced technology costs less. Trends in software development go more towards the "virtual nature". This evolutionary process allows individuals and even teams from different locations and from different cultures with different expectations and goals, so managers must be aware of how cultural differences among its members can influence the activity in various stages of the cycle.

Demanding needs of the IT development industry, leading the metamorphosis from traditional forms of development applications to modern virtual nature. Lack of skills, the fact that the development process costs, extended development time as the special requirements of the local market. These extended development time and cultural diversity are some of the obstacles that multinational companies are trying to overcome engaging virtual teams. However, there are barriers which arise in the implementation and maintenance of virtual teams, the most common barriers were related to the characteristics of team members. The main common factor that influences the effectiveness of virtual teams are different national cultures of their members. Individuals from different cultural areas may have different beliefs, values, competencies and understanding of priorities. There are different models of national culture, so that practitioners are trying to understand the cultural differences between teams that collaborate together or within a team.

IT professionals have different views on the importance of cultural differences. Culture is a sensitive topic for discussion because it has to do with archetypes. The most effective way to deal with cultural differences is to use any of the archetype as a starting point and that is constantly supplemented with new information. It should be emphasized that all the time dominated by individual differences in cultural differences. There are several types of cultures that exist and are responsible for patterns of behavior of team members.

Each individual is a member of multi culture: one or more national / ethnic cultures, one or more of professional culture, functional culture, corporate culture and team culture. But today, thanks to numerous studies and referring to Constantine (*Constantine L. 1995*) IT professionals belong computer culture, which is stronger than any other culture. For example, a Russian programmer is more like an American programmer, the developer, than Russia's marketing manager. This argument provides the opportunity for endless debate about whether the cultural differences emerged to the surface in virtual IT teams despite strong professional IT culture.

So, these changes in the global environment shaping the strategic management of business systems. On the other hand because of all the pronounced changes in the environment, business systems thanks to changes in human resources and information technology, trying to find new organizational forms, new structural solutions, the flexibility and necessary adaptive. The new business system has a significant implications for the practice of human resource management and that is causing major changes. The new business systems emphasis global talent management, manage with their resources and with their approach to the development and use of information technology. So, for the strategic management of business systems is important to involve the impact of national cultural differences and investigate the cultural impact on the each business activities..

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STRATEGIC INVESTMENT IN HEALTH AS DETERMINANT OF ECONOMIC GROWTH

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Abstract: *The aim of this paper is to indicate the importance of strategic investment in health system development. The new paradigm stresses that investing in health system is investing in health and well-being. Further, it introduces the view of investing in health as a determinant of economic growth. Although there is vast evidence from different studies in support of the fact that increase of investment in health systems results in better health and more effective economic growth (in terms of GDP), there are still differences in the levels of efficiency of health systems. This paper suggests that beside the importance of investing, Serbia must strategically invest in health system development. This means optimal allocation of limited resources, prioritising, goal-oriented investment and pressure on efficiency. After the introduction of a new paradigm and theoretical framework of the impact of health on economy, a comparative analysis was made of health systems in Serbia and several other countries. This empirical analysis shows investment gaps in our health system. The main limitation in building a case of investing in health system is a lack of performance measurement and consequently a lack of relevant data. Finally, the paper suggests introduction of strategic purchasing as a tool for strategic investment in health system development. Goal-oriented contracting between purchasers and providers is expected to bring gains both to health and to the efficient use of resources.*

Keywords: *strategic management, strategic purchasing, investment, health sector, health performance*

1. INTRODUCTION

Investing in health, in addition to being a worthy goal in itself, produces enormous benefits, both on individual and country level. This view brings paradigm shift according to which health is not merely seen as an end in itself, but in addition it can be considered a means that brings further benefits, especially to the economy (CMH, 2001). In this sense the investing in health system is investing in economic growth based on productivity gains from healthier workers.

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However in Serbia it seems that this paradigm is far away from our perception of health and investing in health system development. Serbian health policy-makers have been under enormous pressure for two past decades over concerns about financial sustainability and cost-containment instead of concerns brought by new paradigm. Although financial sustainability and cost-containment are common concern both rich and poor countries, because resources available to any society are finite, emerging evidence is recasting health systems not as a drain on those resources but as an opportunity to invest in the health of the population and doing so in economic growth (Figueras et al., 2008). The acceptance of new paradigm in Serbia could bring fundamental reassessment of the role of health system in society.

In addition to traditional concerns on health status, its influence on health expenditure or high economic costs of health inequalities, new paradigm signify impact of health system development on economic productivity. This is something what policy-makers in Serbia often forget during the policy making process. Serbia has set target to establish knowledge driven economy where human capital is crucial for reaching the goal and it is determined by both education and health level.

The impact of health on economic productivity was recognized and confirmed back in 2001 by the Commission on Macroeconomics and Health, which found that in both high- and middle-income countries, poor health dragged down economic growth. People in poor health are less likely to work and, when in work,

are less productive. They are less likely to invest in their own education or to save for retirement, and so to support the wider economy. Evidence from numbered studies indicates that economic position of countries today is in great deal associated with population health status, which is determined by investment in health system development.

But consideration of investment in health system development must include learned lesson that there is an important distinction to be drawn between the capacity to make an impact and actually making it. If Serbian health system is to secure the investment needed to realize his potential, it must be seen to be efficient and effective, and it is here where strategic management is crucial. Whereas policy-makers in the past often reformed without critically evaluating their efforts, they now need to introduce strategic management system and doing so define expectations, track resources and demonstrate outcomes and outputs. Strategic management as a framework for performance management makes possible a structured assessment of how health systems are doing and what can be done better.

Naturally as a part of Europe we are first looking up on countries of the European Region and their practice in health system development. The Europe has experienced waves of health system reforms with no country exempt. Reforms have reflected wider societal debates, the search for efficiencies and, in many cases, wholesale political and social change. They have also consistently sought to enhance the performance of one or more health system functions: reform of health service delivery, resource generation, financing reforms, stewardship reforms etc.

Although all this reforms are important for health system development the purchasing reforms would be maybe the first step needed for our health system development. It addresses the issue of how to allocate pooled resources in order to lever the changes that policy-makers want. Purchasing reforms often involve more explicit market elements that allow fund holders to specify volume, timelines and quality of care. These include strategic purchasing, the introduction of a purchaser-provider split, contracting, case-based or performance-related payments, and sometimes more explicit market elements such as provider competition or selective contracting. These mechanisms give purchasers leverage over priorities but have associated risks, not least that providers will focus only on the specific targets to the detriment of other areas. The success of purchasing reforms and management of potential adverse affects depends heavily on information to assess what is being purchased and on performance measurement.

2. THE IMPACT OF HEALTH ON THE ECONOMIC GROWTH

The impact of health on economic growth is nowadays more obvious than ever before. Maybe it started with neo-classical economic theory but the pressure on creating knowledge based economy where the human capital is with no doubts most important success factor definitely bring out the health as investment goal.

Referring to the neo-classical economic theory economic growth depends on an increase in the labour supply and an improvement in the productivity of labour and capital. It treats productivity improvements as an exogenous factor meaning that productivity is assumed to be independent of capital investment. Therefore labour supply and improvement in productivity of labour are simple dependent on health status of workforce.

Second the health status of workforce in knowledge based economy, what Serbia stated as one of the most important goals to achieve, seems to be even more critical determinant of economic growth. Economic growth is seen as an endogenous process that could be driven in particular by investments in human capital, especially skilled labour through education but also health. Thus it is simply to track that raise of individual's productivity depends on investment in health.

Literature review on this subject finds evidentiary support in numbered studies. For this paper it was interesting Suhrcke's et al. (2005) study "The contribution of health to the economy in the European Union" suggesting that health could contribute to economic outcomes (at both the individual and the country level) mainly through four channels: higher productivity, higher labour supply, higher skills as a result of greater education and training, and more savings available for investment in physical and intellectual capital. Although this suggestion refers to high-income countries it is also suitable for middle-income countries where Serbia belongs to.

It seems reasonable to assume that health of individuals is condition for higher production per hour worked, enhanced physical and mental activity and greater flexibility and adaptability to change. All these gains could

increase directly or indirectly productivity. Therefore, with better population health in Serbia it can be expected higher labour productivity, maybe even more than in developed countries.

The second suggestion is that with healthier individuals the labour supply is higher. Labour supply is measured by sick days which individuals spent not working, but also have impact on wages, preferences and life horizon. Suhrcke et al. (2005) explains these intermediate factors as follows:

- If wages are linked to productivity and healthier workers are more productive, health improvements are expected to increase wages and thus the incentives to increase labour supply (substitution effect)
- Being healthy might allow higher lifetime earnings and therefore an earlier withdrawal from the labour force (income effect)
- As health improves, working becomes less cumbersome, and therefore the individual might be ready to take up more work in exchange of leisure time
- Health improvement reduces the needs for consumption (e.g. of health treatments or medicines) and therefore reduces the relative preference for work, leading to a reduction of working time and an increase in leisure time
- Finally, if good health changes neither preferences nor wages, but raises life expectancy, the individual's needs for lifetime consumption would increase, leading to a higher labour supply

Beside the discussed labour productivity and labour supply in knowledge based economy higher productivity is obviously determined by individual's education level (higher skills as a result of greater education and training). Nevertheless, again one of the dependent variables that determine the success in education is individual's health status. Children with poor health tend due school absenteeism to have poor results in education process and often early drop-out. Also due to lower life expectancy, individuals would have less motivation to invest in education and training. Therefore, the circle has the following form: starts with poor health that lead to less education, less education lead in knowledge based economy to lower productivity which lead to lower earnings, lower earnings lead to lower savings what results in lower propensity to invest in physical or intellectual capital. In sum, there are a number of channels that may causally link health and economic outcomes on the individual and on population level. Serbia must work on improving population health in order to increase productivity and achieve economic growth in knowledge based economy.

3. COMPARATIVE PERFORMANCE ANALYSIS OF SELECTED HEALTH SYSTEMS

Previous chapter contained the theoretical consideration about health impact on economic growth and this chapter will supplement it with evidentiary support. Evidentiary support is consisted from results of data analysis with data gathered from World Health Organization – European Regional Office database called European Health for All Database (HFA-DB). HFA-DB provides a selection of core health statistics covering basic demographics, health status, health determinants and risk factors, and health-care resources, utilization and expenditure in the 53 Member States in the WHO European Region. The data are compiled from various sources, including a network of country experts, WHO/Europe's technical programmes and partner organizations, such as agencies of the United Nations system, the statistical office of the European Union (EUROSTAT) and the Organisation for Economic Cooperation and Development (WHO, 2012).

Selected parameters for analysis were: 40 countries from European region, year 2009 as a last year with needed data and indicators GDP per capita and life expectancy at birth. In this analysis GDP per capita was used as a measure for economic growth and life expectancy at birth as a health indicator (adequacy of this indicator as a measure of health status of population is discussed elsewhere). Analysis for selected parameters showed that health status of population is determinant of economic growth confirming the theoretical considerations. It showed that healthier nations have higher economic growth (Figure 1). This means that better individual's health is precondition for higher productivity, higher labour supply and higher skills (educational level) and more savings for further investing in health as a physical capital or intellectual capital.

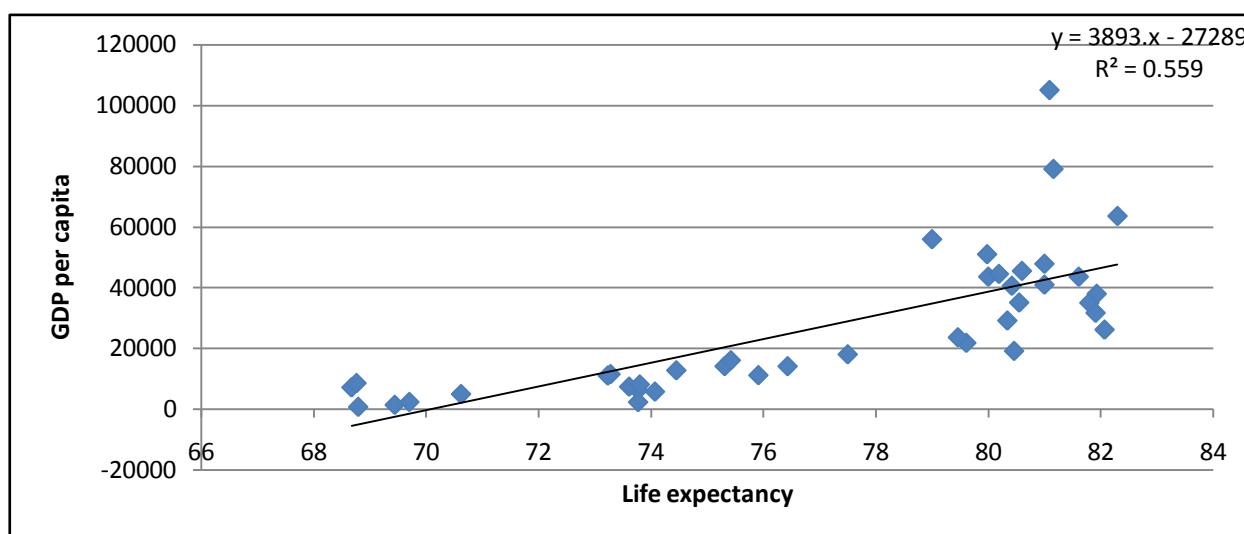


Figure 1:Life expectancy at birth and GDP per capita (2009), source: WHO, 2012

The analysis revealed that there are three groups of countries:

- The first group with life expectancy at birth less than 72 years and less than nine thousand GDP per capita: Belarus, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Ukraine
- The second group with life expectancy at birth between 72 and 78 years and less than 20 thousand GDP per capita: Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Poland, Romania, Serbia, Slovakia, Turkey
- The third group with greater than 78 years of life expectancy at birth and greater than 20 thousand GDP per capita: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland and United Kingdom

It could be easily said that these results were expected: the most developed countries with highest economic growth have healthiest population. However the second question was: does most developed countries have the healthiest populations due to higher ability to invest in health or healthier population brings higher economic growth due to higher productivity, labour supply etc.

In order to answer to that question we analyzed same two indicators just for third group of countries but for period of 40 years, from 1970-2009. Analysis showed high correlation between life expectancy at birth (Figure 2) and GDP per capita (Figure 3). The correlation for selected indicators and countries from third group was: Austria (0.956), Belgium (0.947), Finland (0.929), France (0.965), Ireland (0.956), Italy (0.960), Netherlands (0.961), Spain (0.923), Sweden (0.943), United Kingdom (0.967). Even more important is to notice that correlation for this group of countries was significantly higher than for all three groups together where correlation was only 0,76, point out that there is some efficiency gap in health care systems.

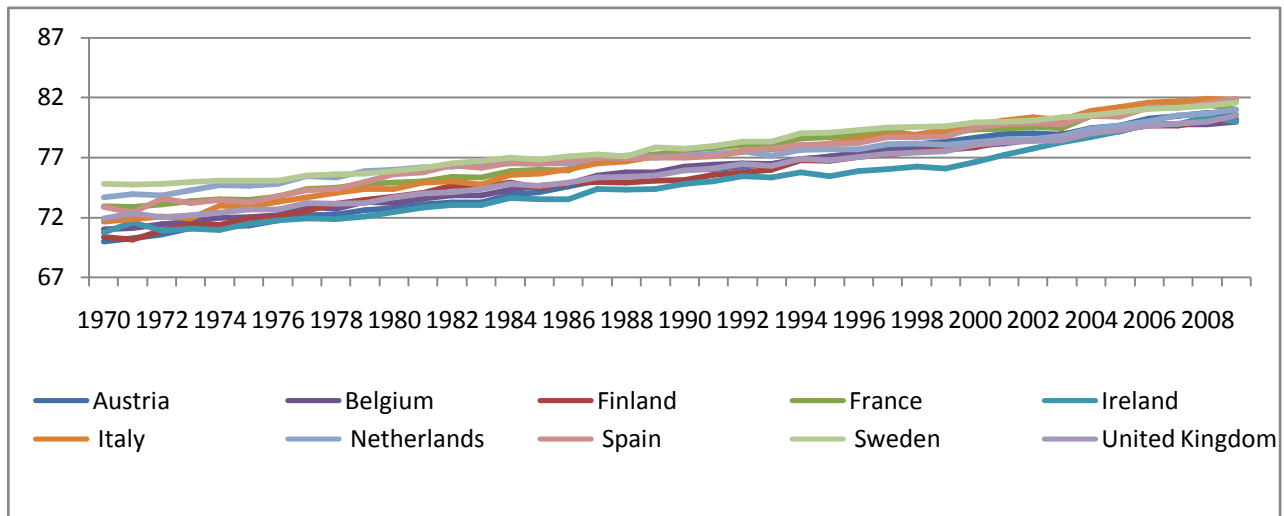


Figure 2: Life expectancy at birth, in years (1970-2009)

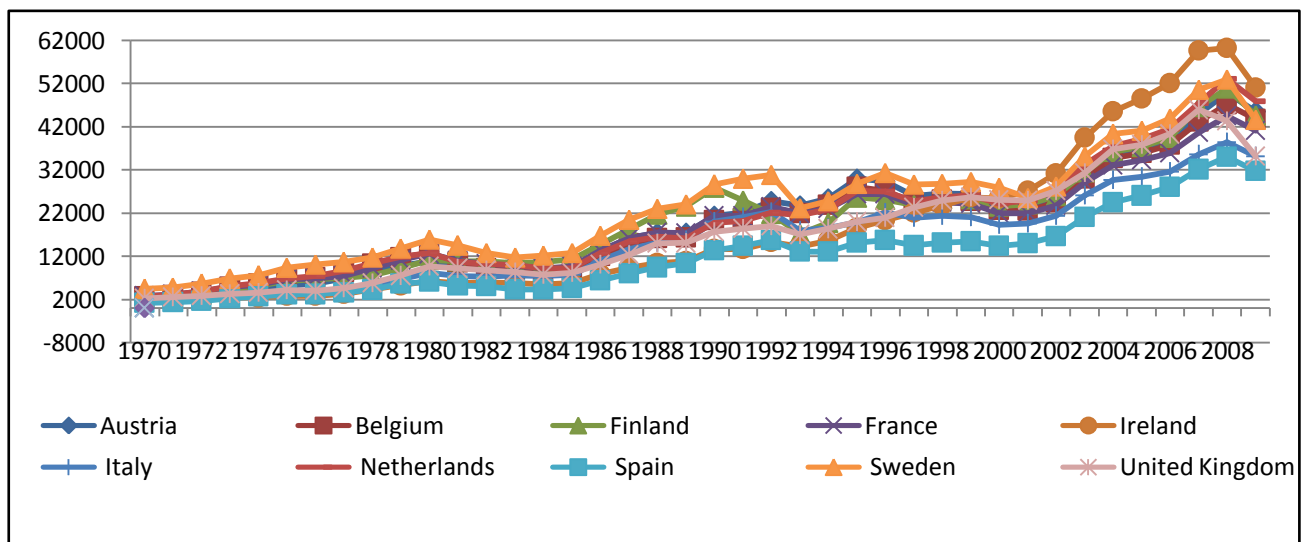


Figure 3: GDP per capita (1970-2009)

On the other hand, research “Health Care Systems: Efficiency and Institution” conducted by OECD Economics Department (2010) showed that there is also significant correlation between life expectancy and health care spending. Joumard et. al (2010) used two methods for identifying the health gains associated with health care spending: Panel data regressions and Data Envelopment Analysis (DEA). They identified with panel data regressions that a gain in life expectancy at birth of slightly more than one year for both females and males over the period 1991-2003 could be in particular attributed to the increase in health care spending per capita which amounted to more than 50% in real terms over the same period. The results also suggested that health care spending is the single most important factor explaining differences in health status across countries, though other factors also play important roles. However, results of panel data regressions shed light on performance in transforming health care resources into health status across countries assuming that unexplained differences in health status indicators across countries reflect efficiency differences in the use of inputs. Research showed that DEA and panel regression results were remarkably consistent in suggesting that potential efficiency gains in the health care sector might be large enough to raise life expectancy at birth by more than two years on average across the OECD (holding all inputs constant) while a 10% increase in health care spending per capita would increase life expectancy by only three to four months (Joumard et. al, 2010).

Finally, high positive correlation between life expectancy at birth and GDP per capita are undoubted, meaning that healthier population is more productive and brings faster economic growth. Also there are results suggested that health care spending is the single most important factor explaining differences in health status across countries but potential efficiency gains in the health care sector might have even larger

influence. To achieve higher economic growth Serbia must have healthier population, what only can be achieved through investing in health system development but with great respect for efficiency gains through strategic investment.

4. STRATEGIC INVESTMENT IN HEALTH SYSTEM DEVELOPMENT

In Serbia the serious lack of data is, as could be expected, a prime cause of the relative weakness of research on the effects of health on the economy. This lack of evidence may have been holding back an adequate policy response. Following the evidence presented in this paper, policy-makers who are interested in improving economic outcomes would have a strong case for considering investment in health as one of their options by which to meet their economic objectives.

The paper suggested that if Serbia wants to have higher economic growth must improve health status going from second group to third group with life expectancy at birth greater than 78 years. To achieve this goal it must be considered health care resources and the most important health problems, see following (WHO, 2012):

- Number of physicians: for Serbia is 284.2 per 100,000 population; average number of physicians in selected group of countries is 348.1 per 100,000 population
- Number of General Practitioners (GP): for Serbia is 71.32 per 100,000 population; average number of GPs in selected group of countries is 84.54 per 100,000 population (minimum in Slovenia with 49.8 GPs per 100,000 and maximum in France with 165.78 per 100,000)
- Average length of stay in hospitals (performance indicator): for Serbia is 9.4 days; in selected group of countries is 7.74 days
- SDR¹¹ all causes, 0-64¹², per 100,000: for Serbia is 322.05; average for selected group of countries is 167.1
- SDR, diseases of circulatory system, 0-64 per 100,000: for Serbia is 96.13; average for selected group of countries is 30.57
- SDR, ischaemic heart disease, 0-64 per 100,000: for Serbia is 34.29; average for selected group of countries is 15.03
- SDR, cerebrovascular diseases, 0-64 per 100,000: for Serbia is 25.01; average for selected group of countries is 5.82
- SDR, malignant neoplasms, 0-64, per 100,000: for Serbia is 107.43; average for selected group of countries is 62.38
- SDR, malignant neoplasm female breast, 0-64 per 100,000: for Serbia is 18.79; average for selected group of countries is 12.87
- SDR, cancer of the cervix, 0-64, per 100,000: for Serbia is 7.19; average for selected group of countries is 1.63
- SDR, trachea/bronchus/lung cancer, 0-64 per 100,000: for Serbia is 31.32; average for selected group of countries is 14.31
- SDR, diabetes, 0-64 per 100,000: for Serbia is 6.29; average for selected group of countries is 2.61

Listed indicators showed that we have significantly smaller number of physicians than average number of physicians in selected group of countries and the same problem is with general practitioners which should be gate keepers. The problem is even bigger if we consider the gap in health status depicted with indicators in the second part of the list (Figure 4). Normally the consequence is that average stay in hospitals is longer than in selected group of countries. The problem could be efficacy but also low use of GP's as gate keepers and utilization of preventive medicine.

¹¹ SDR is the age-standardized death rate calculated using the direct method, i.e. represents what the crude rate would have been if the population had the same age distribution as the standard European population.

¹² Standardised death rates are calculated for the age group 0-64 - premature death

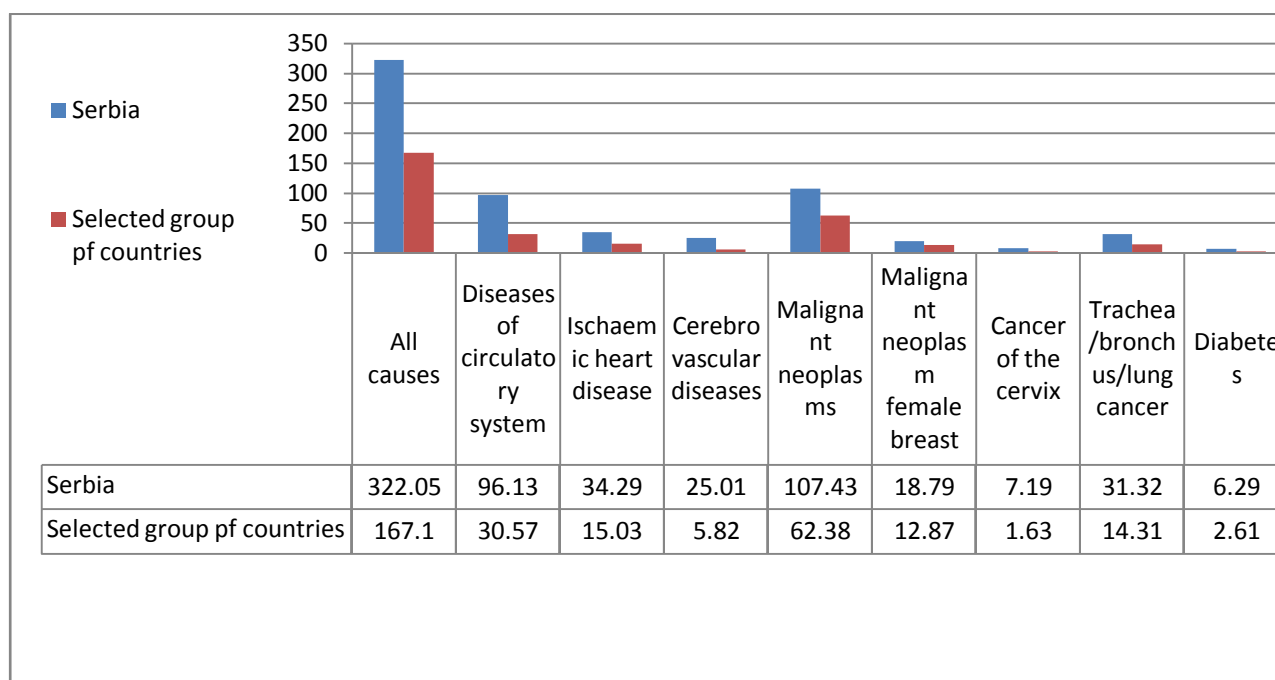


Figure 4: SDR for selected causes, 0-64, per 100000

For dealing with challenges of health system in order to meet goals imposed by sustainable development necessity in Serbia strategic purchasing should be the first step. Serbian health system has lack of investment but may be even more have problematic efficiency gap, both resulting in low health system performance. Accordingly strategic purchasing has been identified as a key component for the improvement of health systems performance. It's potency to improve performance lies in possibility to bring together a range of separate functions with the potential to improve efficiency, effectiveness and responsiveness, but also make a major contribution to the achievement of public health goals. Recognizing the potential of this approach, the World Health Report 2000 put forward strategic purchasing as a major option for improving performance of health systems. It argues that where a purchaser model exists, countries should move from passive purchasing – whereby a predetermined budget is followed or bills are simply reimbursed retrospectively what is case with Serbian health system– to strategic forms of purchasing in which proactive decisions are made about which health care services should be purchased, how and from whom (Figures et. al, 2005).

The purchasing-based models keep third-party payers organizationally separate from health service providers. Figures et. al (2005) the rationale for this purchaser-provider split summarize in terms of five main objectives:

- First, service may be improved by linking plans and priorities to resource allocation, for instance, shifting resources to more cost-effective interventions and across care boundaries (such as from inpatient to outpatient care). Purchasing can thus be regarded as an alternative way to take some measures that have traditionally pursued via planning.
- Second, population health needs and consumer expectations may be met by building them into purchasing decisions.
- Third, providers' performance can be improved by giving purchasers levers such as financial incentives or monitoring tools, which can be used to increase provider efficiency.
- Fourth, the separation of functions within publicly operated health systems can reduce administrative rigidities generated by hierarchically structures command-and-control models. Management can be decentralized and decisions making devolved by allowing providers to focus on efficiently producing the services determined by the purchaser.
- Finally, the separation of functions can be used to introduce competition or contestability among public as well as private providers and thereby use market mechanisms to increase efficiency.

To move from passive purchasing to strategic form of purchasing Serbian health system should start from changing contracts between purchaser and providers. The new types of contracts should be used to reflect the purchaser's health objectives and the health needs of the population, and to define what services are to

be provided and under which terms. Considering advantages and disadvantages of different types of contracts for making a difference in Serbian health care system it should be started with market-entry contracts. Market-entry contracts describe the obligations to be fulfilled in order to take part in the health care network, they are accreditation or licences for providers and doctors, they are long-term and prerequisite. Once when the health care network is set, the purchaser can do the selective contracting combining market-entry and process contracting to a select group of providers. Through this process selected group of providers is organized as supply structure and adapted to health needs and policy objectives. This adaption should be made with two types of process contracts: combination of performance contracts to provide strategic framework and service contracts, in particular cost-and-volume contracts (viewed as a combination of sophisticated block contracts and a cost-per-case contract) to provide risk sharing between purchasers and providers. It is important to notice that purchasing model blur the line between the public and private providers and doing so introduces necessary competition for efficiency gains. In addition, it introduce consumer choice and exit as a classical mechanisms for influencing an organization's behavior in a market system etc.

The most important benefit of introducing strategic purchasing through new contracting process is creating contracting process as an integral part of health policy implementation. Contracts between purchaser and providers should be incorporated into the broad planning process, and contracting cycle should be linked to the planning cycle. In this way planning process begins with assessment of the population health needs and the establishment of a set of health priorities. In Serbian case that would be non-communicable diseases partly showed in Figure 4: diseases of circulatory system, malignant neoplasm and diabetes. These three priorities would form the basis for developing purchasing strategy and would be followed by the establishment of a set of requirements and targets to be achieved through contracting. Next step would be identifying, selecting and contracting providers (public or private). Contracting process should be done through negotiations about elements: type of contract, output definition and size, time, subcontracts by speciality or client group, payment arrangements in term of incentives and sanctions, risk-sharing, specification of services and quality, monitoring etc. The last step should be managing contracts with central part of monitoring implementations of contracts by purchaser. The result of this process should be included in planning and contracting process punishing bad performers. In this way the investment in Serbian's health system development could be implemented through new health care system network consisted of both public and private providers that have market-entry contracts guaranteeing the quality of service and through contracts with reliable providers that are enough efficient, effective and responsible to meet both performance targets set by purchaser and consumers expectations. Instead of building of new facilities through strategic purchasing Serbian health system could just employ already existing capacities in private sector. The main benefit of health system development should be health and efficiency gains.

4. CONCLUSION

The main purpose of this paper has been to review theoretical considerations and empirical evidence on the economic impact of health. Our point was to make a powerful economic case for investing in health and consider bringing paradigm shift in Serbia. This paradigm shift could rise to potentially important policy implications: if health were to become recognised as an investment that brings an economic return, then this would be expected to strengthen the position of health and health policy-makers and might make other economic policy-makers seek to consider health as one, of several, options by which to achieve their primarily economic objectives. In sum, we find that there is much evidence documenting the positive contribution that health made to the economy in most developed European countries and assume that the same positive results could be expected in Serbia with acceptance of new paradigm.

Paper is consisted of three parts, first describes the impact of health on economic growth, second gives evidentiary support for previous theoretical consideration and in last part it suggests introduction of strategic purchasing in Serbia health care system. Strategic purchasing is seen as a first step for developing more efficient, effective and responsive health care system that could bring both health and efficiency gains is an end goal. Also this investment option is the one that with less brings more. There is a vast of evidence that healthier population brings higher economic growth in particular in knowledge based economies. Remains to be seen when Serbian policy makers will accept health as investment goal and determinant of economic growth.

Acknowledgments

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PROBLEM SOLVING TEAMS IN STRATEGIC GOVERNANCE

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Abstract: *Strategic governance is based on adequate organizational processes, but very often problems appear which require immediate attention. Organizations on a strategic level are lethargic and slow in responding to problems. Hence, in this paper, our goal is to explain the importance of establishing problem solving teams which rely on theoretical knowledge and practical experience. It is clear that in complex organizational systems problems appear more frequently than in smaller organizations and it is much harder to find solutions to them. Our article explains steps in the problem solution process as a part of strategic governance, as well as how ad hoc-established problem solving teams might yield faster solutions and improve the overall decision making process. A decision making process is a complex task that requires adjustments by the organization to produce an adequate solution. When problems arise, the creation of ad hoc teams is one of the most helpful tools in strategic governance.*

Keywords: *strategic governance, problem solving team, strategic analysis, conflict, solution*

1. INTRODUCTION

The terms 'governance' and 'good governance' have become increasingly common in the development literature. As a concept, 'governance' has two key aspects: It (1) describes the process of governmental decision-making and (2) the manner by which decisions are put into practice (or, in some cases not put into practice). Theoretically, whatever the precise nature of the political system within which they function, public institutions have three functions: (1) conduct public affairs (2) manage public resources, and (3) guarantee the realization of a range of human rights. 'Good governance' succeeds in delivering these objectives in a manner and context that is (mostly) free of abuse and corruption and with due regard for the rule of law. Note, however, that 'good governance' is an ideal – difficult to achieve and to implement in its totality. There are two key dimensions to its implementation. On the one hand, good governance should be a primary internal goal of (preferably, democratically elected) governments. In addition, virtually all developing countries are dependent on various external actors for developmental inputs and, increasingly, such actors demand proof of the implementation of 'good governance' factors in order to begin or to continue to disburse developmental assistance (Haynes 2005). Strategic governance in goals oriented decision making process requests, among other, adequate analysis of external and internal environment. One of the most important internal factors is accountability. Governmental institutions must be accountable to the public and to their institutional stakeholders. In general, organizations and institutions are accountable to those who will be affected by decisions or actions. Accountability is a key way to ensure that this power is used appropriately and in accordance with the public interest. Strategic governance is term which has been derived from governance.

2. WHY STRATEGIC GOVERNANCE?

Strategic governance is the process and practice of establishing and delivering an organization's strategy. In this regard it is necessary to manage a number of aspects of the organization that are of strategic significance. In particular aspects such as:

- Recognition of core competencies
- Understanding environmental changes
- Identification of threats and opportunities
- Balancing stakeholder expectations
- Evolving an appropriate culture
- Embracing the impact of technology and innovation
- Understanding the motivations of staff and customers
- Being able to understand the significance of elements within the value chain

- Recognising the impact of critical success factors (Neal, 2006)

The McKinsey 7 S model is helpful in explaining this point as it highlights the key dimensions, or levels, that need to be addressed:

- Strategies (H)
- Structures (H)
- Systems (H)
- Staff (S)
- Skills (S)
- Styles (S)
- (S)Shared Values (S)

The key point here is that three of the areas are defined as hard (H) and, as such, they are levels over which senior management has full control and where change can be made relatively quickly. Consequently, it is unsurprising that management address these areas first and, often misguidedly, think that the other levels, defined as soft (S), will take care of themselves. Obviously, organizational problems appear in the strategic governance and to solve these issues in hard (H) areas is important to manage organization appropriately.

3. WHY PROBLEM SOLVING TEAMS?

Having improved the quality of governance can often be viewed as a frustrating activity, and many problems have rising. It means that we have to face with inefficient governance and questionable accountability. Consequences might be inefficient organization development, inefficient decision making and many other impacts. Problem appears always when we have different interests, outside and inside of dedicated organization and when answer or solution is requested. In this case we can define problem as a gap between an actual and desired situation. Problems have typical characteristics that can be summarized as follows:

- lack of clarity of situation,
- multiple goals,
- complexity and
- Time consideration.

The resolution of problems requires a direct action on each of these characteristics that are encountered. (Dietrich Dörner 1996, Joachim Funke 2005). Establishment of problem solving team has the main role in problem management. For that purpose it is important to establish problem solving teams. In the decision making process, solving problems are parts of efficient governance, but very often problems are not under control. This kind of team requests flexible structure and excellent communication skills among each member of the team. It is necessary to build an adequate process of participative decision creation. (Adizes 2008) Team should be consisting of experts who can establish structure and decision making in which trust and respect are in favour. Sometimes, under pressure from decision makers team leaders should accept inadequate and useless persons as members, mostly because of illiteracy or because of lack of trust or respect. The most important is to try to avoid this kind of influence and reject inadequate members. Problem solving team has to have independence and expert based opinion and solutions. Problem solving team should have characteristics of cooperative work, common interests and trust and to have internal conflict which must be constructive. To avoid destructive conflict and have constructive outputs, symbiosis of the team is of extreme importance. Respect among team members is highly likely to turn conflict to right way and to make it constructive from which we can learn from differences among teams and produce better decisions. Trust among team members is important to check is "win/win" combination desirable in the future. In that case conflict is constructive instead destructive, from opinion conflict to constructive dialog and the best possible solution as final result of the original conflict. (Adizes 2008). Consultations among problem solving team members are on a regular basis, team leader cannot work by him, he/she should have consultations on a regular basis with all team. Adizes pointed out that perfection of the strategic management is developing through team work where dominant characteristics are cooperation, communication, trust and respect, which is perfectly applicable to strategic governance as well.

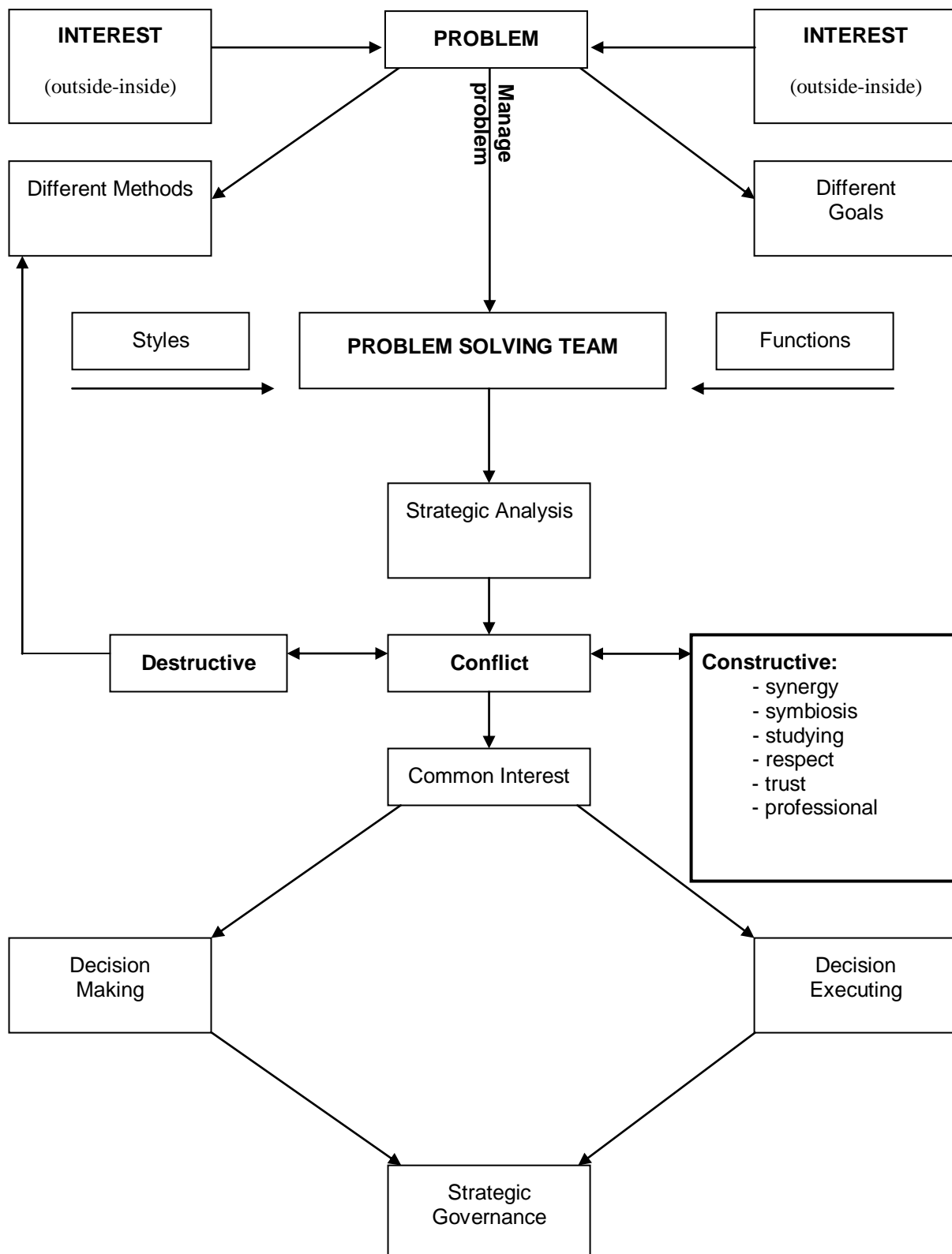
4. PROBLEM-SOLVING TECHNIQUES

Mayer explaining techniques which are usually called problem solving strategies.

- Abstraction: solving the problem in a model of the system before applying it to the real system
- Analogy: using a solution that solved an analogous problem
- Brainstorming: (especially among groups of people) suggesting a large number of solutions or ideas and combining and developing them until an optimum is found
- Divide and conquer: breaking down a large, complex problem into smaller, solvable problems
- Hypothesis testing: assuming a possible explanation to the problem and trying to prove (or, in some contexts, disprove) the assumption
- Lateral thinking: approaching solutions indirectly and creatively
- Means-ends analysis: choosing an action at each step to move closer to the goal
- Method of focal objects: synthesizing seemingly non-matching characteristics of different objects into something new
- Morphological analysis: assessing the output and interactions of an entire system
- Reduction: transforming the problem into another problem for which solutions exist
- Research: employing existing ideas or adapting existing solutions to similar problems
- Root cause analysis: eliminating the cause of the problem
- Trial-and-error: testing possible solutions until the right one is found
- Proof: try to prove that the problem cannot be solved. The point where the proof fails will be the starting point for solving it

5. PROBLEM SOLVING STEPS:

1. **Verification, defining** – in process of defining it is necessary to ask very painful questions, in order to clarify problem. Team leader have to determine how deep to go into problem to find core of the problem.
2. **Evaluation criteria establishment** - once the problem has been identified, evaluation criteria should be established which might be: efficiency, effectiveness, vulnerability and how identified criteria might affect the problem. For decision making strategic level is important to find the best possible criteria which might affect the problem.
3. **Alternative policies identification** - list of possible alternatives can be very long and is huge obstacle to find out the best.
4. **Solution evaluation** - possible solution evaluation performance
5. **Solution presentation** - the best possible presentation of the solution
6. **Applied policy monitoring** - to exclude danger of taking wrong way in decision making every step must be monitored and analyzed.



Graphic 1: Problem solving team

6. STRATEGIC ANALYSIS

Mintzberg (1994) said that we can see very often misperception defining strategic analysis as a part of strategic thinking, on the contrary analysis are crucial part of strategic planning, while strategic thinking are based on synthesis. In every problem solving situation, strategic analysis are developing as a part of strategic planning process. Strategic analysis is the process of taking known information about situations and

entities of strategic importance, characterizing the known, and, with appropriate statements of probability, the future actions in those situations and by those entities. Obviously, a set of problem-solving talents are essential for analysts. Since the other side may be hiding their intention, the analyst must be tolerant of ambiguity, of false leads, and of partial information far more fragmentary than faces the experimental scientist. According to Heuer (1999), in an experiment in which analyst behavior was studied, the process is one of incremental refinement: "...with test subjects in the experiment demonstrating that initial exposure to blurred stimuli interferes with accurate perception even after more and better information becomes available...the experiment suggests that an analyst who starts observing a potential problem situation at an early and unclear stage is at a disadvantage as compared with others, such as policymakers, whose first exposure may come at a later stage when more and better information is available.

Experienced analysts recommend seeing oneself as a specialist on a team, with 5-10 key players. Learn something about each of them, both in terms of how they express themselves, and how you can reinforce their strengths and support their weaknesses. The analyst must constantly ask himself, "what do they want/need to know? How do they prefer to have it presented? Are they still trying to select the best course of action, or have they committed and now need to know the obstacles and vulnerabilities on their chosen path?"(Ikke, 2005)

Other team member may know how to handle the likely challenges. The analyst's contribution is in recognizing the unlikely or providing connections that are not obvious. Consumers must get information in a timely manner, not after they commit to a decision they might not have made having rougher information available sooner.

Sometimes, when the producer is struggling with how to meet the needs of both internal and external customers, the solution is to create two different types of products, one for each type of customer. An internal product might contain detail of sources, collection methods, and analytic techniques, while an external product is more like journalism. Remember that journalists always address:

1. Who?
2. What?
3. When?
4. Where?
5. Why?

Krizan (1999) points out regardless of its form or setting, an effective collation method will have the following attributes:

1. Be impersonal. It should not depend on the memory of one analyst; another person knowledgeable in the subject should be able to carry out the operation.
2. Do not become the "master" of the analyst or an end in itself.
3. Be free of bias in integrating the information.
4. Be receptive to new data without extensive alteration of the collating criterion.

An analysis is not a nicely arranged scrapbook of raw data. It should have a summary of the key characteristics of the problem, followed by the key variables and choices. Increasingly deep analysis can explain the internal dynamics of the matter being studied, and eventually to prediction, known as estimation.

The purpose of strategic analysis is to reveal to a specific decision maker the underlying significance of selected target information. Analysts should begin with confirmed facts, apply expert knowledge to produce credible but less certain findings, and even forecast when the forecast is appropriately qualified. Analysts should not, however, engage in fortunetelling that has no basis in fact.

7. CONFLICT

Conflict might be defined as an incompatibility of ideas among team members. Team leader has to identify and manage with conflict in a sensitive, fair and efficient way. As we mentioned before, role of problem solving team leader is not to eliminate conflict, than use it in a constructive way. In this particular problem, is

said that conflict of ideas is even desirable on an early stage of formulating problem solving proposals. Constructive conflict in solving problems has several positive effects such as:

- Strengthen different views,
- Positive ideas are rising,
- Ideas development,
- Bring out the best from all team members

Destructive conflict in problem solving brings us again to the beginning of process and established team failed. In that case there are two solutions, disband established team or to start again in same team but with different inputs.

Common interest is when conflict is constructive and ideas are developed from where deriving decision making and what is harder decision executing.

8. CONCLUSION

Strategic governance is always sensitive. Considering findings, advantages of problem solving teams in the strategic governance are:

- Faster and easier identifying scope and importance of the problem (conflict) to be solved;
- The possibility of taking into account the different functions and styles of leadership in solving the problem (conflict);
- More people with different skills and abilities to participate in making strategic decisions;
- Rapid development of high quality strategic analysis with less mistakes and oversights;
- Creating the conditions for finding ways to different interests (channel) into a common interest (partial elimination of the problem);
- Creating conditions for new decisions to be largely consistent with previous decisions made;
- Creating conditions for teamwork and responsibility, synergetic adoption and implementation of strategic decisions;
- Increase confidence of decision makers in the decisions proposed by problem solving team;
- Ability to predict future.

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STRATEGIC FRAMEWORK FOR EUROPEAN DEFENCE RESEARCH, TECHNOLOGY AND INDUSTRY

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Abstract: *This paper presents a strategic framework for European Defence Research, Technology and Industry. Integrative processes in the European Union imply appropriate integration in the field of defence research and technology development, as well as the industrial production of military equipment and other products and services needed in the defence branch. The integration of defence industries of the Member States and their transformation towards a coherent European Defence Technological and Industrial Base seems to be a logical step in a wider process of the building and development of the European Union. Likewise, integration is defined as a goal in strategic documents related to the European Security and Defence issue. However, reaching a state of a united and consistent European Defence Research Technology and Industrial Base will not be an easy and fast task. There are many challenges: a problem of redundant (not only duplicate) resources; problems of access to national defence markets; a problem of remaining competitive on the world market; a question of priorities in technological development, etc. The main advantage for small states, in this context, lies in the opportunity to promote their resources, adopt higher standards, access the huge European and potentially other markets, and to connect with larger players and their best practices.*

Keywords: *strategy, defence, industry, European, integration*

1. INTRODUCTION

European Security and Defence Policy (ESDP), latter transformed to the Common Security and Defense Policy, (CSDP), is starting point for all aspects of security and defense considerations at the European level. The policy recognizes main security challenges and threats, and defines general directions and visions how to respond. Threat analysis is important because it influence process of defining and tailoring forces capabilities. Kind and scope of needed capabilities defines, further, kind, quality and quantity of defense equipment.

European Security Strategy assess that large-scale aggression (classic war threat) against any Member State is improbable, while some other threats are much more actual, and those are taken as key threats to the European security:

- Terrorism;
- Proliferation of weapons of mass destruction;
- Regional conflicts;
- State failure; and
- Organized crime.

European security strategy defines three strategic objectives: Addressing the Threats; Building Security in European Neighborhood; and An International Order Based on Effective Multilateralism. To achieve these objectives, the strategy suggests few guiding principles for all stakeholders: to be more Active; to be more Capable; to be more Coherent; and to be Cooperative (to work with partners).

European Defense Agency (EDA) was founded in July 2004, by the Council of Ministers, in order to support the Member States and the Council in their intent to support European Security and Defense Policy. There are four main function of EDA:

- Development of European defense capabilities;
- Promotion of cooperation in armaments production;
- Sustaining and development of defense technological and industrial base and defense equipment market;

- Advancing research and technology.

Strong European Defense Technological and Industrial Base (EDTIB) which “operate” on the competitive European Defense Equipment Market (EDEM) have fundamental importance for successful European Security and Defense Policy. Up to now, EDTIB is rather a collection of national Defense Technological and Industrial Bases, then one consistent, non-redundant and united technological and industrial base. The similar problem exists for the case of defense equipment market. Because of that fragmentation and redundancies of capacities and market, cooperation is imperatively important and deserves to be pointed out.

There are four strategic documents for development of the four EDA functions:

- Capability Development Plan;
- European Armaments Cooperation Strategy;
- European Defense Technological and Industrial Base Strategy; and
- European Defense Research & Technology Strategy.

Capability Development Plan (CDP). CDP defines future military needs and priorities of ESDP. CDP is not a supranational plan, instead it is a common vision of Member States regarding future defense capabilities as answer to the perceived security threats in the future.

European Armaments Cooperation (EAC) strategy, mainly promote European armaments cooperation and its enlargement with a goal of supporting capabilities for Common Security and Defense Policy. The Cooperation is one of the leading challenges due to specifics of the European Defense Industrial Base.

European Defense Technological and Industrial Base (EDTIB) strategy offers vision of future European defense industrial scene as one based on three principles: Capability driven; Competent; and Competitive. In the future, EDTIB should be more integrated and interdependent, with more specialization and less redundancy (or duplication), and with more care on place and role of small and medium companies in defense business.

European Defense Research & Technology Strategy (EDRT strategy), has a goal to obtain more effective R&T for supporting military capabilities. EDRT strategy defines the set of key technologies of the highest priorities as a lighthouse for investment decisions and research efforts.

2. KEYSTONES FOR EDTIB

EDTIB keystones are identified by PEST (Political, Economic, Societal, Technological) analysis. However, first factor (Political) is divided on two entities, due to its specifics for European Union and its Member States. EDTIB exist, operates and develops in a specific European environment defined by next keystones:

- **EU policies;**
- **National policies of individual Member States;**
- **Economic environment;**
- **Societal environment;**
- **Technological environment.**

EU policies related to defence and security, industry and technology, research, and market. This factor contains policy papers and directives related to the next: Coordinated European policy on security and defence; Future operations and priority threats; Consolidation of demands; Intra-EU trade of defence equipment; EU-USA trade of defence equipment; European coordination of Research and Development.

National policies of individual Member States, presents theirs traditional relations and attitude to the national defence and technology industrial base. This keystone consists of next factors: National defence budgets; Bottom-up cooperation between Member States (on bilateral and multilateral basis); The role of NATO; Offset policy; Integration between defence policy and security policy; Integration of general industrial policy and defence industrial policy; Public-private partnership (traditionally, defence related issues in European countries was managed by the state); Ownership of defence industry (differs from state to state).

Economic environment, is very complex containing various factors: availability of resources (human-skilled labour, capital, knowledge, infrastructure, physical resources); demand conditions (level of demands for products and services in domestic and outside market; level of development and availability of other industries closely related to defence industry and level of cooperation and integration, as well as issues of globalisation, barriers for market entry and exit, competitions and rivalries among industry and market players).

Societal environment makes indirect influence mainly. It could be explicit in the sense of public opinion on support for military missions and activities, development of defence forces and level of defence spending (military budget in general, and acquisition of new equipment particularly). Intra- governmental relationship, in a sense of trade-off among various ministries competing for budget shares, is important and relevant indicator of the level of readiness of the society to invest more or less in defence branch instead of more or less investing in a healthcare, education, welfare, environment, etc. Other societal factors with possible influence on EDTIB are: demographic issues (aging population, declining population, intrastate migration and global migration); regional development; healthcare pressure; lack of natural resources; public attitude towards military operations and additional security measures (like those against terrorist threat).

Technological environment. Development of EDTIB could be influenced by wider technological aspect in many ways: New technologies on the free market ("civilian"; "supply" side) can initiate its involvement into defence branch (Examples: new energy technology, next generation software, complex system modelling, advanced computer technology, intelligent electronics and mechatronics, molecular biotechnology, advanced material technology); Military demands are changeable from time to time (mission changes, nature of warfare changes, threat changes, battle environment changes, interoperability issues, force protection, battle awareness, etc) and that lead to new development ("demand" side); Dual use of defence and civilian technologies brings mutual benefits; Growing cost of high-tech products and services brings the same high cost if applied or used in defence equipment; New trends in innovations involve novelties in defence equipping and services (e-learning, networking, cyber space threats).

3. STRUCTURING PRIORITIES

Evidently, there are many influential factors for EDTIB. Some of them has little power or very indirect influence, others could be very important. Also, results could be different for different European countries.

An example of structuring priorities associated to the set of influential factors for EDTIB (Bekkers et al. 2009) shows that a factor entitled as:

- "A coordinated European security and defence policy",

has the highest importance for development of EDTIB. This result is based on a questionnaire answered by a group of 14 experts from the branch (but with different backgrounds: politics, industry, army personnel, defence researchers and consultants). It is not strange that questions of coordination and coherency are frequently pointed out even at the highest political levels of EU (Ashton, 2012). Next to this most important factor, are:

- National defence budgets;
- Nature of priority threats and future operations;
- Dual use technologies and innovations;
- Coordination and consolidation of demands (towards EDTIB);
- Trade agreements of defence goods (particularly on relation EU-USA);
- Defence industry ownership;
- Increasing cost of modern defence equipment;
- Barriers in defence market;
- Competition level in defence industry;
- Level of industry specialisation and mergers,
- Market strategies;
- Globalisation of the industrial structure; etc.

Many of those influential factors are mutually related and interfered to each others. In example, a number of the largest companies on defence market are global players in the sense that they are international (located in more than one country; present at many national defence markets; private owned and relatively independent of any national government). Also, many of those companies are not exclusively dedicated to defence equipment production, but they diverse theirs production portfolio in other ("civilian") directions. Good example of concrete analysis with regard to some of the mentioned factors (Globalisation issues, above all) is presented by Franck et al. (2011).

In the same questionnaire Bekkers et al. (2009), find out that some factors eared much lower relevance for EDTIB, and those are: Demographic factors (global migration, ageing population); Budgetary pressure caused by increasing health budget demand; Future EU enlargement; Availability of skilled industry labour; Role of NATO in defence; etc.

4. GENERAL TRENDS IN DEFENCE INOVATIONS

Defense research and technology used to hold a leader position for decades after World War Two, and serve as a basis for progress in other –non military domains. That situation started to change few decades ago and today we have reversed situation. Adopting and exploiting advanced technologies produced by "civilian R&T", for the defense equipment needs, became a common place today. This way of technological advancing of defense equipment is cheaper, quicker and more effective, but also it is more demanding in the sense of better flexibility, initiative and invention.

Defense research actors (both: individuals and organizations) have to be well and on time informed, networked, creative, and active in order to be able to successfully find, recognize and implement appropriate civilian technological product in a correspond defense equipment or a need (under development or modernization). Researchers and research organization must have high level of competency and innovation talent to successfully perform this task. However, scope and dynamics of appearing of new technological assets is such that a single organization usually hasn't capacity to use all potential benefits from that abundance of advanced technologies. Because of that, networking of defense research organizations and individuals, become imperatively important. But, there are still some defense areas which do not have their civilian counterparts (like explosive ordnance).

Some general trends in defence innovations include:

- Soldier modernisation (different modules for protection and sustainment on the battlefield);
- Advancing armoured fighting vehicles;
- Developing high-performance aircraft;
- Creating high-performance special-purpose ships;
- Development of unmanned platforms and robotics;
- Further development of precision weapons;
- Development of Beyond Visual Range weapons;
- Improving decision support tools and the use of it;
- Improving information gathering, selection and sharing;
- Improving situational awareness in real time;
- Advancing communication links;
- Enabling networks capabilities;
- Enhancing capabilities for computer network operations;
- Advancing Information operations;
- Advancing Intelligent logistics;
- Improving Life cycle management for various technical items;
- Munition (explosive ordnance) management;
- Nuclear, Biological and Chemical defence;
- Non-lethal and less lethal weapons development;
- Direct energy weapons development.

5. CONCLUSION

Strategic framework for the European Defence Research, Technology and Industry, consists of a set of policies and strategic documents. European Defence Agency is main organization at European level charged to “unify”, currently dissipated and doubled, defence resources of the Member States. Integrative processes in European Union assume appropriate integration in the field of defence research, technology development and industry production of military equipment and other products and services needed in defence branch. Integration of defence industries of the Member States and their transformation towards coherent European Defence Technological and Industrial Base, seems to be logical step in the wider process of building and developing European Union.

However, achieving the state of united and consistent European Defence Research Technology and Industrial Base will not be easy and fast. As it was in the other fields, this “unification” of defence resources and market will be long-term process with hard multilateral negotiations and influence of the Member States. There are many challenges: problem of redundant (not only duplicate) resources; problems of access to national defence markets; problem of staying concurrent on the worlds market; question of priorities in technological development, etc.

Main advantage for small states, in this context, is opportunity to advance its resources, adopt higher standards, access huge European and potentially other markets, and to connect with larger players and their best practices.

ACKNOWLEDGEMENT

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STRATEGIC CONTROL WITH A SPECIAL REVIEW OF THE BALANCED SCORECARD (BSC)

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Summary: *Process control means comparison of the realised with the planned in order to reveal deviations and take corrective steps. Mechanisms of control need to be defined in a way that does not cause a decrease of business effectiveness, and also needs to be represented in a manner that makes it able to avoid ineffectiveness, confusion and chaos. Traditional strategic control means measuring the effect at the end of a process and for that reason it is impossible to do necessary corrections of the process. Strategic control means analysing realised results which are compared with the designated standards, which show effectiveness and efficiency of certain actions. Strategy control was not done well because the results measuring was done only with the instruments and methods which can be quantitatively expressed. To that goal, an ideal concept of a balance sheet is that in which mechanisms of control and management are developed according to the basis of the business strategy and vision. The Influence of these changes resulted in the development of a balance sheet from a system for measuring performances to a strategic management control system, which helps the strategy realization.*

Key words: control, traditional control, modern approach, balanced scorecard, measuring performances, planning, management.

1. INTRODUCTION

"Planning without control is senseless, control without planning is impossible". (Jürgen Wild, 1981)

Process of control means comparing the achieved with the planned with the purpose to reveal deviations and taking correctional actions. Control is necessary in all phases of certain actions. Mechanisms of controlling need to be defined in that way that they don't influence on the reduction of effectiveness in work, but also needs to be present in that matter in which it could avoid ineffectiveness, confusion and chaos.

Strategy is a method how to fulfill the purpose. Taking into consideration that companies do work in competitive conditions, strategy is the only way to make a connection between company and environment. She gives the answers to questions where the company is now and where it wants to be and defines way which help get to the wished state. In the process of implementing strategy, it's necessary at the same time, to control, the process with the goal to as soon as possible to determine and remove deviations. Therefore, purpose of control is to make available to company to review their goals. When strategy is created, confirmed, balanced, transferred and when participation is achieved, next step is "controlling" the strategy. This step of control includes measuring, review and recovery of the strategy.¹³

Most important elements of every process or system of control are:

1. In advance set goals, plans, politics, standards, norms, rules of decisions and criteria.
2. Methods of measuring current activities, if it's possible quantitative.
3. Methods of comparing current activities with designated criteria.
4. Correction of current activities, with the goal of reaching wanted results.¹⁴

First element of this system has the purpose to give answer to question what purpose are those and results which are planned to be achieved in the future. Criteria around this element, which are given in advance, need to be quantitatively expressed.

Second element means measuring results of current activities. Results of measuring are necessary to be expressed in the same measurement units in which are given criteria or standards from the first element. In the scope of this element, precision is necessary.

Third criterion means comparing the measured results with the set criteria and determine deviations, also show ways to remove deviations. Also it's necessary to define allowed deviations, so attention is focused on unwanted deviations.

Fourth element is dedicated to correction of unwanted deviations. Decision can be that, that it is not necessary to do any corrections, if all activities are progressing according to the planned.

¹³ Peter S. DeLisi, Strategy Execution: An Oxymoron or a Powerful Formula for Corporate Success?, str.12

¹⁴ Jovanović Petar, Strategijski menadžment, Viša škola za projektni menadžment, Beograd, (2007), str. 146

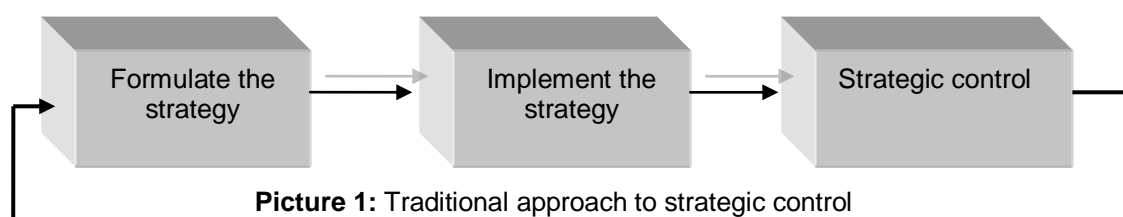
2. TRADITIONAL VS MODERN STRATEGIC CONTROL

2.1. Traditional strategic control

Traditional control implies following steps:

- Highest management formulates strategies and determines goals.
- Implementation of strategies
- Measuring the effect according to designated group of goals.

Traditional approach, system of control was based according to the principle of feedback, which starts from measuring the effect to formulating the strategy. This process characterizes longer time backlogs, which are mostly connected to the cycle of yearly business of a company. With this way of control, real effect is compared to before planned goal. This system of control is convenient with the conditions of a stable environment, when goals can be simple and safely measured.



Picture 1: Traditional approach to strategic control
(Branislav Djordjevic & Danijela Janjic-Vasiljevic, 2010)

Traditional strategic control means measuring the effect at the end of a process and for that reason it's impossible to finish necessary corrections of the process. If for example, realization of strategy takes for years, it's meaningless to do strategic control at the end of the process.¹⁵ We conclude that traditional strategic control is inefficient and worst case, irresponsible to the economical subject.

2.2. Disadvantages of traditional strategic control

The end of 70s and beginning of 80s of the 20th century is the time that characterizes dynamic and complex work process, which have again, highly enhanced influence on process of strategic control. Problem and disadvantages of traditional way of strategic control have interested theoreticians about which in the coming period, a lot of studies and critiques will appear. Direct reason was consequences of oil shocks from 1973 and 1979 - 1980, which revealed all disadvantages of the late and inadequate reaction on the field of strategic control.

First to write on this subject was Lorange¹⁶, who by strategic control understood control of the ability to gain and comprehend new knowledge, also the control of ability of transformation of economical subject.

He made a difference between 2 approaches of control on the strategic level:

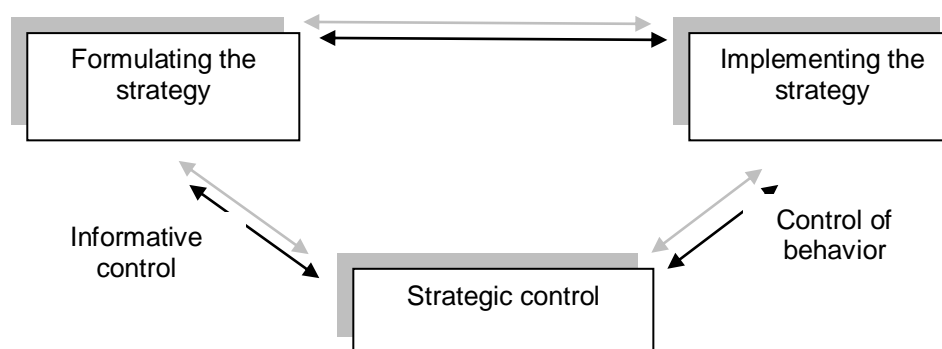
- "strategic momentum control" which is suitable with the continuing development of environment and which focuses on planned parameters, so called "planned-realized-state".
- "strategic leap control", which is suitable with the discontinuing development and goals whose focus is on turbulent environment.

2.3. Modern strategic control

Modern approach to strategic control means adaptation, prediction of internal and external changes. Between the process of formulating strategy, implementation and control there is a huge level of interdependence. This approach means two types of strategic control: control of information and control of behavior. First type of control gives answer to the question does the organization do the right things? And other type of control answers on the question does the organization do things in the right way during the implementation of strategy?

¹⁵ Georg Schreyögg/ Horst Steinmann, Strategische Kontrolle, Wiesbaden (1985), str. 391.

¹⁶ Lorangeve Methode, Franz Xaver Bea, Jürgen Haas, Strategisches Management, Stuttgart (2005), str. 233.



Picture 2: Modern approach to strategic control¹⁷

Control of information means the whole environment, internal and external and makes possible constant update and review of predictions and assumptions of organization which have founded the firm strategy. In that way disadvantages are removed of traditional approach of strategic control - time backlogs are shortened, changes in the environment are revealed sooner, abilities of the organization to react fast and flexible are improved.

Control of behavior means implementation, or to correctly do things, which applies the availability of levers: culture, reward and restriction. Companies have to develop balance between culture, reward and stimulation, restrictions and coercion, with the goal of adequate reaction to changes and adaptation to new requests of the market.

Modern systems of control, to be successful, needs to have next characteristics:

1. Attention must be focused on changeable information, which top managers think are strategically important.
2. Information must be so important that managers on all levels give them meaning and attention
3. Generated data and information must be interpreted in the best way and they must be subject on meetings
4. System has to be a catalyst for uninterrupted debate about information, assumptions and action plans.

Into modern strategic systems of control, strategic uncertainties are included, which can come from changes in technology, state laws, competition, the taste of the buyers...

Strategic control is directly connected with other phases of management, especially with planning, because with control reached goals are analyzed which are compared with designated standards, which shows effectiveness and efficiency of some actions. However next to registered deviations of reached to planned, in this phase correction of deviations is performed.¹⁸

The whole meaning of control of management is to improve performance on both, the individual and organizational level. Control is the basis for needs of training, motivation to get standards and development of the individual.

2.4. Concept of strategic control of Schreyogg and Steinmann

Georg Schreyogg and Horst Steinmann developed in 1985, according to the latest models of strategic control, their concept of strategic control. This concept is based on consequent following and control of strategy during her implementation. This was a big step instead of that time present models of strategic control.

As a reaction on noticeable disadvantages of that times models, Schreyogg and Steinmann have divided strategic control on 3 different parts of control¹⁹:

- strategic control of planning
- strategic control of implementation
- strategic monitoring

Core of strategic control is strategic monitoring, although the first two steps are important the same. While strategic control of planning deals with assumptions, which are determined in the beginning of process,

¹⁷ Prof. Dr. Branislav Djordjevic, Emeritus, Dr. Danijela Janjic-Vasiljevic, OBEZBEĐIVANJE INFORMATIVNE KONTROLE: EFIKASNO REAGOVANJE NA PROMENE OKRUŽENJA, Međunarodna naučna konferencija, Kruševac, 2010

¹⁸ Mihaela GHICAJANU, STRATEGIC PLANNING AND CONTROL IN MANAGEMENT BY OBJECTIVES, (2008), str. 4

¹⁹ Georg Schreyögg/ Horst Steinmann, Strategische Kontrolle, Wiesbaden (1985), str. 401

during that time strategic control of implementation deals with gathering information, which appear during the process of implementation, so in time, danger can be noticed for the process of implementation.

These three steps of strategic control make a whole of strategic system control. According to the concept of Schreyögg and Steinmann strategic control is a continuing process, which starts already with the planning and follows the whole process of implementation.

3. INFLUENCE OF ENVIRONMENT ON STRATEGIC CONTROL

For strategic control is important to clearly define relevant environment. Also it's necessary to determine which factors have the most influence on the process of strategy control. Having into consideration the fact that business environment is dynamical and changeable; it's very hard to find balance between environment and control. According to system theory of Luman²⁰, it's necessary to artificially reduce the complexity of factors of environment, on an acceptable level for strategic control.²¹

However, the more complex the environment, the bigger possibility is that factors, which are fundamentally important for strategic control of designated economical subject, are left out. With that, during the design of environment in which the process of control will be done, it's necessary to include all important elements of environment, on which influence needs to be counted on.

Factors which influence on the process of strategic control can be divided this way:²²

- Macroeconomic
- Technological
- Social-cultural
- Law-politic
- Ecological

Next to global factors of environment, it's important to mention the factor of competitive environment.

In macroeconomic factors we include elements like gross domestic product, monetary system, inflating movements, foreign currency course, buying ability of inhabitants, etc.

Technological factors importantly influence on the dynamic of change in environment through the process of technological progress and innovation.

Social-cultural factors include system of value in society, demographic trends, social milieu of society and also general trends of movement in a society.

Law-political factors are working on the law system (workers' rights, laws about protecting the intellectual property, laws about responsibilities of developer and the bidder etc.) also with the immediate political environment. Ecological factors include the availability of natural resources, ecological responsibilities, necessity to recycle etc.

Common denominator of global factors of environment is that they influence economical subjects. Meanwhile, economical subjects can't control global factors, which mean that the influence of global factors is one-way.

Factors of global environment start from the so called strategic triangle. Also the concept of strategic groups needs to be mentioned.²³ Welge and Al-Lahm were doing analysis, on which factors of environment, companies especially pay attention and they came to the results that companies regularly analyze consumer behavior and market of competitors. Reason for that is to get an authentic image of expectations from the perspective of a consumer. According to that analysis least attention is paid to the social-cultural factors by the companies.

4. BALANCED SCORECARD AS A RESPONSE TO PROBLEMS IN STRATEGY CONTROL

In the period before, strategy control wasn't done well for the reason that measuring of results was done with the instruments and methods which can be quantitatively expressed. However, financial results show only before business was done and there are no information about economical subject, how it did its work and how it will be doing it in the future. Robert Kaplan and David Norton in 1992 revolutionized the research of metric with their implementation of a "balanced scorecard".²⁴ Method of balanced scorecard is a deductive system in which according to strategy and vision, business is developing mechanisms of control and management.²⁵

²⁰ Luhmann Niklas, Zweckbegriff und Systemrationalität, Frankfurt (1973), str. 322.

²¹ Horst Steinmann/ Georg Schreyögg, Management, Wiesbaden (2000), str. 129.

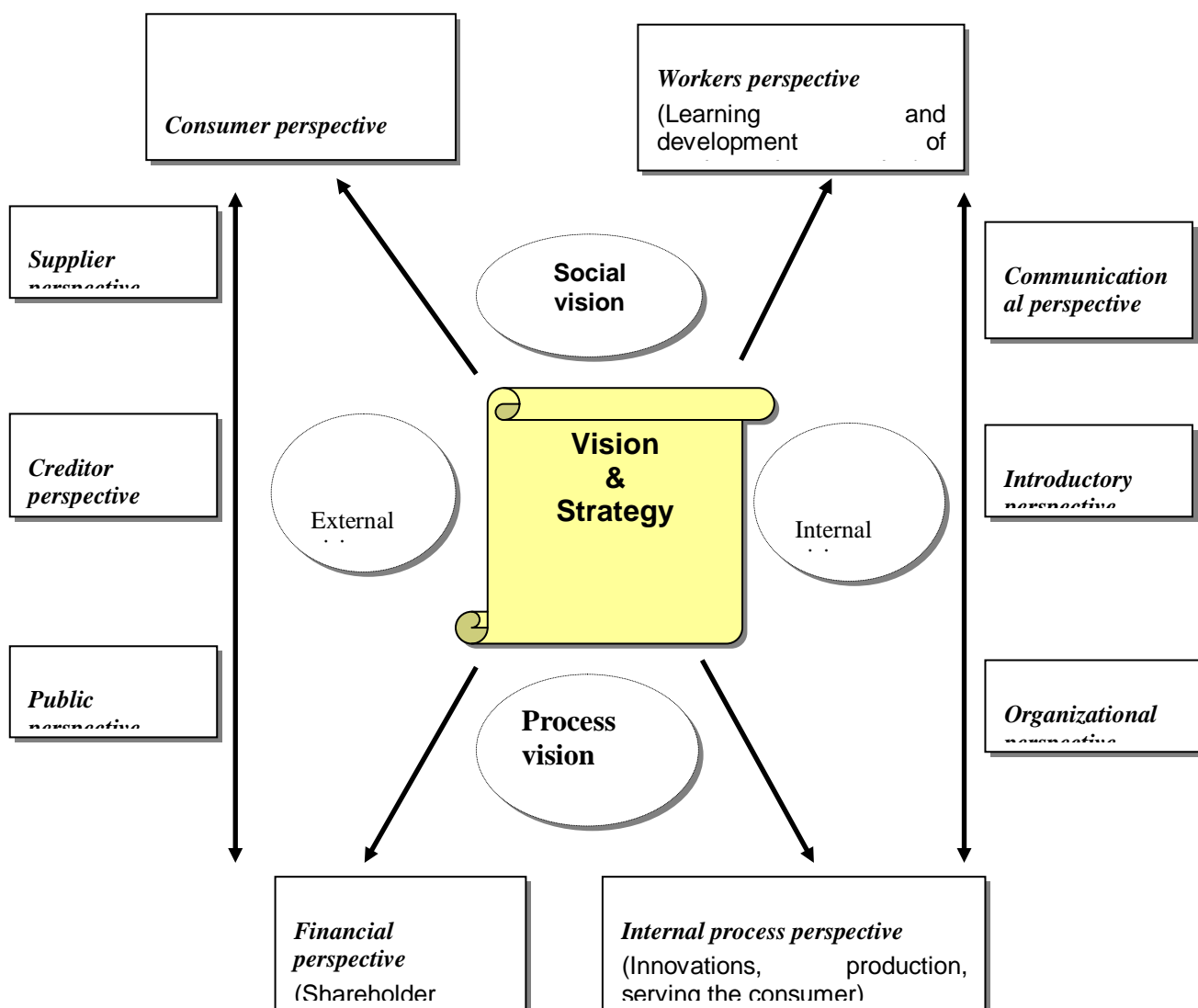
²² Liam Fahey/ V. K. Narayanan, Macro-environmental Analysis for Strategic Management, St. Paul (1986)

²³ Martin Welge/ Andeas Al-Lahm, Strategisches Management, Wiesbaden (2003), str. 290

²⁴ Peter S. DeLisi, Strategy Execution: An Oxymoron or a Powerful Formula for Corporate Success?, str. 11

²⁵ Friedtag, Herwig R./Schmidt, Walter: Balanced Scorecard – Mehr als ein Kennzahlensystem, Freiburg (2002) S.199

Picture 3: Possible perspectives of balanced scorecard concept



Source: Friedag, Herwig R. /Schmidt, Walter: Balanced Scorecard – More than one performance measurement system, Freiburg (2002), page.199

It still includes financial markers but next to them it includes a dimension of pleasure of the consumer, dimension of efficiency of finished internal processes and dimension of innovation, learning and development of the workers.

Kaplan and Norton tried to method of balanced scorecard and strategy. From one side, they managed to set a direct connection between all strategic goals according to some dimensions, and on the other side, they found cause-consequent rate between the measurements.

Influence of these changes made the balanced scorecard to develop from system of performance measurement to strategic management control system which helps realization of strategy and transport strategy to programs, actions and initiative. Her role is to help and lead the process of control.²⁶

According to the measurement of results, Kaplan and Norton say the following:

1. Measuring has to be balanced and to include more than financial measurement

²⁶ Ljiljana Bonić, Bojan Krstić, Komplementarnost upravljanja zasnovanog na vrednosti i balansne karte performansi u funkciji stratejske kontrole, Ekonomski fakultet Niš, (2010), str. 594

2. Measuring should merge the operational and strategic measuring
3. Measuring has to be objective, to start from strategic goals and to be focused on main challenges, but also main characteristics of the product and service
4. Measuring has to be in balance with the phase of the life cycle of the product and service
5. Individual measuring has to be agreed with the total measurement on the level of the company.

5. CONCLUSION

Effects of this concept are mirrored in the fact that companies supply available access of analysis of different alternatives and develop analytical evaluation of the alternatives.

Balanced scorecard provides:

- Achievement long year goals
- Focus on maximizing the value
- Supplies functional behavior of the manager, because of the new way of measuring the effect.
- Provides focus on determinates which influence on growth of value in the future
- Also provides identification of activities which do not contribute to value growth.

One of the main disadvantages of balanced scorecard is the uncertainty which measures need to be implemented, so the previously set goals can be optimal fulfilled. Also, companies are used to use a huge number of measurements, which in the long run, can make the implementation even harder. The rule is that the maximum number of measurements is not to cross the number of 25.

Advantage of balanced scorecard is his systematic and logical construction, and that's why it's easy to be implemented and use in all parts of a company. In last case, balanced scorecard is an instrument for comprehensive and integral implementation of goals of a company.

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OUTSOURCING AS A BUSINESS STRATEGY

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Abstract: *Outsourcing is a strategic decision that a company can make in the case of possible opportunities involving the transfer of part of its activities to a partner specialized for that job. That could improve the whole business process and reduce expenses. This kind of decision brings a lot of benefits to the company, which are firstly reflected in savings, but also in a possibility of hiring specialists who will do the job in a professional and timely manner. Additionally, with this kind of business strategy the company can focus all its resources on its main activity, unconcerned about the work delegated to its outsourcing partner.*

Although benefits of this kind of business decision-making are great, there are some disadvantages, which are primarily reflected in the distancing of the company from its clients in cases when the outsourced activity involves communication with customers. With the passage of time, the company becomes increasingly dependent on its outsourcing partners and that could be considered as a lack of its business strategy. If the company hires workers from other states, that could be a serious problem for the country, since that means fewer opportunities for local specialists.

Key words: *outsourcing, globalization, off shoring, strategic decision, business improvement, profit*

1. INTRODUCTION

Outsourcing represents the process of transferring ownership under existing business function of one organisation to another, specialized for that job. Two companies can make an arrangement which includes providing services with agreed payment. This way of conducting business is making cooperation between two companies easier in their spheres of influence or core businesses. In that way they can facilitate business, improve skills and decrease the lack of expertise in the areas they want to outsource. Outsourcing arrangement can also include transfer of the workers involved.

Modern economy era is characterized by this kind of business. This term has appeared in America in the end of last century and represents transferring an existing business function to other organisation, instead of traditional internal managing of that business.

Outsourcing is sometimes wrongly interpreted and mixed with terms out-tasking and off shoring, which are not its synonyms. Out tasking means transferring one segment of the business process to another organization where management control is not transferred (key characteristics of outsourcing). Off shoring is the sub variant of outsourcing and it represents business process outsourcing from one country to another. The most frequently transmitted operational processes are manufacturing and accounting (Munch, 2009).

2. ADVANTAGES OF OUTSOURCING

As the time passed by organization has been realising advantages of doing business with outsourcing and benefits which are coming with it. There are many motives which cause introduction of outsourcing. The main reason is cost reduction. This could give new opportunities to the business to invest money in upgrades and core activities going forward.

There are many other benefits which have appeared by introduction of outsourcing, beside savings:

- Focusing on the main business activity – workers, infrastructure and other resources are concentrating on the development
- Knowledge – hiring the company specialized in particular areas with high-knowledge of the personnel responsible for the execution of the assignment.
- Management capacity - improved method of capacity management, services and technologies where the risk of providing excess capacity is on a supplier.

- Introduce easier changes - with introducing of outsourcing, organizations can make changes which independently would not be able to cope.
- Risk management - companies that do business with outsourcing partners, share with them the responsibilities and risks.
- Scalability – preparedness of temporary or permanent increase or decrease in production.
- Speed in introduction of new services
- Access to new technologies that the company would not be able to afford without the help of outsourcing partners.

3. DISADVANTAGES

Although advantages of outsourcing business strategy are positive, there are some drawbacks. One of the biggest disadvantage is the lack of direct communication between the company and its clients. This can prevent a company to build successful relationship with customers, which can lead to dissatisfaction on both sides. Another important deficiency is reflected in the company's ability to control all aspects of its business, which makes it dependent on its outsourcing partners. If some business partners unexpectedly decide to terminate cooperation that could significantly interfere with the normal functions of the company or the implementation of the project which part is outsourced.

4. ONLINE OUTSOURCING

This way of doing business gives the opportunity to hire a third party to perform certain business tasks over the Internet. With introduction of online outsourcing, company can achieve significant savings and therefore becomes more competitive on the market. On the other hand, critics of outsourcing believe that this method takes away the possibility of hiring local experts from the particular area of expertise.

Companies often use this strategy of doing business for specific business purposes. The most common examples of outsourcing are human resources, accounting, bookkeeping, different types of analysis etc. Instead of paying full-time employees, the companies would preferable hire a third party which performs the necessary tasks for them. Outsourcing is very important in scenarios where companies have need for more staff to perform casual assignments. Organization needs fewer resources to hire a specialized company which would perform a task than to hire new staff or train the existing one.

Online outsourcing allows the company to reduce costs so it would not have to pay more employees than it is necessary. Home shoring is a process in which the company hired workers from the country in where is located and who would work from their homes and carry out certain business processes. Such employees may do the tasks such as taking over the customer service calls, editing, etc.

Online outsourcing also has its disadvantages which are mainly reflected in decreased opportunity for potential employee in a country where the company is located. Many firms hire workers from other countries, because they are willing to do the same job for less salary, where the company generates significant cost of savings. For example, in America, very often companies hire workers from India who are able to perform the same tasks for less pay, than local workers (Benoit, 2008), (Straub, 2008)

5. DIFFERENCE BETWEEN OUTSOURCING AND OFFSHORING

It often appears that the terms outsourcing and offshoring are mixed, although they do not relate to the same. Outsourcing refers to hiring a third party, which carries out the tasks that are traditionally performed by someone from the organization. On the other hand, offshoring means relocation of the whole company or one of its part to another country.

Outsourcing is used to reduce expenses, get experts and achieve other benefits. This way company can hire workers from the country where it is or from the other one.

Off shoring is considered as subform of outsourcing. Company may decide to relocate some or all of its activities to another country, when considered profitable. If during this process work still performed by employees in the company is ongoing, then the concepts of outsourcing and offshoring is not related to the same. However, if it is decided to hire a third party, to do the job, then both term can be used for that company (Siffat,2010).

Another difference between those two practices is location. On one hand, outsourcing does not particularly require involvement of the third party from abroad. Therefore it is within the borders of one country just as profitable as when it is international. On the other hand, off shoring is always done outside the home country.

Many assume that those business opportunities are limited to activities of the IT industry, but this strategy can be applied to almost every form of business (Soffit 2011).

6. TYPES OF OUTSOURCING

There are many types of outsourcing, but some can be extracted as the most common:

BPO (Business Process Outsourcing) involves transfer of business to the provider of these services. Usually those are jobs that do not require a high level of technical knowledge. The term is often linked to production, such as Coca-cola, which uses outsourcing for large segments of the supply chain management. BPO processes are divided into two groups:

- back office outsourcing - includes internal business processes such as human resources, finance, accounting, etc.
- front office outsourcing - consists of user-oriented services such as call centre services.

ITO (Information Technology Outsourcing) is outsourcing of activities related to work with computers and Internet, such as programming. ITO is most commonly introduced due to lack of resources and reduce costs.

KPO (Knowledge Process Outsourcing) is outsourcing of business activities that require a high level of expertise in certain areas. KPO involves processes which usually seeks advanced information search, analytical and technical skills and in some situations, making decisions. The whole concept of KPO is based on the information. The areas most commonly used are e-marketing, animation and design, data analysis, writing and content development, etc.

HRO (Human Resources Outsourcing) - This term refers to the scenario when company has decided to delegate all or part of a process that is related to human resources to third party, specialized in the area of operations. HRO is commonly used by small and medium enterprises and is particularly useful for newly formed companies. They can decide to outsource entire HR department or its section. Large companies can sometimes decide to switch certain part of the HR activities to a third party. Health care and pension plans are examples of processes that large companies outsource, because specialized partner is able to give significantly better responses to questions and requests of employees. Some of the most common HR processes (which are outsourced) are: recruitment, training and development of employees, payrolls, etc (Soparnot, 2011)

7. THE PROCESS OF INTRODUCTION OUTSOURCING IN BUSINESS

Any innovation that is introduced into business processes of an organization must pass pre-determined stages. The same principal applies for outsourcing and if the company would like to introduce it in its daily business, outsourcing would go through several stages. Since introduction of outsourcing is strategic decisions, it is logical that first stage is characterized by the question whether this mode of operation fits into company philosophy and what role would it have in its activities. Next stages are evaluation and selection. More precisely it has to be estimated if outsourcing project is appropriate. Company has to determine possible locations for its application and choose potential executors. In order to be protected both sides have to ensure that contract will define the current working relationship between company and its outsourcing provider.

8. OUTSOURCING IN THE WORLD

This type of business which has been established in America during the 90's, took part in business so much, that in 2004 was already a popular topic of political leadership and public. It led to debate on the impact of outsourcing on the local workforce and economy. Presidential candidate in 2004 John Kerry, criticized the companies which outsource abroad, avoiding paying taxes. According to polls 71% of citizens believe that outsourcing is extremely bad for domestic economy, while 62% of citizens believe the government should

take certain measures in the form of tax increase, for companies which outsource abroad. The American workforce felt dissatisfied because companies are enabled to hire cheaper labour, while their rights are reduced. The conclusion of many people is that many outsourcing-off shoring contributes to threaten the position of the middle class in society (Hira, 2005).

In European Union law signed between member states in 1977, supplemented in 1998 and consolidated in 2001, guarantees all the rights for employee if he/she loses his/her job because company has decided to outsource. In general, employees whose job(s) are outsourced can benefit from the protection offered by the directive. Searching for the opportunity to reduce costs many Western companies transferred part of their jobs to Eastern European countries. Unlike America, where outsourcing and off shoring are represented in all sectors, several consulting studies have shown that in Europe this type of business is generally being exploited by the banking sector and other financial service firms such as insurance companies. Outsourcing in Europe has produced good results and the application of this kind of business strategy is constantly increasing.

Outsourcing business model has expanded horizons and possibilities of many companies. In a constant desire and needs for cost reduction, many companies have transferred their jobs beside Eastern Europe to Asia. Companies which are doing business in IT, computer technology and software development, thanks to this kind of business, have found their interest in countries like China and India. Today we can confidently state that India is the leading country in software development. India has become an attractive country where many companies (which are not primarily devoted to software development) want to outsource in various fields such as processing and collection data, telephone directories and more. If this country continues with product and whole system development, combining software and applications, this uprising will provide long-term significance of the Indian subcontinent, making it a major global provider of software and putting it, in the competitive position with traditional software countries in the U.S. and Europe. Research shows that China, Malaysia and Philippines are also becoming desirable locations for outsourcing. In the near future, it is expected, that activities in this aspect of business, will expand along the entire Indian Ocean, including market in South Africa, Malaysia, Australia and Singapore. However, the main market will be India, with its potential of more than one million new jobs in the field of outsourcing-off shoring of financial services (Werner, 2001), (Frischmuth, 2005).

9. CONCLUSION

The fact is that many organizations, because of the rapid development of the market, increase competition, technological progress and continuous need for reducing costs, have made a business model such as outsourcing. This mode of operation has enabled the migration of knowledge, expertise, information and techniques, from highly developed countries to less developed and undeveloped countries around the world, contributing to increase globalization. This has created the global division of labour and led to new operational models and business structures. Financial institutions have been forced to reevaluate their position and the way they do business.

Outsourcing from year to year becomes more popular and acceptable business model from financial institutions, which are among the first that have started with outsourcing. Many other organizations in the field of IT-I, automotive and other companies from various spheres of business are also using outsourcing. Organizations have realized the advantages of this business model and implement it. It is obvious that in a lesser or greater extent this business model has shown growth and success and therefore achieving goals and purpose of company existence, profit.

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IMPROVING BUSINESS THROUGH RISK MANAGEMENT

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Abstract: Individuals, organizations and the whole society are at risk more than ever, owing to the technical and technological progress, economic development and social progress. The risk can be reduced through the process of defining a strategy for preventative action and increasing safety measures. In the process, risk management is coordinated with the long-term needs of the individual, organization or society and using different methods and analyses, solves the problem of the gap between the current situation and the achievement of an ideal or desired state with minimum risk, respecting the defined strategies for responding to risks. Applying GAP analysis defines the list of risk priorities and proposes a strategy plan for responding to risks, which is necessary to comply with the existing state in line with the desired lossless.

Key words: risk, risk management, organization, procurement, GAP analysis

1. INTRODUCTION

Modern organizations are characterized by a large number of risk events. Drawing on the literature, this paper defines the concept of risk and exposes a possible concept of risk management, which in the operational work could be part of decision-making process in order to improve business. Thus, risk management can reduce the harm of occurrence of adverse events that may provide an assessment as probable.

Actions of the organization are planned at present, and all potential decisions in their implementation may be "playing", but the concrete realization comes in the future, in which the results are also expected. The future is by definition unknown and uncertain, so the implementation of actions and expected result are uncertain.

Improving business through risk management generally means that the risk is recognized in all stages, so as to the decision-making process would take measures to mitigate risks and achieve the desired objectives. Therefore, risk management involves improving operations, to ensure increased probability of achieving desired goals, and decrease the possibility of adverse events and adverse outcomes.

In many cases the perception of risk is based on experience, monitoring and predicting industry trends. Many theorists have justify this approach and define it as a success. In the area of the sphere of economic decision for some strategic investments may not be based only on prediction, but should have a defined size and to be constantly evaluated in order to be successful at any time. The risk is always current, changing, dynamic and can be viewed as a processing activity.

2. DEFINITION OF RISK

Risk can be most generally identified as a situation in which there is a possibility of occurrence of an adverse event. Under adverse event in the economy is considered a loss or an unexpected cost. From the theoretical point of view, risk is considered to be uncertainty regarding the outcome of an event, in a situation where there are two or more features (Marović Boris & Avdalović Veselin, 2006).

Traditionally, risk management was limited to pure risks, which included: property, personal liability and risks.

Modern theories of risk management belong to a more recent date. They developed in the last twenty years, when the organizations began to expand the scope of risk management, such as taking into account all the risks they face. Organizations acquired the ability to identify risk, measure it, understand the potential consequences and take appropriate measures for its avoidance or mitigation of its consequences. Of course, all this success directly depends on the availability of authoritative information (Šolak Zdravko, 2003).

The essential task of modern risk management comes down to management changes, in contrast to traditional management, which is tasked to regulate and control, or to maintain the system in steady state. If we take into account that changes in the present time very common, dynamic, comprehensive, and with an uncertain outcome is necessarily imposes an increased need to manage these uncertainties that carry certain risks.

Changes in the environment or to obtain new information (financial, manufacturing or control) can influence the initial risk assessment. The requirement for a successful risk assessment is producing timely and accurate information.

However, despite the availability of authoritative information hardly anyone can successfully predict future trends and activities. For these reasons, risk management, is one of the most creative jobs of contemporary organization.

In the literature one finds several definitions of risk. Kerzner defines risk as the probability that a project (task) suffered a failure and the consequences of that failure. According to one conception, Kerzner defines risk as a function of probability of occurrence of risk events and consequences that result from implementation of the risk event. The total risk is increased if the risk increases the likelihood of events or consequences caused by these events.

According to the second concept, Kerzner defines risk as a function of risk event and risk management strategies. In this case, good risk management means to identify the risk event and ensure adequate management strategies to avoid or minimize the consequences that would result from implementation of the identified risk event.

Crouhy M, Galai D. and Mark R, (2006) go so far in the glorification of risk management that they identify it with the conduct of war, "what is war for generals, that is risk management for managers" (p. 4).

3. CONCEPT OF RISK MANAGEMENT

Risk management involves a set of methods and techniques used to reduce the possibility of realization of unwanted adverse events and consequences and thus increase the likelihood of achieving the intended results. The concept of risk management is based on the basic assumption that it was planned, far-sighted, structured, informative and always applicable technique (Samed Karović & Nenad Komazec, 2010). The key to successful risk management is a good strategy, planning and early implementation of measures.

Although each risk management strategy depends on the nature of the organization, risk management must include: risk planning, risk assessment and measures to mitigate risk.

Each management process begins with planning, which can be defined as the process of setting future goals, assumptions about the environment in which to implement the objectives defined, the choice of the direction of action, means and ways to achieve goals. Planning involves internal and external analysis, ie analysis of the environment and the ability of the organization in a variable environment, in order to obtain relevant information.

The information in the process of risk management is essential. Changes in the environment or to obtain new information may significantly affect the change in the original risk assessment.

In addition to risk planning, it is necessary to measure risk and assess the frequency and size of risk exposure. Risk is determined by measuring the importance of a risk for an organization. Adequate risk assessment requires the application of expert knowledge for understanding the information and use of qualitative and quantitative methods.

The risk of a quantitative method, based on the estimated probability of an event and the assumed amount of loss or damage. The problem is the lack of data and uncertainty about the probability of an event. The most widely used approach to risk analysis is a qualitative method. No need for data on the likelihood, but is used to estimate the possibility of loss (damages) or do not respect the absolute values of the parameters, but qualitatively taken their impact on risk.

Taking action to mitigate risk selection process is the best strategy from the existing plan strategies to manage risk.

Risks multiply and complicate the development of technology and increase the overall social standards. This means that we must live with the risk, and that is why it is necessary to find methods for their management. One such method is the GAP analysis.

4. GAP ANALYSIS APPLICATION

If we carefully analyze the risk management process, analysis of internal and external factors shall be based on comparison of risk assessment and define a plan of strategies for responding to risks. GAP analysis can provide a practical solution to these problems, and to the gap between the current situation, the possibilities of the organization and the ideal or desired state, ie permeates through the entire process of risk management.

In essence, GAP analysis sets and gives the answers to two questions:

- What is the situation now?
- What would we like it to be?

GAP analysis is carried out through four steps (Figure 1):

- identification and recording of risk (status quo),
- analysis and risk assessment (identification problem),
- defining recommendations (required),
- a proposing plan strategies for responding to risks (solutions).

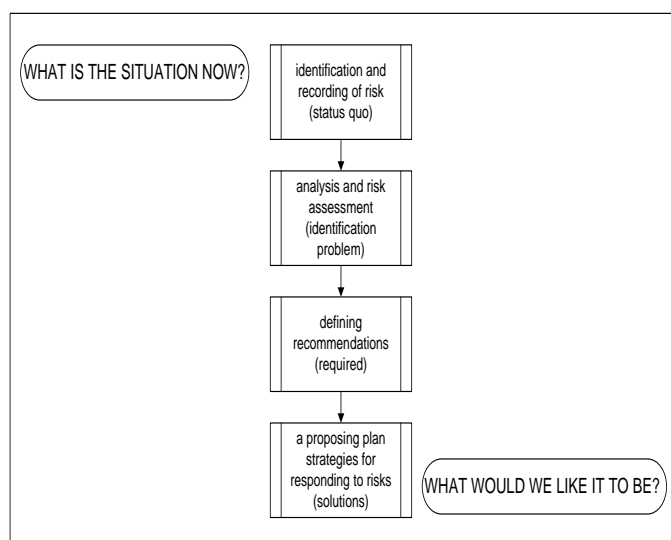


Figure 1: Realization of GAP analysis (adjusted <http://www.webteh.hr/usluge/pci-dss-implementacija/gap-analiza>)

Risk identification is the first step in the overall process of risk management. Risk identification is the process of identification and classification of risk events that in the future may have a negative impact on the goal that is implemented and can lead to losses. It covers the process of determining, recording, classification, and ranking hazards that can realize the negative impact. Since the continuous risk management process that takes place continuously throughout the year, this means that the identification of risk, not only the determination of risk at the beginning but also throughout the whole year of business organization. The risk is usually classified by cause of apparition, and sometimes by the consequences. The ranking is usually done by the possibilities of risk management, and by the solution (risk weight). Efficient implementation of the planned objectives can be achieved if all the risks are not known in advance. Therefore, the identification of risks is very important step in the process of risk management.

For proper management and risk identification, it is important that the organization fully understands the nature of the risk and its relationship and impact of internal and external risks. Problems can arise as a manifestation of non-compliance of internal and external factors (Philippe Carrel, 2009).

After the identification of risk events next step in the process of risk management is its analysis. In this step it is detailed analyzed and evaluated the likelihood of a risk analysis of interdependent risks, defines the space and time where the risks can be expected to determine the size and impact of risks to achieving goals. The implementation process involves analysis to take into account all the risks identified in the identification stage. The usual practice is that risks that are considered high risk are analyzed in detail. However, risk analysis should be very cautious. Although much importance is given to high-risk analysis, the risks of low-risk must not be overlooked, which set or combination can make a big impact on the process of realization of the goals.

As a wayout of risk analysis in the third step are defined recommendations.

Based on the recommendations, and according to the capabilities of the organization, the possible solutions, are proposed a plan of strategy made for responding to the risks, and measures and actions that should be taken so as to the current state corresponds to the desired state without consequence.

GAP analysis is one of the most important steps in planning stages and risk comparisons, and begins with phase of analysis of internal and external factors. GAP analysis is the result of a strategy plan for responding to risks that must be respected and implemented to the current state at any time agreed with the desired state.

An example application of GAP analysis in the planning of risk in a real organization (just a function of procurement) can be seen in Figure 2:

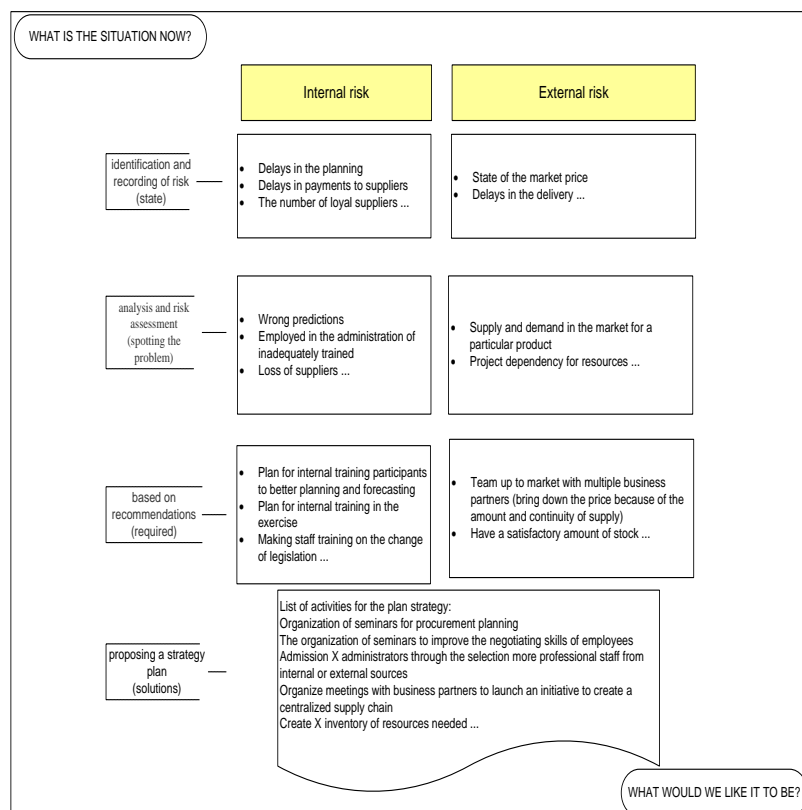


Figure 2: Example of GAP analysis in the procurement process

The planning results (of any function in the organization) is a plan with specific measures, activities, deadlines and carriers. from the above examples can be seen that the resulting gap analysis based on recommendations from the plan a strategy for responding to risks, where necessary observed is the plan to

be agreed with the status quo desired. The practical importance of the gap analysis is reflected in the definition of recommendations and its reformulation in the specific plan as the basis for the work.

5. CONCLUSION

The very organization of the risk assessment must be good. Poor attitude to risk management can lead to a miscarriage of the desired state, that is, significant losses in the organization.

Although the risks can not be entirely predicted, most of them can be still predicted with good management and treatment, and uncertainty that accompanies the risks can be largely transformed into a certainty. Through risk management it is necessary to identify important risk factors and develop a proper risk management plan, to be reduced to a minimum the likelihood of a risk event and its bad influence.

The main objective of this study is a scientific description of the application of GAP analysis of risk management, taking into account the real possibilities for the realization of research, pointing to the importance of risk in modern organizations.

Examining the possibilities of GAP analysis of risk management has established its practical applicability. In the present example the use of GAP analysis is described and observed the content and manner of its application.

The importance of research is reflected in the practical application of GAP analysis in all phases of risk management, particularly in defining the list of risk by the priorities according to which a plan for strategies for responding to risks is developed.

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THE ROLE OF SOCIAL ENTREPRENEURSHIP IN ACHIEVING THE CONCEPT OF SUSTAINABLE DEVELOPMENT

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Abstract: *This paper is aimed at highlighting the importance, significance as well as the role social entrepreneurship has in making a contribution to the achievement of the concept of sustainable development and achieving the main millennium goals. The activities of social entrepreneurship oriented towards the achievement of the concept of sustainable development include a new approach demanding the implementation of the principle of social responsibility. The incapability of states, governments and big companies to solve the society's social problems treads a path for innovative social entrepreneurs to offer services that satisfy people's basic needs, especially those of marginalized groups, as well as those of generations to come. Social entrepreneurship activities open new possibilities for big companies, too, to more actively become involved in achieving the concept of sustainable development. The establishment of new social values based on knowledge, creativity and social responsibility contributes to the encouragement and development of social entrepreneurship having a significant influence on a balanced social, economic and cultural development.*

Key words: *social entrepreneurship, sustainable development, social responsibility, social enterprises, change*

1. INTRODUCTION

The moment contemporary society exists at is characterized by social, political, economic and ecological problems. On the other hand, it is necessary that a balance between economic and social development as well as a natural environment humans need to live in should be achieved. Also, it is needed that decisions at the global level be reached on social-economic issues, comprising: global warming, atmosphere pollution, poverty eradication, technological innovations and economic development.

The role of social entrepreneurship, as a form of social economy, is, first of all reflected in the improvement of the quality of living¹ as well as in achieving the concept of sustainable development, while, simultaneously, social problems are transformed into managerial ones, solved in an innovative and entrepreneurial way. Social entrepreneurs engage themselves in reviving hope that problems will be solved and spreading optimism in the field of achieving sustainable development. Differently from big organizations, they do not attempt to modify the world's good practice but are focused on what is possible to achieve at the local level.

The United Nations' Millennium Declaration with its eight main millennium goals², adopted at the New York Millennium Summit in 2000, bound states, both rich and poor, to do their best to reduce poverty, promote sex equality, achieve the peace, democracy and sustainability of natural environment. As early as in 2002, it was clear that these goals would not be achieved in many countries.³ In September 2010, at the UN General Session, the status of the implementation of the millennium development goals was revised and it was concluded that the main factor influencing the non-fulfilment of the obligations was a lack of funds to finance the millennium development goals⁴.

¹Parun-Kolin, M., Petrušić, N., (2008), Social Enterprises and the Role of Alternative Economy in European Integrations Processes, European Movement in Serbia, Belgrade, p. 27.

²<http://www.un.org/millenniumgoals/>

³Ziegler, R., (2009), An Introduction to Social Entrepreneurship: Voices, Preconditions, Contexts, Edward Elgar Publishing Limited, UK p. 231

⁴Innovative financing for the MDG's: A precondition for success; New York, 20-22 Sept. 2010, taken from http://www.un.org/esa/ffd/events/21Sept2010_SideEvent_InnFinForMDGs.pdf

Social development is a complex process impossible to program or manage by a linear intervention. Given the fact that there is no unique formula or reference point ensuring a balance between nowadays' consumption and saving for the future, sustainable development remains a process we incessantly learn about, a process in need of innovative solutions and models for the creation of sustainability.

2. THE INFLUENCE OF SOCIAL ENTREPRENEURSHIP ON SOCIAL TRANSFORMATION

The Report of the World Commission on Environment and Development from 1987, entitled "Our Common Future", indicates that the policy of economic growth and global crises (energy, development and environmental crises) are a danger to humans and the planet Earth, with no possibility of its regeneration⁵. Fifteen years later, at the World Summit on Sustainable Development held in Johannesburg in 2002, there were statements that the global environment is increasingly suffering⁶. It has become obvious that climate changes are more rapid and natural disasters more frequent and more devastating, while air and water pollution have reached alarming dimensions. However, market globalization provides new dimensions of these problems, reflected on developing countries which are becoming more sensitive and vulnerable and are having a more difficult time in solving such problems, because its costs are unevenly distributed. On the other hand, it has become clear that neither developed organizations nor multinational companies are capable of offering necessary innovative solutions to the achievement of sustainable development at the global level. One of the main reasons for this is the fact that the solving of problems influencing the achievement of the concept of sustainable development requires that we solve a series of interrelated problems which, as such, cannot be eliminated by direct intervention because there is no clear picture of the chain of causes⁷. Also, aid for the poor by means of food, drug or educational service and medical care direct donations, does not ensure the change of the system that has caused the emergence of poverty. An especially sensitive social group – the extremely poor⁸ – has a high natural increase growth rate, which brings about a quicker increase in the number of the extremely poor in comparison with the development of efforts for poverty suppression. The projected population growth until the year 2045, as presented by the World Bank, shows that 1.5 billion out of 2.2 billion new-born population will be born in the lowest-income area whereas 0.026 billion will be born in the highest-income area⁹.

To achieve the concept of sustainable development and solve the stated problems, a new approach is needed, the one that, first of all, includes the implementation of the social responsibility principles, which represents the basis for the development of social entrepreneurship changing human lives as well as the system creating and maintaining obstacles to achieving sustainable development; it is also an increase in all people's awareness of a high degree of responsibility in all spheres of life and work, even in the one concerning the simple population reproduction. In that view, it is necessary that social marketing concepts should also be applied through organized activities carried out by organizations taking care of the welfare state in order to elevate the awareness of marginalized groups to a higher level that would also involve the concept of social responsibility related to uncontrolled reproduction, which is extraordinarily important from the aspect of overall sustainability.

Social entrepreneurship as a possibility of and an opportunity to overcome numerous social problems is increasingly becoming a legitimate model of implementing social changes, encouraging the recognition and solving of problems existing in society. Social entrepreneurs have a double role to play and make a double contribution to society: firstly, they contribute to specific changes through their business, and secondly, they stimulate other individuals and organizations to engage themselves in shared finding solution to problems of contemporary society. Change is undoubtedly a term one cannot avoid when contemplating over contemporary business and living conditions. Only change creating a new and sustainable balance and contributing to finding a solution to the root, i.e. cause of a problem, not its consequences, is real and credible change. This fact has been recognized by social entrepreneurs who are becoming initiators of the remodelling of different social fields (health-care, living environment,

⁵ UN (United Nations) (1987): Report of the World Commission on Environment and Development, Our Common Future, taken from <http://www.un-documents.net/wced-ocf.htm>

⁶ UN (United Nations) (2002): Report of the World Summit on Sustainable Development: Johannesburg, South Africa, 26 August-4 September 2002. A/CONF.199/20 and A/CONF.199/20/Corr.1

⁷ Seelos, C., Ganly, K., Mair, J., (2005), Social Entrepreneurs Directly Contribute to Global Development Goals, IESE Business School, University of Navarra

⁸ The World Bank defines extreme poverty as living with less than 1US\$ per day

⁹ United Nations, (2004), Department of Economic and Social Affairs, Population Division, World population to 2300, New York, taken from <http://www.un.org>

education, social protection, entrepreneurship development) in that they take advantages where others fail to in order to upgrade systems, design new, effective and sustainable solutions and create new approaches to social values.

If sustainable development is observed as “development satisfying needs of the present in a way that the possibility of future generations to satisfy their own needs is not threatened”, according to the definition contained in the Brundtland Report, then two concepts which sustainable development consists of are possible to observe¹⁰:

- a) the concept of needs (special and basic needs of the poor, which have the most important significance) and
- b) the concept of limitations (economic development conditioned by the current degree of the development of technology and the protection of living environment).

Social entrepreneurship activities for achieving the concept of sustainable development can be conducted in three fields:¹¹ 1) by satisfying humans’ basic needs, 2) by developing a society in which norms, rules and behaviour are determined as preconditions for taking part in social and economic development, and 3) by translating assumed needs of future generations into current actions.

The satisfying of humans’ basic needs is the absolute priority of social activities necessary for achieving sustainable development. There are numerous examples of the social entrepreneurship of profit and non-profit organizations making their own contributions to achieving the Millennium Goals. The biggest non-profit organization in the world that influences the lives of millions of people, dealing with sustainable development issues, BRAC¹², addresses the problems of the reduction of poverty, disease, illiteracy and social injustice. Founded in Bangladesh 40 years ago, this organization has directed its activities towards the education of people and communities to realize their potentials by means of economic and social programs and also towards the segment of the transformation of the process of change in personal lives and, simultaneously, in the overall community. Thanks to social entrepreneurship, i.e. different social enterprises (handicrafts shops, printing houses, dairies), and being the biggest non-profit organization in the world, BRAC generates 80 per cent of the budget, i.e. 485 million dollars today. The success in the field of social entrepreneurship and in achieving sustainable development has encouraged the World Bank to grant loans to BRAC and other non-profit organizations dedicated to the same task – the strengthening of the economic power of Bangladesh. On the basis of the so-far successes of social entrepreneurship and economic indicators, the World Bank forecasts that Bangladesh could join countries of the middle revenue rank by the year 2016¹³.

The other crucial aspect of development is the creation of a society where norms, rules and behaviour are determined as preconditions for taking part in social and economic development. Social enterprises should engage themselves in order to establish and enhance discipline, interpersonal support, individual responsibility as well as responsibility towards the community. It is necessary that new forms and models of behaviour be developed, as well as that the view of life and an individual’s prospects be changed through different educational programs. The research BRAC initiated with an aim to enhance the quality of education, the teaching process and the educational system in a school in Bangladesh asked a question intended for children between 10 and 12 years of age concerning what they would like to do once they have grown up. The results accounted for answers completely contrary to the expected ones. So, the respondents did not want to be rickshaw drivers nor housewives, either; they wanted to be doctors, professors or managers¹⁴. Such ambitions and expectations of the new generation give rise to the society’s responsibility to create conditions for their achievement as well. The lack of a market, as well as opportunities, the non-existence of an efficient input market as well as infrastructures limit people in their use of their own knowledge and their productivity, too. Organizations thinking in an entrepreneurial way and having developed their social sensitivity, such as BRAC or SEKEM, have been trying to make a connection between poor rural areas with the existing urban zones’ markets or the international market.

¹⁰<http://www.iisd.org/sd/>

¹¹Seelos, C., Ganly, K., Mair, J., (2005), Social Entrepreneurs Directly Contribute to Global Development Goals, IESE Business School, University of Navarra

¹²www.brac.net

¹³Jonker, K., (Winter 2009), In the black with BRAC, Stanford Social Innovation Review, taken from http://www.ssireview.org/articles/entry/in_the_black_with_brac/

¹⁴Seelos, C., Mair, J., (2005), Sustainable development: How social entrepreneurs make it happen, IESE Business School, University of Navarra, taken from www.iese.edu

Egypt's social-entrepreneurial organization SEKEM¹⁵ was founded in the year 1977 on the area of 70 ha of desert soil; however, today, it is a pioneer in organic agriculture in Egypt, placing its products in both local and international markets. Part of SEKEM's profit is used as a financial support to different non-economic activities concerning the achievement of sustainable development.

The third aspect necessary for sustainable development is the translation of assumed needs of future generation into current actions. Today, it is impossible for us to know the exact nature of future needs; however, it is certain that future generations will need to make their own choices on their own. The concept of sustainable development imposes the imperative of behaviour which makes it possible for generations to come to make their choice, not shrinking that possibility. The research related to this theme called "British Public Opinion on the Needs of 'Future Generations' was carried out by the Intergeneration Foundation and Foundation for Democracy and Sustainable Development in November 2011¹⁶. To one question: what it is the most important to leave to future generations, 46% of the respondents answered – a healthy planet, 16% – the technology and skills for the survival of mankind, 16% – safety and security, 9% – a developed economy, 8% – a developed society, and 4% – non-polluted nature. Apart from these questions, today's society should certainly take into consideration some other factors significantly influencing the lives of those to come, no matter if they make their survival easier or endanger it. When assumed expectations of new generations are in question, professor Tough of Toronto University highlights that strategies and actions are needed in the following fields¹⁷: peace and security (the elimination of nuclear and biological weapons, the application of non-armed methods, the strengthening of the spirit of tolerance and community); living environment (intensive activities to achieve the concept of sustainable development when agriculture, forestry, fisheries, feral animals, water and energy are concerned); catastrophes (identifying all potential catastrophes that can endanger or destroy human civilization, such as: epidemics, biological experiments beyond control, cosmic phenomena and taking all necessary measures to avoid catastrophes); knowledge (the implementation of steps ensuring that culture, knowledge, literature, music and arts and other heritage are saved for generations to come); children (child poverty reduction, famine, child negligence and abuse, and bringing up children with good mental and physical health, self-confidence and learning and thinking skills) and learning (enabling permanent lifelong learning, which should contribute to each individual to live and be responsible for one own self, the community and the planet, as well as for generations to come).

Due to an increasing concern of ever-worsening conditions of our living environment, a fact has been recognized that new generations' living conditions directly depend on our responsibility towards our natural environment today. Some countries, such as Bolivia or Norway,¹⁸ have more seriously approached the obligation of the promotion of interests of future generations by today's generations by implementing those obligations in the state Constitution. Non-profit organizations are also very active in achieving the concept of sustainable development when living environment is concerned. One of the biggest and most respectable world organizations for the protection of nature, the WWF¹⁹, supported by even five million people, is active in more than one hundred countries on the five continents. The Greenpeace²⁰ global organization exists, as they say themselves, because the fragile planet Earth deserves a solution, change and action, and their campaigns are waged because of climate changes, the devastation of rainforests, the violation of the ocean's ecosystem, genetic engineering, pollution and nuclear weapons. Social entrepreneurship of small organizations also significantly contributes to sustainable development and the preservation of living environment. To reduce the waste's damaging effect, especially the one of plastic, social entrepreneurs produce bio composite degradable materials, and in Malaysia and Indonesia (where 80% of the world palm oil production is realized), food transportation packaging is produced from palm-oil post-extraction residues²¹.

¹⁵ www.sekem.com

¹⁶ British public opinion on the needs of "future generations", taken from <http://www.fdsd.org/>

¹⁷ Tough, A., (1993), What future generations need from us, Futures, Butterworth-Heinemann taken from <http://allentough.com/>

¹⁸ Science and environmental health network, (2008), Models for protecting the environment for future generations, taken from <http://www.sehn.org/>

¹⁹ <http://www.wwf.org/>

²⁰ <http://www.greenpeace.org/international/en/>

²¹ Pandey, A., Mukherjee, G., Kumar, S., (2009), Creation of economic and social value by social entrepreneurship for sustainable development, International Journal of Human and Social Sciences

All the mentioned activities of social entrepreneurship contribute to the achievement of sustainable development because they, first of all, influence the fulfilment of the basic needs of today's and future generations, changing the view of life and an individual's prospects, creating a society supportive of those changes.

3. THE CONCEPT AND POSITION OF SOCIAL ENTERPRISES IN EUROPE

In Europe, the concept of social entrepreneurship appeared for the first time in 1990, after the establishment of the cooperative movement in Italy. The journal called *Impresa Sociale (Social Enterprise)* began to discuss issues related to social entrepreneurship as a response to unsatisfied social needs. "Social Cooperatives" established by the Italian parliament in the year 1991 used to be the first legal form of organizations of similar social enterprises. Simultaneously, in other European countries, there were also similar initiatives; in the year 1996, the EMES²² network was formed, covering the then 15 European Union member countries, whose aim was to study the emergence of social enterprises in Europe. According to EMES, the concept of social enterprises is based on two series of indicators – economic and social. In order to account for the economic and entrepreneurial dimensions, it is necessary that an enterprise satisfy the following four criteria²³:

- a constant production and/or service providing activity;
- autonomy from the state and private sectors;
- an enterprise consciously takes an economic risk to achieve own incomes;
- an enterprise employs a certain, though minimal sometimes, number of paid workers, although volunteers most frequently take part in working activities in a social enterprise;

According to the same source, and with an aim to point out the social dimension, an enterprise should fulfil the following five criteria:

- to carry out business activities to achieve social performance and benefit for the society or a certain marginalized group;
- to be formed and act as the result of an organized and solidity campaign of the citizens;
- to make management and decision-making inside the enterprise be independent of the equity share and be based on the "one member-one vote" principle;
- to have users participate in the managing structure of a social enterprise;
- to have the profit limited distribution practice.

In both Europe and the USA, the basic mission of social entrepreneurship and social enterprises is to contribute to the community or create a "social value", not to distribute a profit. The American approach to social entrepreneurship includes entrepreneurs – individuals motivated to solve social problems, whereas in Europe, the organizational approach to social entrepreneurship is more present²⁴.

At the European Union level, social enterprises make almost 10% of all enterprises (around 2 million social enterprises) and employ 6% of all employees in the EU, whereas the number of users of services provided by social enterprises is more than 100 million²⁵. Apart from the social function it performs, social entrepreneurship significantly contributes to Europe's economic development through the development of social economy. Within the European Union's countries, the International Centre for Research and Information on Public, Social and Cooperative Economies (CIRIEC) carried out research with the following goals: to assess the level of the recognition of social economy in three important spheres: public administration, the world of academics and scientists as well as the social economy sector itself in each country and identify and assess other similar concepts²⁶. The results account for the fact that three groups of countries are recognized:

²² www.emes.net

²³ Fayolle, A., Matlay, H., (2010), Handbook of research on social entrepreneurship, Edward Elgar Publishing, UK, p. 68

²⁴ Group 484, Report from the International Conference Social Entrepreneurship – Possibilities and Perspectives, Social Entrepreneurship – the Electronic Bulletin on Social Entrepreneurship, No. 1, July 2010, taken from <http://www.grupa484.org.rs>

²⁵ <http://www.emins.org>

²⁶ Chaves R., Monzón Campos J. L., (2010), Social Economy in the EU, Social Policy Review, Year 17, No. 1, pp. 113-138, Zagreb.

- countries with the highest level of accepting the concept of social economy – including France, Italy, Portugal, Spain, Belgium, Ireland and Sweden. In France, as well as in Spain, social economy is legally acknowledged, too;
- countries with a middle (relative) level of accepting the concept of social economy – including Cyprus, Denmark, Finland, Greece, Luxembourg, Latvia, Malta, Poland and Great Britain. In these countries, the concept of social economy coexists together with other concepts such as the non-profit sector, the volunteering sector and the social enterprises sector. In Great Britain, the low level of recognizing the concept of social economy is in contrast with the government's policy of supporting social enterprises. In Poland, it is quite a new concept, however more and more accepted, and the structural performance of the European Union has contributed to that the most;
- countries with small recognition or no recognition at all of the concept of social economy – including Austria, the Check Republic, Estonia, Germany, Hungary, Lithuania, Holland and Slovenia. The social economy concept is little known of or is still in the cradle, whereas similar concepts such as the non-profit sector, the volunteering sector and the non-government organizations sector enjoy a very high level of relative recognition.

On the basis of the European Union's data, it is possible to notice that there is a permanent increase in the number and organizational forms within social economy. In the last two decades, these organizational forms have been contributing to not only employment but also to finding a solution to numerous social problems because we must bear in mind the fact that the health-care and social protection provided on the basis of social economy covers 120 million users²⁷.

Table 1: Service and Production Types in Social Enterprises

<i>Social enterprises' activities</i>	<i>Types of social enterprise</i>	<i>Number of organizations %</i>
Social services	29	19
Recycling	28	18
Services for enterprises	19	12
Personal social services	14	9
Maintenance of parks and urban regeneration	12	8
The processing industry	10	6
The construction industry	9	6
Restaurants and hotels	8	5
Transportation and telecommunications	7	5
Culture and recreation	7	5
Education	5	3
Trade	3	2
Services	3	2
Agriculture	1	1
Total	155	100

Source: European Movement in Serbia, (2008), Social Enterprises and the Role of Alternative Economy in European Integrations Processes, p. 31

As it can be seen from the table, the most present field of the activity of social enterprises is the one of organizing social services substituting public programs, especially when the disabled-related programs are in question. Reasons lie in the impossibility of the public sector to offer sufficiently acceptable and adapted social protection solutions which would cover different target groups. As a solution to these shortcomings, social enterprises offer socially responsible programs for one part of the population, where special efforts, empathy, enthusiasm, a new and more efficient system for the integration of individuals and social groups in society as a whole are needed.

The studies focused on the development of this field say that, apart from social services, social entrepreneurship activities are oriented towards numerous local problems such as: recycling,

²⁷ European Movement in Serbia, (2008), Social Enterprises and the Role of Alternative Economy in European Integrations Processes, p. 31

transportation organization, tourism, local handicrafts or free time organizing, social housing and the protection of living environment²⁸.

Social entrepreneurship does not make its contribution only via innovative individuals; its power lies, and increasingly does so, in the strategic partnership and cooperation with the economy, government, universities and, of course, entrepreneurs on an interpersonal basis. In connection with that, the European Commission simplified the procedures for commencing business activities of social enterprises, i.e. it facilitated their access to the capital market, so, in future, they will not predominantly be dependent of the state budgets' funds. With an aim to promote a concrete social market economy, which is essential for the Europe 2020 Strategy, the European Commission started the Initiative for Social Business²⁹. This should stimulate the creation and growth of social enterprises given the fact that social enterprises have been prioritized in financing within the framework of the EU regional policy. In the time period 2014-2020, the European Union plans to help the repayment of the debt and social enterprises' new investments with about 90 million Euros, which should contribute to the growth of the number of jobs in social economy.

4. THE DEVELOPMENT OF SOCIAL ENTREPRENEURSHIP IN SERBIA

The condition of social entrepreneurship in Serbia is assessed as an unused possibility for Serbia to reduce poverty, unemployment and the social exclusion of marginalized groups, and to enable a more balanced regional development. In Serbia, there is still no adequate legal and decree-level regulation for the successful functioning of social enterprises; at the same time, there is no sufficient degree of knowledge of this sector's potential, either³⁰. The Act on Professional Rehabilitation and Employment of the Disabled³¹ introduces the term "social enterprise" in our legislation for the first time, while the new Act on Social Protection³², adopted in the year 2011, was reached with an aim to stimulate social inclusion, also enabling disabled people's organizations to become authorized providers of certain services inside their local communities. In Serbia, there are about 15,000 social enterprises including non-government organization, associations and cooperatives, too.³³ The review of organizations in Serbia, on the basis of the definition of social enterprises according to the EMES network's research conducted in the year 2008, shows that there are 1150 organizations in Serbia with social enterprise characteristics, namely³⁴:

- citizens associations,
- cooperatives,
- professional enterprises for the employment of the disabled,
- dependent spin-off enterprises established by citizens associations (most frequently in a form of limited liability companies and joint-stock companies),
- business incubators, and
- agencies for the development of small and medium enterprises.

The mapping results point out the fact that the total number of part- and full-time employed workers in social enterprises is about 12,000, which is no more than just 0.5% of the total number of the employed in Serbia. On the other hand, it is estimated that there are between 700,000 and 800,000 persons with disability, 160,000 of whom are capable of labour³⁵.

Although social entrepreneurship is an addition to the market economy, it is only about to develop in Serbia, and currently exists in the form of individual initiatives by which unemployment and social exclusion issues are solved in individual cases. The secondary research results account for the fact that the majority of social enterprises penetrates the market with no special privileges whatsoever, compared to the European Union countries where they are enabled that. Social enterprises in Serbia are strongly

²⁸ Ibid.

²⁹ <http://ec.europa.eu>

³⁰ <http://www.kombeg.org.rs>

³¹ The Official Gazette of the Republic of Serbia, No. 36/2009 as of 15th May 2009, Act on the Professional Rehabilitation Employment of the Disabled

³² The Official Gazette of the Republic of Serbia, No. 24/2011 as of 31st March 2011, Act on Social Protection

³³ <http://www.euractiv.rs>

³⁴ Cvejić, S., Babović, M., Vuković, O., (2008), Mapping Social Enterprises in Serbia, UNDP Serbia, Belgrade

³⁵ Statement by Sanja Gavranović, woman adviser at the Ministry of Economy and Regional Development of the Republic of Serbia (communicated by Tanjug on 12th March 2012)

oriented towards agriculture, retail activities and job-finding intermediation. The majority of these enterprises sell their products and/or services to citizens and profit enterprises. Also, the majority of social enterprises in the market operate individually, without entering partnerships.

“The Network for the Development of Innovative Social Entrepreneurship”³⁶ project (ISEDE NET) was being implemented in the time period from March 2009 to September 2011 and was supported by the EU. It had been designed with an aim to help the development of the social economy and social entrepreneurship in the region of South-east Europe and encourage a more competitive job-finding and social cohesion market in Europe. Among other things, it was aimed at determining possible drivers of social entrepreneurship oriented towards the job-finding and inclusion of threatened population categories in the society and the achievement of socially responsible activities. The Network members are provided with:

- free business support services in the fields of business doing, marketing, finance, the development of human resources and legal aid;
- a facilitated communication amongst registered social enterprises enabling the exchange of information, learning about new business, cooperation development and exchange of goods and services;
- better visibility of certain social enterprises.

There are three most important general conclusions that can be derived from the breakdown of the condition of social entrepreneurship in Serbia at this moment, namely³⁷:

1. In Serbia, there is an obvious and urgent need for a closer and better definition of the framework for the development of social entrepreneurship. (This conclusion is grounded on the fact that a large number of marginalized persons are in need of support as well as those facts that a certain number of social enterprises already exist and do business in Serbia.)

2. In Serbia, there is a good basis for the development of social entrepreneurship. (Numerous attempts are recognized in trying to actively contribute to social inclusion and sustainable development via different legal frameworks and ways of financing. Positive experiences from the European environment encourage the development of the awareness of the strengthening of social cohesion, whereas the theme of social entrepreneurship is making its steps within the framework of national institutions and legal regulations.)

3. In Serbia, there are numerous obstacles to the affirmation and development of social entrepreneurship. (The establishment and financing of social enterprises has not been institutionalized yet because, unfortunately, there is no sufficient understanding of the significance of this sector and its role in the planning of the national budget and activities has not been gained an insight into. On the other hand, social enterprises have no sufficient knowledge and entrepreneurial skills to respond to problems and unsatisfied needs of the society.)

It is important to add the fact that it was in Rio de Janeiro in 1992 that the problem of inclusion of developing countries³⁸ was recognized as economic and technical. Also, it was concluded as necessary to provide an international financial and technical support to countries whenever convenient involving the private sector in implementing national policies and programs for sustainable development. Accordingly, in 2007 Serbia adopted a national strategy for sustainable development³⁹ based on the globally accepted principles identified in the Declaration of Sustainable Development in Johannesburg, the UN Millennium Development Goals and the EU Sustainable Development Strategy. The vision of sustainable development sees Serbia in 2017 as an institutionally and economically developed country with adequate infrastructure, compatible with EU standards, with a knowledge-based economy, efficient use of natural and man-made resources, greater efficiency and productivity, well-educated people, with a preserved

³⁶ <http://rs.isede-net.eu/homepage>

³⁷ Group of authors, (2011), Social entrepreneurship: the models, comparative practice and legal framework of social entrepreneurship in Serbia, Group 484, Belgrade, p. 128

³⁸ UNCED (1992): Agenda 21: Programme of Action for Sustainable Development, Rio Declaration on Environment and Development. N.Y.: United Nations, taken from <http://www.un.org/esa/dsd/agenda21>

³⁹ Nacionalna strategija održivog razvoja, taken from <http://www.pks.rs/SADRZAJ/Files/Nacionalna-strategija-odrzivog-razvoja-Republike-Srbije.pdf>

environment, historical and cultural heritage, the state where there is partnership of public, private and civil sectors, providing equal opportunities for all citizens.

5. CONCLUSION

The sphere of the influence social entrepreneurship has on social and economic development is significant. The majority of researches point to excessive population, excessive consumption and excessive pollution, and they highlight the necessity of sustainable development accompanied by a rational use of resources, the protection of living environment, waste recycling and poverty reduction, the controlled population reproduction. In such circumstances assumptions for the creation and development of social enterprises are developed, too, and they are: the connectedness with the local community and offering welfare by solving concrete social problems, stimulating local development and supporting local institutions and markets to achieve general social benefits of the local community. The idea and practice of social entrepreneurship are not new in the business world, but the concept of social entrepreneurship is being diversified in organizations, industry and geographical areas, and recently it has been paid greater attention to within the framework of the public and private sectors as well. Given the fact that neither big companies nor states' governments have succeeded in doing much to achieve the concept of sustainable development and reach the millennium goals, there is still a chance and hope that innovative and enterprising individuals and groups will be using a new and more efficient approach to, locally first, then globally as well, manage to satisfy the need to actively contribute to social inclusion and sustainable development.

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EPI: ENVIRONMENTAL FEEDBACK ON ORGANIZATION'S SUSTAINABILITY

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Abstract: Selecting meaningful and effective tools for measuring environmental performance is becoming increasingly important due to the increasing costs of environmental operations; market, regulatory and public pressures; voluntary initiatives, such as the International Chamber of Commerce Business Principles for Sustainable Development; and international standards, such as the International Organization for Standardization (ISO) 14001. Many metrics are already in use. These include lagging indicators, which measure outputs such as pounds of pollutants emitted or discharged; leading indicators, which are in-process measures of performance; and environmental condition indicators, which measure the direct effect of an activity on the environment. Each type of indicator has its own strengths and weaknesses, and different audiences; most organizations use a mixture of them. Organizations that measure, manage and communicate their environmental performance are inherently well placed. They understand how to improve their processes, reduce their costs, comply with regulatory requirements and stakeholder expectations and take advantage of new market opportunities. This paper considers some of the ways in which organizations are now developing new "win-win-win" strategies in this area with the aim to simultaneously benefit the organization, its customers, and the environment.

Keywords: *sustainable development, sustainable organization, environmental performance indicators, measuring environmental performance indicators*

1. INTRODUCTION: SUSTAINABLE DEVELOPMENT AND SUSTAINABLE CONSUMPTION AND PRODUCTION

Concurrent to the publication of Our Common Future, the 1987 report of the World Commission on Environment and Development, and the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992, the concept of sustainable development - involving the integration of environmental thinking into every aspect of social, political, and economic activity - has become central to the environmental debate. Therefore, societies and businesses need to make a drastic shift to a sustainable socio-economic system with fewer environmental impacts. There is an increasing recognition that good environmental performance makes good business and organization sense.

As a result of population growth and economic development, humans have exerted a considerable impact on the Earth and have become seriously incompatible with natural resources, environment and economy. At the same time, as outcomes, environmental problems appear as one of the greatest problems of the 21st century. The rapid technological advancements and industrialization have resulted in an increased level of negligence and insensitive behaviour, leading to the destruction of environmental balance (Cetin & Nisanci, 2010).

Population growth demands a new concept of development – one that is sustainable and that takes into account the satisfaction of the needs and desires of every citizen of the Earth, of the pluralism of societies, but also the balance and harmony between humanity and the environment. The implication of this ecological situation is obvious: to be sustainable, human beings must live within nature's carrying capacity; and they must measure where they are now and how far they can go (United Nations, 1972).

Sustainable development is a global development management philosophy that aims to conserve the integrity of the Earth's ecosystems while supporting economic growth and social welfare, and therefore, is linked to ongoing economic growth and development (Petrović et al., 2011). It was developed by the Brundtland Commission during the World Commission on Environment and Development in 1987 (WCED,

1987). Sustainable development has been defined in many ways, but the most frequently quoted definition is from *Our Common Future*, also known as the Brundtland Report:

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

The use of this definition has led many to see sustainable development as having a major focus on intergenerational equity. Although the brief definition does not explicitly mention the environment or development, the subsequent paragraphs, while rarely quoted, are clear. On development, the report states that human needs are basic and essential; that economic growth, but also equity to share resources with the poor is required to sustain them; and that equity is encouraged by effective citizen participation. On the environment, the text is also clear: The concept of sustainable development does imply limits - but absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities.

It is undisputed that all definitions of sustainable development require that we see the world as a system - a system that connects space; and a system that connects time. The concept of sustainable development is rooted in this sort of systems thinking. It helps us understand ourselves and our world. The problems we face are complex and serious - and we can't address them in the same way we created them.

Further on, one of priorities for immediate actions in strategies of sustainable development every company is sustainable consumption and production. This strategy sets out how this is being taken forward, through measures to promote:

- better products and services, which reduce the environmental impacts from the use of energy, resources, or hazardous substances;
- cleaner, more efficient production processes, which strengthen competitiveness; and shifts in consumption towards goods and services with lower impacts.

World goods and services production growth of 6.000 billion dollars in year 1950 to 43.000 billion in 2000 caused devastation of environment to the extent that we couldn't even imagine 50 years ago. If the world economy continues with 3% growth a year, production of goods and services will quadruple in 50 years accumulating in total sum of 172.000 billion of dollars (Emil, 1994).

In last 20 years new global awareness that demands switching to sustainable production is increasing. Instead of emphasizing quantity and a mass production now emphasize is given to quality. Additional value is not knowledge based anymore but resource based. Innovation is not reflecting in finding new ways of increasing existing capacities for exploiting the nature anymore but in finding alternative materials which can be used in production process. That's how different kinds of waste usage, that was just piling before and further more polluting the environment, came about.

Sustainable consumption issue was raised for the first time as one of the key issues of sustainability at UN Conference on Environment and Development in Rio in 1992. Two decades since, different experts from this area agree that progress in tracking consumer habits and thinking the ways of changing them is too slow. Sustainable consumption emphasizes that quality of consumption must increase, both of today's generation and the future ones. This concept demands optimization of consumption subject, in order to sustain in time utilization and quality of resources, hence environment as well (Emil, 1994).

2. ENVIRONMENTAL IMPACTS

Although, several papers already discussed companies' environmental impacts, the precise meanings of this construct often remains unclear and badly-defined (GLRI, 2005). Possible reason for this ambiguity is that perceptions of environmental impact "differ depending on one's view of the environment and the components of the environment that one values" (Riha et al., 1996). Further, environmental impact is

defined as the degree to which an organization's business processes, activities and operations positively or negatively affect the natural environment. The environmental impact is the consequence of the organization's actions in relation to the quality and cleanliness of air, water and soil and, more generally, to the short-term and long-term health of Planet Earth's global ecosystem.

A major initiative of sustainable businesses is to eliminate or decrease the impact made on the environment by harmful chemicals, materials, and waste generated by processes to manufacture products and services (Becker, 2008).

The impact of such human activities in terms of the amount of greenhouse gases produced can be measured in units of carbon dioxide and is referred to as the carbon footprint. The carbon footprint concept branched off from ecological footprint analysis, which examines the ecological capacity required to support the consumption of products (Hawken et al., 1999).

3. MANAGING AND REPORTING ENVIRONMENTAL PERFORMANCE

Responsible businesses are at the heart of society. Companies that understand their links with the communities they operate in, and their impact on the environment, are most likely to prosper in the long-term. At the same time, interest from stakeholders in firms' environmental performance is at an all-time high. There is an increasing recognition that good environmental performance makes good business sense. Environmental risks and uncertainties impact to some extent on all companies, and affect investment decisions, consumer behaviour and Government policy. Further on, management of energy, natural resources or waste will affect current performance; failure to plan for a future in which environmental factors are likely to be increasingly significant may risk the long-term future of a business.

Companies that measure, manage and communicate their environmental performance are inherently well placed. They understand how to improve their processes, reduce their costs, comply with regulatory requirements and stakeholder expectations and take advantage of new market opportunities.

There is an increasing demand for company reporting that is sharper and more focused on the key impacts on the business and on the environment. It takes needed reporting of environmental performance, which will benefit in two ways:

- It will provide management information to help exploit the cost savings that, good environmental performance usually brings; and,
- It gives the chance to set out what is significant in firm's environmental performance.

Environmental performance indicators provide information on how to understand and assess the environmental performance. Businesses would implement meaningful activities on environmental conservation if they could select appropriate environmental performance indicators. Environmental performance indicators would facilitate environmental communication with stakeholders if they were included in environmental reporting.

ISO (The International Organization for Standardization) issues a guideline of the environmental performance evaluation process as ISO 14031 (Environmental Performance Evaluation – Guidelines: Specifies the purposes of environmental performance evaluation, preparation of an evaluation plan, data collection, review of results – this was regulated as JIS Q 14031 on October 20, 2000). Although the guideline defines the concept and procedure of selection of environmental performance indicators, it does not cover development of actual indicators.

In the meantime, environmental performance indicators are being developed by overseas research organizations including WBCSD (World Business Council for Sustainable Development) and GRI (Global Reporting Initiative).

Managing and reporting on environmental performance can lead to significant business benefits as well as benefits for the environment:

- *Cost savings and productivity gains.* Businesses can save costs and increase efficiency through reducing and managing resource use. Typical areas where cost savings are identified include the use of raw materials and supplies, reductions in waste, water and energy use and

transport, travel, and packaging. By reducing environmental impacts, such as waste to landfill, businesses can significantly reduce any associated taxes or levies, or avoid the cost of compliance altogether. Responsible management of risks and liabilities can lead to reduced insurance costs.

- *Improved sales.* Businesses can benefit from improved reputation amongst their customers (and potential customers) by reporting on relevant environmental issues in a clear and transparent way. Good reporting improves customer confidence. Informing customers of efforts to improve organisation's environmental performance can lead to increased confidence in products and services.
- *Preferred supplier status.* Large organisations are increasingly requiring suppliers and contractors to submit environmental performance information to satisfy the expectations of their own shareholders. Reporting on environmental information can make a more attractive supplier than competitors.
- *Increased attractiveness to the investment community.* Investors, financial analysts and brokers are now asking questions about the sustainability of business operations. Reporting on environmental matters provides a good indication of what measures an organisation is taking to reduce risks and develop opportunities.
- *Product and service innovation.* Measuring and managing environmental impacts drives and supports innovation in product and service development, helping to secure new markets and customers or safeguard existing ones.
- *Employee recruitment.* Clear reporting of an organisation's efforts to manage its environmental performance helps to attract high-calibre employees as good environmental reputation and performance can be an important factor in an employee's choice of employer.
- *Licence to operate.* Managing environmental impacts and minimising the organisation's impact on the environment can reduce the exposure to fines. It can improve relations with regulators and help ensure the company maintains its licence to operate by providing assurances about compliance with environmental legislation and conformity with other relevant laws and regulations.

4. MEASURING ENVIRONMENTAL PERFORMANCE INDICATORS

Since the United Nations Conference on Environment and Development in 1992, sustainability has become a widely shared goal. Although information can provide an improved basis for decision-making and gauging progress, accountability is possible only if goals and measures of progress are explicit. Appropriately formulated indicators can provide such measures, enhancing the diagnosis of the situation and making progress or stalemate obvious to all.

Environmental performance indicators provide businesses with a tool for measurement. They are quantifiable metrics that reflect the environmental performance of a business in the context of achieving its wider goals and objectives. Also they help businesses to implement strategies by linking various levels of an organisation (business units, departments and individuals) with clearly defined targets and benchmarks.

Metrics can measure the business value of environmental programs or progress as well as the environmental performance of business operations. This can be particularly effective in demonstrating the value of environmental efforts to management. It can also provide data with which business units can design more efficient processes, decreasing material usage and environmental impacts while at the same time increasing yield and profitability.

The last several years have seen the development of several trends in environmental metrics. Some of these trends are:

- the globalization of metrics,
- increasing emphasis on sustainability in its environmental context (the efficient use of resources) and efforts to develop sustainability metrics,
- increasing use of environmental management systems as benchmarks of environmental performance,

- and emphasis on the integration of environmental performance with business performance with the goal of reducing costs and material losses, and improving yield, market share, and profitability.

Environmental indicators are essential tools for tracking environmental progress, supporting policy evaluation and informing the public. Since the early 1990s, such indicators have gained in importance in many countries and in international foray (European Commission, 2003).

Usually, three categories of environmental indicators are defined for evaluating and reporting the environmental performance of an organisation (European Commission, 2003):

- Operational Performance Indicators (OPIs):
 - Input indicators:
 - Materials,
 - Energy,
 - Services supporting the organisation's operation,
 - Products supporting the organisation's operation.
 - Physical facilities and equipment indicators:
 - Design,
 - Installation,
 - Operation,
 - Maintenance,
 - Land use,
 - Transport.
 - Output indicators:
 - Products provided by the organisation,
 - Services provided by the organisation,
 - Wastes,
 - Emissions.
- Management Performance Indicators (MPIs):
 - System indicators:
 - Implementation of policies, and programs,
 - Conformance,
 - Financial performance,
 - Employee involvement.
 - Functional area indicators:
 - Administration and planning,
 - Purchasing and investments,
 - Health and safety,
 - Community relations.
- Environmental Condition Indicators (ECIs):
 - Environmental media indicators:
 - Air,
 - Water,
 - Land.
 - Bio and anthroposphere indicators:
 - Flora,
 - Fauna,
 - Humans,
 - Aesthetics, heritage and culture.

Operational performance indicators (OPIs) concentrate on the aspects associated with an organisation's operations including activities, products or services and can cover such topics as emissions, product and raw material recycling, fuel consumption of vehicle fleet, or energy usage.

Management Performance Indicators (MPIs) concentrate on the efforts of management to provide the infrastructure for environmental management to succeed and can, among others, cover environmental programmes, objectives and targets, training, incentive schemes, audit frequency, site inspections, administration and community relations.

Environmental Condition Indicators (ECIs) give information on the quality of the environment surrounding the organisation or the local, regional or global state of the environment. Examples include the water quality of a nearby lake, the regional air quality, concentrations of greenhouse gases or the concentration of certain pollutants in the soil. While they may be quite wide-ranging they can be used to focus the attention of the organisation on the management of the environmental aspects associated with significant environmental impacts.

5. CHOOSING ENVIRONMENTAL INDICATORS

As noted, many environmental indicators are needed to fully describe the environmental impacts of a pest management product or method. To use the example of pesticide toxicity, there is no single species or group of biota that is most sensitive to all pesticides and thus useful as a surrogate for all others in toxicity testing. This truism applies to other environmental perturbations as well -- we cannot rely on a single indicator species or abiotic effect to tell all we need to know about impacts of any management decision. Scientists are therefore faced with the need to test and evaluate impacts on various groups of biota, and then integrate the results in order to create a composite assessment of environmental impacts of a pest control method or other management strategy. One can grasp the conceptual challenge this poses by thinking about how one would go about weighting and summing an evaluation of impacts on human beings in relation to impacts on other biota, especially if the impacts were dissimilar in magnitude and type.

Another challenge to creating a composite assessment of environmental impacts of organizational strategies is finding a meaningful common currency to describe different types of impacts. In answering many questions about environmental impacts, monetary values do not adequately describe non-market costs -- such as the loss of an individual life, loss of biodiversity, impacts on 'non- game' species, disruption of an ecosystem, future costs of current soil erosion, or loss of non- replaceable resources. Ongoing research in several disciplines (and inter-disciplines) is aimed at devising means of valuing environmental and other non-market goods; much of this work falls under the rubric of 'resource ecological economics' (Daly et al., 1994)

Another challenge of creating composite assessments of environmental impacts is due to the reality that there is no one set of social or environmental indicators that are most appropriate to use in assessing impacts of agriculture. Different circumstances and objectives prioritize different indicators and interpretations. One may answer the question of how to integrate; weight and value impacts in the context of one assessment scenario, but these issues will re-emerge when the question of environmental impacts is asked on a different scale or with different objectives. For example, the types of data required to create a decision model for a farmer to use in the field in choosing a 'least impact' but efficacious pest control method, may not be the same as the data required for a national policy model assessing other area practices. The design of an assessment system must, therefore, be appropriate to the objectives of the audience served.

6. QUESTION OF BIAS TOWARDS FUTURE

There are several ways in which we can be biased against considering future, as compared to present impacts. The issues that tend to concern us most are those that occur in our immediate space and time frame. This implies that current activities which lead to environmental impacts at more distance places and times tend to receive less attention. For example, majority of impact tests emphasizes their short-term lethality rather than their chronic and cumulative impacts. Or we may be more interested in the short-term reduction in damage that occurs than in the long-term impact on populations caused by the same issue. Long-term and cumulative impacts are more difficult to comprehend and quantify than short-term impacts and there are less data generally available. As a result, less weight tends to be given to these impacts in environmental assessments.

A second manner in which we can be biased against the future as compared to the present is by not considering impacts associated with future events (Garetz, 1993). Future impacts of future events can be more uncertain than assessing impacts of current events, but this does not mean that such impacts are less important. For example, the Superfund Program and Hazardous Waste Program were established primarily on the basis of future rather than current risks.

Another problem for current assessments is that as environmental systems change or become better understood in the future, the impact of EPI may be assessed differently. This implies that assessors must be aware of new information and problems, and be prepared to modify or change their assessment methods to account for changes in our knowledge base.

7. CONCLUSION: TOWARDS SUSTAINABLE ORGANIZATION

Since the United Nations Conference on Environment and Development in 1992, sustainability has become a widely shared goal. Although information can provide an improved basis for decision-making and gauging progress, accountability is possible only if goals and measures of progress are explicit. Appropriately formulated indicators can provide such measures, enhancing the diagnosis of the situation and making progress or stalemate obvious to all.

Environmental performance indicators provide businesses with a tool for measurement. They are quantifiable metrics that reflect the environmental performance of a business in the context of achieving its wider goals and objectives. Also they help businesses to implement strategies by linking various levels of an organisation (business units, departments and individuals) with clearly defined targets and benchmarks.

The impact of environmental matters on organization performance is increasing and will continue to do so. For example, poor management of energy, natural resources or waste can affect current performance; failure to plan for a future in which environmental factors are likely to be significant may risk the long-term value and future of a business. Therefore, governments expects that businesses will need to use environmental performance indicators to adequately capture the link between environmental and financial performance (Petrović & Slović, 2011).

The green and sustainability trend has manifested in pressure from consumers, shareholders, employees, partners and governments (regulations) put upon companies to embrace more sustainable and green practices. Many companies resorted to [greenwashing](#) instead of actually creating green innovations by marketing their product in a way that suggests green practices.

However, there are many companies that have taken the sustainability trend seriously and are doing so profitably (Tueth, 2010).

Organizations that give back to the community, whether through employees volunteering their time or through charitable donations are often considered to be socially sustainable. Organizations also can encourage education in their communities by training their employees and offering internships to younger members of the community. Practices such as these increase the education level and quality of life in the community (Becker, 2008).

In order for a organization to be truly sustainable, it must sustain not only the necessary environmental resources, but also its social resources, including employees, customers (the community), and its reputation.

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POSSIBILITIES OF IMPLEMENTING ENVIRONMENTAL MANAGEMENT AND AUDIT SCHEME IN SERBIA

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Abstract: *In this paper we analyze EU examples of successful EMAS implementation into two branches of economy. We chose auto-industry and education, due to their importance for the Serbian economy. The EU Environmental-Management and Audit Scheme (EMAS) is a management tool for companies and other organizations which is used to evaluate, report and improve their environmental performance. Audi Hungaria Motor Kft. is a company which is very similar to "Fiat automobiles Serbia", one of the most important manufacturers in Serbia. It was used as an example in this paper, and analyzed in several different areas of their businesses: ecology, social awareness, environmental awareness, etc. The other part of this paper is oriented towards education, which is constantly growing. The University of Macedonia that has already implemented EMAS can show the possibility of incorporating EMAS into the Serbian educational system, analyzed on the example of the University of Niš. Costs, benefits and trammels are analyzed in both of the examples.*

Keywords: Ecology, EMAS, Serbia, Industry, Environment

1. INTRODUCTION

The EU Environmental-Management and Audit Scheme (EMAS) is a management tool for companies and other organizations to evaluate report and improve their environmental performance [1]. Environmental management is not, as the phrase suggests, the management of the environment as such, but rather the management of the interaction and impact of human societies on the environment. The scheme is globally applicable and open to all types of private and public organizations. The scheme has been available for participation of companies since 1995 and was originally restricted to companies in industrial sectors. Since 2001 EMAS has been open to all economic sectors including public and private services. (Morrow, D. et al. 2002.). Environmental management aims to ensure that ecosystem services are protected and maintained for equitable use by future human generations. (Milieu Ltd. and Risk et al. 2009).

Serbia is very open and fertile ground for investments. Already many companies have grown and expended their businesses into profitable parts of hardworking Serbian regions. One of the most interesting divisions for growth is the car industry. In Serbia there is an already functioning auto industry. With low labor costs and huge possibilities for expansion, it is the perfect choice for investments. By implementing EMAS investors would benefit from the reduced costs that operating within EMAS rules provides. (Web site ec.europa.eu 15.04.2012). Other very important field that is in constant growth in Serbia is education. As a public field, education has many possibilities for more efficient functioning that will be provided by implementing EMAS. In Serbia education is free for students, which means that the Government has high costs when it comes to education every year. Investing in more efficient functioning, which EMAS concludes, provides that "education machine" runs more economically and that environmental awareness rises in minds of student and workers as well. (Web site ec.europa.eu 29.04.2012)

2. COMPANIES IN EU THAT USE EMAS AND THEIR SERBIAN COUNTERPARTS

Audi Hungaria Motor Kft. is one of AUDI-s outsourced companies. It produces engines for every Audi model and assembles the whole car for models Audi TT, A3 cabriolet and others as well as some models for Volkswagen, Seat and Skoda. This operation, stationed in Hungarian city Győr, employs 5845 worker. (Web site www.audi.hu 21.04.2012)

On the other hand, "Fiat automobiles Serbia" is one of Fiat outsourced factories which they run as partners with Republic of Serbia. It's the biggest production complex of this type in South-Eastern Europe. Factory is equipped with the latest technology which provides for 5000 workers and engineers excellent conditions to work in. (Web site www.fiatsrbija.rs 25.04.2012.)

These two companies have similarities in many aspects such as number of employees and production technology. Analysis of effects which implementation of EMAS in Audi Hungaria Motor Kft. can show what benefits could be expected if “Fiat automobiles Serbia” would implement EMAS as Audi Group in Hungaria already did.

In the other example the University of Macedonia Economic and Social Sciences, located in Thessaloniki, Greece, is analyzed. It is a twenty year old institution, housed in a group of buildings with a total area of approximately 40,000 square meters, consisting of amphitheatres, teaching and seminar rooms, offices and the areas of the administration sections. University of Macedonia employs around 863 people including professors and staff, and more than 15,000 students attend lectures. It has 8 departments and offers both bachelor and master degree.

The University of Niš is a state-governed educational and research institution. At present, the University comprises 13 departments, all of which offer bachelor, master and PhD degrees. It employs 1560 people including professors and staff, and over 28,000 students at all of levels of studies. The University of Niš is almost twice as big as University of Macedonia, if compared by the number of employees, students and departments.

The analysis of benefits which were caused by implementation of EMAS in University of Macedonia, could indicate the effects it would have on business of University of Niš as they are proportionally similar.

3. HOW THE EMAS WAS IMPLEMENTED

The proper implementation of the EMAS Regulation is monitored and controlled by European Commission, which is also **in charge of its development. Besides the regulatory role, the Commission also** promotes the scheme at the EU level. Key actors in the verification and registration process ensure the public credibility and reliability of the scheme. Furthermore, key actors ensure that the applicability of the scheme is enhanced. After an organization has conducted an environmental review, set up an environmental policy and program and carried out an internal audit, an environmental verifier ensures that an organization seeking registration is in compliance with the requirements of the EMAS Regulation (verification). Environmental verifiers also verify the reliability, credibility and correctness of the data and information in the (updated) environmental statement and other environmental information provided by organizations (validation). The final step in the EMAS implementation process is to apply for EMAS registration. (*Web site ec.europa.eu_27.04.2012.*)

Automotive industry

Audi Hungaria Motor Kft. implemented EMAS into overall corporation behavioral in 2005. This decision was guided by the desire to substantiate its responsibility of communicating the company's values to society with the implementation of concrete measures, and by the wish to actively and positively contribute to the environmental as well as social and cultural processes of the city of Győr. Moreover, over the years it has become clear to the company that environmental protection is not only an ecological, but also an economic question. The view that expenditures for environmental protection are not profitable is long obsolete. At appropriate points, efficient interferences can be created and improvements of the environment may lead to economic advantages. The implementation of EMAS confirms the enterprise's interest is not only in the environment but also in the sustainable development of the city where the company is located. Since the introduction of EMAS, indeed, the enterprise has managed to implement a large number of plans:

- It decided to organize the transport of materials and engines between Győr and Ingolstadt, the mother company in Bavaria, by rail instead of by road for ecological reasons.
- An examination of the environmental management system as well as of the environmental policy regarding its fitness and appropriateness takes place regularly, with updates - if necessary.
- The workers, according to their functions, are constantly informed on issues related to environmental protection, in order to promote their sense of responsibility towards the environment.
- Implementation (in 2005) of the BUWAL method for a better analysis of environmental aspects and effects.
- In 2007 Audi Hungaria Kft. was nominated in the category “large organizations” at the EMAS Awards ceremony 2007 in Lisbon - the most prestigious award in environmental management granted to top companies and local authorities since 2005.

Management of the company emphasize that they hadn't encounter almost any particular difficulties implementing the EMAS. This ease has been possible only because of the huge effort and great commitment both of the management and the staff of AUDI Hungaria. Furthermore, during the whole process leading to the acquisition of EMAS certification, Audi Hungaria was supported and accompanied by 10 years experience of the mother company Audi AG, which had already implemented EMAS in November 1995.

Education

In order to enhance its contribution to society, the University of Macedonia embarked on the pursuit of environmental excellence by implementing a fully blown environmental management system in 2004. The University of Macedonia is the first university (and the first organization in the wider public sector) to implement an environmental management system, in Greece. The University has chosen to apply EMAS because it considered it the best instrument to not only continuously improve its environmental performance, but also to promote transparency and an open dialogue with the public. Furthermore, it could join the very active group of EMAS-registered universities in Europe and exchange ideas and best practices with them. The international collaborations lead to participation in the Virtual Campus for a Sustainable Europe project while the University is currently in the process of applying for a Regional Center of Expertise (RCE). (*Web site www.uom.gr 19.04.2012*).

The main results of the 4-year implementation of EMAS include:

- identification of the most important environmental impacts of the University's operation, and taking the appropriate actions for the optimal use of natural resources, including conservation of water and energy and the subsequent economic benefits
- improvement of hygiene and safety and the ensuing reduction of labour accidents
- reduction in the use of materials and more appropriate waste management and recycling of materials (paper, electric and electronic devices, batteries, etc) with the subsequent economic and environmental benefits
- offer more and attractive choices to students by increasing the number of courses with environmental content in the University's curriculum
- improve, qualitatively and quantitatively the University's research activity by extending it to the area of environmental protection and offering additional choices for international collaboration

They have indentified the main difficulties in implementing EMAS as:

- to overcome the red tape obstacles inherent to the Greek public sector
- to convince faculty and staff members to actively participate in the activities of the environmental management system
- to ensure the constant and substantial support of the University's authorities
- to secure the necessary financial resources

4. ACHIEVED BENEFITS

Implementing EMAS into organization implies certain costs such as fixed costs. Some of fixed costs are validation/verification fees, registration fees, integrating EMAS logo into corporate design. There are some external costs that implementing EMAS poses almost as essential, such as consultancy expertise to support implementation and reporting. Some new internal costs also appear, like the costs of personnel and technical resources needed for implementing, as well as for administering and reporting. EMAS helps companies optimize their production processes, reduce environmental impacts and use resources more efficiently. Benefits from EMAS companies can be clearly seen in enhanced environmental and financial performance, enhanced credibility, transparency and reputation, enhanced employee empowerment and motivation. (*Web site ec.europa.eu 27.04.2012*.) Every year the "EMAS Awards" honors the relentless efforts on environmental protection of EMAS registered organizations. The European Commission hands out these important environmental awards since 2005. An EMAS Award is the most prestigious award in environmental management and is handed out to top performing companies and public authorities in six categories. In this paper we estimate the effects implementation of EMAS could have on business of

Serbian companies in auto industry and education, by analyzing companies in EU with the same characteristics, which have already implemented it.

Automotive industry

After implementing EMAS Audi Hungaria Motor Kft. experienced radical changes in regard to environmental relations, ecology awareness of the employees, society's observation of the company. In real numbers the result for the company was:

- The recycling ratio reached a quota of 97%.
- In spite of increase in production of 140.75% the company has been able to reduce the use of energy by 0.25%, by implementing energy saving measures.
- Air pollution decreased by 0.29% due to further implementations of innovative, pollution free technologies - such as cold tests and treatments with minimum quantity lubrication. (*Web site ec.europa.eu 15.04.2012*).

Education

The University of Macedonia also environmentally improved its business as they achieved to:

- Reduce the consumption of paper per faculty and staff member from over 60kg in 2004 to 20kg in 2008
- Increase gradually the recycling of paper (from zero in 2004) to above 70% in 2008 of the total purchased quantity
- Recycle almost 85% of all photocopy and printer toners purchased
- Recycle 563 electronic devices in 2008, mainly computers and printers
- Minimize the rate of increase in energy consumption despite a continuous increase in the intensity of use of the University premises and an increase in the number of faculty staff and students, through a series of energy-saving measures in the refrigerating, heating and lighting system. (*Web site www.uom.gr 19.04.2012*).

5. POSSIBILITIES OF EMAS IMPLEMENTATION IN SERBIA

Automotive industry

"Fiat automobiles Serbia" is a very suitable candidate for implementing EMAS, since Fiat is already an ecologically awakened company. To reduce emission they have developed and use eco-friendly systems such as Start&Stop and eco:Drive. In the past year the company managed to reduce engine emissions for 30 percent, by using efficient, low pollution engine types like Multi Jet, Multi Air and Twin Air, which was acknowledged as the engine of the year in 2011. (*Web site www.fiatsrbija.rs 25.04.2012*). Due to its high resemblance with the Audi Hungaria Motor Kft., with the same number of employees, same field of work and manufacturing field, it could easily follow the same path in implementing EMAS. Fiat could gain the same benefits as Audi, such as reaching a very high quota of recycling ratio (>95%), reducing the use of energy by implementing energy saving measures, decreasing air pollution ... Workers would be more ecologically aware, the whole company would gain benefits such as reductions in energy and resources expenditures, additional cost reductions, improved employee morale, better internal communication and modernization of management. All of which leads to higher profit in a sustainable system.

Education

Since universities are autonomous from the state, they can implement new management policies more efficiently than other institutions in public sector, which makes them ideal candidates for implementation of modern business policies. In our example the University of Niš could be refreshed by implementing EMAS in a similar way that the University of Macedonia was. New environmental system could help with overcoming the red tape obstacles inherent to the Serbian public sector, convincing faculty and staff members to actively participate in the activities of the environmental management system, ensuring the

constant and substantial support of the University's authorities, securing the necessary financial resources. It would minimize the rate of increase in energy consumption through a series of energy-saving measures in the refrigerating, heating and lighting system, saving millions of RSD on yearly bases.

For example if the University of Niš could reach the goal of recycling 85% of all photocopy and printer toners, like the University of Macedonia did, it would greatly relax their budget. As they use about 7 million RSD yearly on new toners, and the price of recycling is almost three times lower, they would stand to save nearly 3.8 million RSD, every year.

6. CONCLUSION

As the examples show, proper implementation of a good program for environmental management leads to both direct benefits, such as decreasing expenses by recycling and indirect benefits, and indirect benefits, like enhancing companies reputation and public image, which all leads to more successful business. Since Serbia is somewhat behind other European countries in environmental legislation and management it has a great potential for development in this area. Furthermore it can benefit greatly from their experiences. By observing and analyzing examples of successful EU companies, with similar counter parts in Serbia it is possible to make projections of expected benefits, as well as to anticipate possible problems, and drawbacks.

Implementing EMAS in Serbian industry and administration, by following lessons learned from EU companies, can significantly increase the efficiency and sustainability of the economy.

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TECHNOLOGICAL PROGRESS IN THE FUNCTION OF SUSTAINABLE DEVELOPMENT

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Abstract: *One of the key issues that has long occupied the attention of economists in discussions led regarding the possibilities for achieving sustainable development refers to the potential effectiveness of technological development to minimize or neutralize the negative effects of economic growth on the environment. Since technology is the main agent of change in the sphere of production and consumption, the aim of this paper is to highlight the role and importance of the development of technological solutions in a manner conducive to achieving sustainable development goals. With increasing global awareness of the need for solving the problems in the field of sustainable development and the importance of taking a strategic approach in providing responses to the challenges of sustainable development, the immediate reaction of multinational companies was reflected in the identification of new business strategies and policies and creating technologies that support the objectives of sustainable development. Many companies have become aware of the possibility of realising direct business benefits from the introduction of new, sustainable technologies in the business, based on minimizing the use of resources and energy, more efficiently meeting the needs of consumers and minimizing the negative environmental impact. Based on the analysis of the experiences of some leading companies in the implementation of technological innovations, this paper should also contribute to a clearer understanding of the importance of introducing new technologies for achieving more efficient business from the point of sustainable development. In accordance with the subject matter and research goals, the following methods will be used during the research: method of induction, method of deduction, method of analysis, method of synthesis and method of generalization. The application of specific methodology of scientific research in this paper is motivated by the need to contribute to a clear understanding of the problem which is the subject of the research in order to achieve the main goal of the research.*

Keywords: *sustainable development, technological development, sustainable technologies, technological innovations*

1. INTRODUCTION

After setting up the basic premise of sustainable development in the Report of the World Commission on Environment and Development (WCED) in 1987, this concept experienced broad political popularization, while the proper selection of methods, measures and instruments for its materialization becomes a real challenge for the governments of all countries, as well as business sector on a global level. To its widely popularization contributed the apprehension on unsustainability of traditional models of economic growth in the long run, since it ignores the effects of achieving greater economic growth on the environment. However, it would be wrong to conclude that this concept sets limits to economic growth. Changing the nature of economic growth, not its limitation lies in the basis of the concept of sustainable development. Thereby, World Commission on Environment and Development (1990) pointed out that “rather than growth or no-growth, as the debate about environment and development has sometimes been cast, the central issue is what kind of growth. The challenge of sustainable development is to find new products, processes, and technologies which are environmentally friendly while they deliver the things we want”. The concept of sustainable development, in fact, indicates on the need for introduction of modifications in the way on which the human activities exercised of in order to ensure their sustainability in the future and prevent irreplaceable environmental damage that would otherwise limit the capacity of Earth to support such activities.

“Before the Brundtland Commission, “development progress” was associated with industrialization, and measured solely by economic activity and increases in wealth. Environmental protection was perceived by many as an obstacle to development. However, Our Common Future recognized “environment or development” as a false dichotomy“(Martino & Zommers, 2007, p. 10). The concept of sustainable development, namely, was developed from the apprehension that in order to achieve environmental

protection is necessary to make changes in the applied models of production and consumption, and that environmental management and efficient use of natural resources are basic prerequisite for achieving development without environmental degradation.

The prevailing view is that the increasing environmental problems at the global level can be attributed to several factors, among which are above all rapid population growth, which has led to increasing demand for food, water and energy, accelerated economic growth and unsustainable patterns of consumption, progress in science and technology, and institutional factors that have contributed to increasing pressure on the environment and negatively impact on the state of the environment, population well-being and economic activity. Among these factors, certainly it is emphasized in the importance the technological progress that contributed to the increase of population welfare, but at the same time set new risks and threats to maintaining a healthy environment, which is primarily reflected in raising the level of pollution and hazardous wastes from the application of extensive production process loss of biodiversity and global warming. "Unsustainable technology has been the result of linear rather than cyclic thinking. The paradigm shift from linear to cyclic thinking in technological design is the crux of the shift from unsustainability to sustainability" (Vanegas, DuBose & Pearce, 2012, p. 1).

Solving global environmental problems with which the humanity is faced today requires designing of the new methods of management and decision-making in a way that inflict least harm to the environment and contributes to the simultaneous achievement of the objectives of sustainable development. In this regard, the management of technology in the context of sustainable development alludes finding ways to maximize the positive impact of technological progress on economic growth, social development and environmental protection, and minimize its negative impact on the environment and population well being

This paper is structured as follows. After the introduction, in the second part of the paper will be discussed the role and importance of technology in sustainable development. The third part of the paper is devoted to the analysis of experience in the application of technological innovations on the example of the world's leading companies, where new technologies have contributed significantly to increasing the efficiency of business. In the final part of the paper will be performed a synthesis of research results.

2. THE MAIN FEATURES OF "SUSTAINABLE" TECHNOLOGIES

As one of the driving forces of economic development, technological development today rightly occupies a high place among the factors in the realization of development strategy developed countries, while its role in accelerating the development of economies of the underdeveloped countries is irreplaceable, since it represents a factor of essential importance in laying out the future directions of development of these countries. "Technological development has a profound and long-term impact on income distribution, economic growth, employment, trade, environment, industrial structure and defence and security matters (Stoneman, 1987). The acquisition and use of science and technology (S&T) are critical for the achievement and sustenance of food security, as well as the promotion of public health and environmental quality" (Ahmed & Stein, 2004, p. 6).

The role of technology in sustainable development is great because it represents a key ingredient of change in the way on which societies produce and consume. Development and application of sustainable technology solutions is a key prerequisite for raising productivity and living standards, while simultaneously reducing the pressure on natural resources use and improvement the state in the environment area. Technological progress is, in fact, contributed to reducing the degree of dependence of man and society of the immediate environment, since the development of modern technology provide the possibility through the industrial pathway to achieve the access to new cases of artificial or raw materials which are not found in nature. In short, the technology that contributes to the simultaneous achievement of the objectives of sustainable development we can rightly be called sustainable technologies. "These technologies serve to contribute, support or advance sustainable development by reducing risk, enhancing cost effectiveness, improving process efficiency, and creating processes, products or services that are environmentally beneficial or benign, while benefiting humans" (National Science and Technology Council 1994, p. 4). Sustainable technologies differ with the following key characteristics:

1. they contribute to minimizing the use of non-renewable resources and energy, and thereby increasing their using potential for the future generations,

2. they contribute to more effectively meeting the human needs, while respecting human preference and cultural differences,
3. and finally, these technologies are eco-efficient whereas they realize minimal negative impact on the environment, which contribute to ecosystems preservation that is of essential importance for human survival on planet Earth.

There are great difficulties in defining of the environmentally sound technologies. This is especially because the environmental performances of technology depend on the nature of their impact on human society and ecosystems, but also of the infrastructure and human presumptions for technology management and monitoring of their impact. Second, the term itself is relative and liable to changes over time, whereas over time technological progress lead to the abandonment of the ones and the introduction of new environmentally sound technological solutions. Third, there are differences in the effectiveness of environmentally sound technologies between countries. For example, those technologies that represent environmentally beneficial solution for developed not necessarily mean a favourable solution for underdeveloped countries. This is particularly because the problems of development in the underdeveloped country do not appear in the same order, as in developed country, in order to underdeveloped countries could use the pattern of development of developed countries. Namely, if the technology does not correspond to local conditions and the achieved level of development, it may contribute to increasing the gap between developed and developing countries, and further burden the development problems of underdeveloped.

Despite numerous difficulties, the definition of environmentally sound technologies, which is set out in Agenda 21 (Chapter 34) indicative suggests of their key characteristics. Environmentally sound technologies are technologies that “protect the environment, are less polluting, use resources in a sustainable manner, recycle more of their wastes and products, and handle all residual wastes in a more environmentally acceptable way than the technologies for which they are substitutes” (International Environmental Technology Centre, Division of Technology, Industry and Economics, 2003, p.16). ESTs are rather systems than individual technologies, for the reason that they include in themselves and “know-how, procedures, goods and services, and equipment, as well as organisational and managerial procedures for promoting environmental sustainability” (International Environmental Technology Centre, Division of Technology, Industry and Economics, 2003, p.16). Whereas that the implementation of new environmentally sound technologies can contribute to boosting the development gap between countries, of essential importance for their effective implementation is to raising the level of development of human capital and necessary technological infrastructure in order to maximum absorb of their positive environmental impacts and minimize negative.

Agenda 21, as a comprehensive plan of action for 21st century, served as a platform for the promotion of the transfer of environmentally sound technologies in a global framework, while its implementation at the national level enable economic policy makers to make the assessment and identification of practical technological solutions from the aspect of the conveniences for sustainable development. Moreover, by emphasizing the importance of transfer environmentally sound technologies and increase the access of developing countries in development of the modern technological solutions, Agenda 21 indirectly supports the efforts of these countries to achieve sustainable development objectives, and clearly determines the place of modern technological solutions in achieving environmental protection and poverty reduction. It directly indicates to the need to leave the traditional, unsustainable technologies and transition to technologies that are sustainable and environmentally sound (Figure 1).

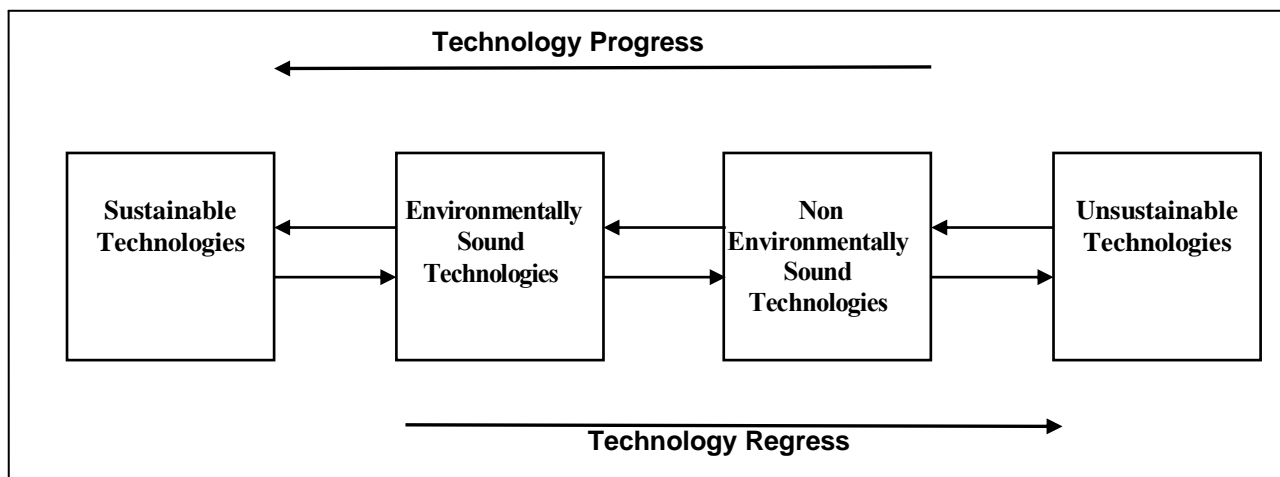


Figure 1: The Transition of Technology towards Sustainability (International Environmental Technology Centre, Division of Technology, Industry and Economics, 2003, p.17)

Therefore, “the paradigm of “sustainable development” can be viewed also as a new paradigm of technological development. The use of green technologies should be promoted, although technological optimism does not escape the need for fundamental social change and a shift in priorities. The institutional background and environmental instruments providing the right incentives play an important role in realizing the savings potential and/or the use of clean technologies” (Sunhilde, 2010, p. 30). Encouraging the transition process to sustainable and environmentally sound technologies and maximum use of their potential for the purposes of achieving sustainable development must be supported by using carefully selected instruments of environmental policy by the state authorities. The increasing use of economic instruments in environmental policies of developed countries confirms the advantages of their use in regard to the regulatory instruments of command and control approach, and the importance of strengthening the application of these instruments in solving the problems of sustainable development in developing countries and countries in transition. This is especially because in regard to regulatory instruments, economic instruments in environmental policy can provide the opportunity to realize significant economic savings, apropos they encourage economic agents to taking into account environmental issues in making their decisions, and to minimize the use of natural resources and the level of waste, but also they provide additional incentives for pollution reduction below the laid level and have stimulating effect on the introduction of new technologies for pollution control and prevention.

3. THE APPLICATION OF MODERN TECHNOLOGICAL SOLUTIONS – CASE STUDIES

During the last twenty years, many companies have realized that in order to achieve their primary motivation for the business, maximizing the profits, it is necessary to create new business strategies consistent with the goals of environmental protection and achieving sustainable development. The concept of sustainable development has imposed the need for modifying the way in which companies implement their activities, while emphasizing simultaneous the importance of re-designing technologies and the introduction of radical transformations in the technological basis of production. In this way, it encouraged the propensity of the companies to take measures of the manufacturing process innovation in order to:

1. “Filling *market gaps* as concerns technologies conducive to sustainable development, by using various schemes to narrow the gap between the private return and the return to society, between the current and future generations.
2. Supporting *dissemination of clean technologies*, low on consumption of resources, by favouring the dissemination of information and knowledge.
3. Promoting *technological diversity*, to avoid getting locked into technologies which may present long-term risks.
4. Reinforcing the *long-term innovation capacity* by favouring the development of skills and strategic prospecting.

5. Laying down procedures to *improve coherence of the various agents*, to encourage appropriation of technologies by users and by society.
6. Encouraging *citizen participation* in developing effective scenarios for a social-economic assessment of technological choices" (Patris, Valenduc & Warrant, 2001, p. 8).

According to the experience of the world's leading companies, efficient business in terms of sustainable development requires significant technological innovations. Thus, the experience of British Petroleum (BP), DuPont, Interface, Monsanto and the other refers to innovative technology management as a common basis of concrete initiatives for sustainable development. Thereby ahead of the management of the company raised serious task of creating and developing a vision and action plan for sustainable development. Traditional methods of gathering information and planning ignore some of the facts inherent in achieving sustainable development, such as discontinuous technological development and integration of key technologies in the delivery of products.

While the traditional approach to technology management is aimed at incremental improvements, the contemporary aspect of sustainable development emphasizes the incorporations of gradual improvements and radical technological changes. Incremental improvement is related to areas such as increasing energy efficiency and reuse of materials in production. In contrast, the revolutionary technological innovations are focused on completely new ways of meeting the needs of customers. In this regard, the traditional approach is limited in terms of speed or costs to implement these dual requirements. In addition to these limitations, it should be noted that sustainable development requires an interdisciplinary approach to management and technological innovation, which is difficult in the traditional approach.

Scientists, engineers, technicians and experts of other disciplines around the world are trying to respond to the challenges of sustainable development. During these efforts, in many leading companies are created new roles and responsibilities for managers of technology. In the following exposure will be render the contemporary examples of meeting sustainable development and technological innovation.

Monsanto Company, a leader in the chemical industry, are giving greater access to sustainable development by introducing significant changes in the field of technical and strategic discontinuity. In this way, it expects a significant competitive advantage inherent to a small number of companies. Developing perceptions of technology and sustainable development, Monsanto has introduced radical changes in traditional business of potato farming and create conditions for the dominant competitive position in an otherwise unchanging conditions of this market. In the modern approach to sustainable development, "*the Monsanto bioengineered NewLeaf potato*" started an initiative for protection against the destructive Colorado potato beetle and leaf virus, by a common approach. The traditional method of potato production often requires large amounts of insecticide to achieve the same level of protection and crop yield.

Monsanto has used a similar technological vision and innovation as Bt Cotton, which uses genetically re-engineering of cotton plants. While traditional cotton production involves the use of chemicals, Bt Cotton manufactures protective proteins, thus providing a more efficient way to produce cotton. Exploring new opportunities in the field of biotechnology, Monsanto has launched a collaboration with universities and laboratories, and initiated some examples of joint ventures. Meanwhile, Monsanto is especially committed to innovation plants and seeds in order to solve the problem of erosion of the upper layer. "Roundup" herbicide remains on the surface to which it is applied, limiting the erosion of topsoil, and natural biodegradation through layers of microbes. By combining sustainable development and technological innovation, Monsanto has created a viable and cost effective method dominant than the traditional.

British Petroleum, a company that several years ago oriented toward addressing issues of sustainable development, more is given to the introduction of new technologies in their business. There is an obvious transition from solid (e.g. wood, coal) to liquid fuels (crude oil) in the last few decades, and the next step is the transition from liquid to gas, by the fact that a liquid becomes a more expensive source, while gas has a much greater quantities and relatively cheaper. Business in the field of security of energy resources is moving towards renewable sources thus paving the roads to sustainability. This vision has crystallized the need for changing from the oil companies, with primary focus on petroleum refining technology, to the energy company with a portfolio of alternative technologies.

Notwithstanding the extreme shifts in business, British Petroleum does not change its attitude to the importance of oil, especially in the short term. However, following the vision of sustainable development,

the company began the transition from oil and natural gas to a wider portfolio of energy, including the development and commercialization of advanced solar technologies. Therefore, it strives to be the first company in the process of this type of transition and to become a leader in management of the energy technologies.

DuPont is a mega company in which the three business units have made significant progress towards sustainable development. “DuPont Agricultural Products” has launched major initiatives in the biotechnology arena (like Monsanto), replacing traditional costly chemical reactors used in the manufacture of polymers with biological plants that produce the desired chemicals in their cells.

Unit “DuPont’s film” is introduced even larger changes. Although seven years before this unit, which produces packaging for food, audio-tapes and substrates for printed boards, was before the abolition, by introducing a vision of sustainable development technology, situation has changed significantly. This business unit has developed a manufacturing process of polyester (80% of its business) which is regenerated polyester film in a very good product. In this way it exerts “unzips” of recycled polymers and provides a fresh starting material. At the same time, with this process is completely changed the cost structure of a mature industry.

Recently, the company DuPont has also introduced amendments to the conventional business procedure in the field of automotive paint. Historically, DuPont and Ford had a classic customer-supplier relationship in which both companies, over the quality and price, are seeking to optimize their market position. In more modern terms, these companies work together on improving the quality of colour and the whole process of painting the car. On this way were obtained significant results in the field of waste reduction and increase the quality of finished product. DuPont now participates in lowering the cost of Ford, which has not been possible in the traditional approach to selling products.

Interface, a company for manufacturing carpets and textiles engages 7300 employees in 26 factories in four continents. This company produces synthetic carpets and fabrics in the value of one million pounds every day, using as raw oil products. Instead of the supplier, Interface has become a service provider, so they stopped selling carpets and started leasing. At the end of cycle use, the carpet is returned to the company, which it is used again, reducing the net use of petroleum products. Today the company has focused on: waste eliminating, emissions reducing, the full closure of the cycle production-use-recycle using completely recycled materials, use of recycled polyester whenever possible, finding new materials that are not based on petroleum products.

In the above examples of leading companies can be identified two critical types of activities required for sustainable development: firstly, a different approach to business creating new vision and technological maps, secondly, the conversion the vision through innovation in the management of technology, by the new interdisciplinary efforts.

Successful companies are introducing new technology management systems, which are:

- low tolerance, focused on the use of developmental systems that provide ample opportunity and flexibility to use the most powerful resources,
- resource-rich, with many different types of inter-related resources,
- to learning-oriented in terms of new business and technology interaction, linking technology and business goals on the path of sustainable development.

From this it can be make a clearly difference compared to traditional approaches, which do not provide all the necessary elements for achieving success in sustainable development, i.e. and fault tolerance, and a wealth of resources and continuous learning.

Moving DuPont and Monsanto to the application of biotechnological achievements in their agricultural enterprises was not based on the conventional way of thinking. Their competitive advantage in agro biotechnology is based on innovative technology and innovative approach to various business issues. Their traditional way of response to customer needs has changed significantly. In the new conditions it was important to listen to causes of the needs of customers and to find technological solutions to respond to them. Models of thinking and planning systems that have functioned well in meeting the needs of

customers in the traditional way were too limited in the creation of biotechnology to meet the fundamentally different business requirements of sustainable development.

The formation and development of innovative vision requires a structured approach, which should consist of the following elements:

- the new decision,
- new people and thinking,
- new talks,
- new enthusiasm,
- new perspectives,
- new prototypes and models of learning and
- new knowledge networks.

A new vision occurs over time, not at one time. When a company identifies opportunities and threats in the environment, the time of their appearance and accordingly develop a vision, unavoidably is introduction of appropriate technology. This crystallizes the second element of sustainable development innovation: an creative technology management process.

Judging by the experience of leading companies, sustainable development initiatives generally require technological expertise from new perspectives and new levels of interdisciplinary collaboration. Today the product development cycle is significantly shortened, there are many products in the field of technology development, which requires a combination of traditional and existing systems. The traditional approach to managing technology and current resources can not provide sufficient technological “scope“, i.e. technological capabilities, systems, personnel and organizations, as well as interdisciplinary opportunities to fully realize the new vision (e.g. a revolutionary technology). Thus, the approach to sustainable development by DuPont and Monsanto means significant new capabilities in bioengineering and their joining with existing technology and scientific knowledge.

On the examples of leaders in sustainable development, and simultaneously the fastest growing and most innovative companies, such as Boeing, Cisco, Microsoft, can be observed a combination of benefits of existing technical and technological resources, speeding up product development and exploitation of new resources in achieving competitive advantage. These companies have taken advantage of external resources in the formation of broad-bandwidth innovation - BBI network. BBI network use the power of resources through partnerships, licensing agreements and capital in systematically products developing and innovations creating coming out of the internal framework of technology and resource base control.

Their main feature is the introduction of non-traditional entities such as:

- *“Incubators* – small, inexpensive breeding grounds for start-up companies that provide new technologies and business approaches. They operate independently and provide continuous streams of new ideas and technologies.
- *Universities* – university-based R&D centres provide excellent intellectual capital.
- *Internal technology management at other companies* – other companies can provide allied R&D, marketing, and other innovation resources that work with the BBI network in selected areas to capture value, direct programs, and cross-fertilize.
- *Venture capital* – technology innovation also requires dealmakers that look far and wide (inside and outside the formal BBI) and that can pull together the best deals. Equity partnerships are an excellent way to gain access to technology without applying internal resources” (Shelton, 1998).

Participation in the BBI provides to companies a number of benefits in addition to the obvious expansion of resources. Their new focus on “deal flow” provides several important moments in innovation:

- focus on business opportunities associated with technological improvements,
- strengthening the technical and scientific capabilities, supported by various participants sharing thoughts,
- better understanding of market and customer needs and the use of prototypes, experiments and models,

- greater sharing of risk and significantly improved access to investment funds at the stage of research, development and commercialization,
- significantly increase the flow of technological knowledge at low cost and administration immanent to traditional internal development.

The use of dynamic models or prototypes include a large number of participants in sharing the vision during the innovation process. For example, radical improvements in the development of Boeing 777 aircraft were made possible by introducing electronic prototyping in which suppliers, project engineering teams and customers simultaneously working to improve the design. This resulted in significant improvements, innovation and dramatically reduced time to commercialization.

4. CONCLUSION

In the contemporary business conditions, radical technological changes represent one of the prerequisites of sustainable development at global level. Development and application of environmentally sound technologies that contribute to the transformation of unsustainable models of production and consumption in a sustainable model of growth and development are becoming of crucial importance for the simultaneous achievement of key aspects of sustainable development. However, the application of environmentally sound technology is not limited to the implementation of cleaner production processes, but it involves also the application of such technologies which perform the evaluation and monitoring the environmental impacts of economic activities, technologies for pollution prevention and remediation of caused damage.

With the institutionalization of the concept of sustainable development at the global level was set up the request to the companies that in order to preserve their reputation and survival in the market take the necessary measures to reshape their relationship to the environment so that the objectives of sustainable growth and development have become feasible. In this context, many companies have begun with the innovation of the technological process of production, introducing new technologies into the business that are consistent with the principles of sustainable development.

It is necessary to distinguish between two types of technological innovation. First, incremental innovations, that are oriented towards cost enhancements or changes the performances in available processes, products or services, and which are characterized by lesser continually modifications in the processes or products. Second, radical innovations, that are oriented towards creation of the entirely new processes, products or services, which posses enormous potential for introducing the radical transformations in the structure of industry and which generate the appearance of the new branches as a dynamic sources of sustainable growth and development.

Experience of leading companies indicates two critical types of activities needed to ensure the proper approach to sustainable development: the creation of new visions and technological map, and convert the vision through innovation in the management of technology, aided by new interdisciplinary efforts. Thus, sustainable development initiatives generally require technological expertise from new perspectives, as well as the new levels of interdisciplinary collaboration.

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PROMOTION OF WASTE SEPARATION AMONG SECONDARY SCHOOL STUDENTS

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Abstract: *This paper briefly describes activities connected to the campaign “Attention(!) to the Environment” – in Slovene: “Pozor(!)ni za okolje”. The campaign was initiated and sponsored by Goodyear Dunlop Sava Tires company. The goal of the campaign is to promote environmental awareness and particularly waste separation among secondary school students in the Gorenjska region (Northwestern Slovenia). The campaign was conducted for the first time in school year 2010/11 and repeated in 2011/12. The core of the campaign is a competition between schools in cleaning up municipal waste separately. However, the entire campaign included many other activities such as lectures and excursions as well as opening a Facebook page related to the environmental issue. During the course of the campaign a survey has also been conducted among the students. The survey consisted of questions asking students about their views on the environmental problems, waste treatment and particularly about their practice of waste collection at their homes and schools. The paper is particularly concerned with the presentation of the survey results.*

Keywords: *municipal waste, separate collection, secondary school students, environmental protection, reduced deposition of waste*

1. INTRODUCTION

In the transitional countries, which either became members of European Union (EU) a few years ago or they are approaching to the EU, separation of municipal waste on the source of origin has usually not very long tradition. Separate collection of municipal waste cannot be successfully performed without active collaboration of citizens. The adaptation of citizens to new waste collecting system is often connected with certain difficulties. Both motivation and information are important. At first citizens should be adequately motivated to put effort in waste separation. However, they must also have adequate knowledge that they are capable to separate waste correctly. Older people, even when they are very conscientious often have difficulties to change their long-standing habits in waste treatment. Younger people, of course, are more susceptible to changes. Therefore, it is of particular importance to invest effort in education of younger generations. There can be found many interesting and innovative approaches to education of young people on the field of responsible waste treatment in the literature (Asmatulu & Asmatulu, 2011; Harris & Probert, 2009; Kaplowitz et al., 2009; Kelly et al., 2006; Petrović & Milićević, 2006). When considering the situation in Slovenia, educational programmes for responsible waste treatment in elementary schools are well organized and effective but it seems that there exist certain possibilities to improve this field in secondary schools. In this paper a campaign entitled “Attention(!) to the Environment” is briefly presented. The goal of this campaign was promotion of municipal waste separation and improvement of environmental care among secondary school students.

2. SOME ASPECTS OF THE CAMPAIGN “ATTENTION(!) TO THE ENVIRONMENT”

The company Goodyear Dunlop Sava Tires is a company belonging to the Goodyear Group. This company is noted for investing great effort in the responsible relation to the environment which is particularly in this branch (tires production) not easy task at all. Following the policy of Goodyear corporation, they have achieved excellent results as in the last years they have extremely reduced quantities of the waste. However, Goodyear Dunlop Sava Tires would like to do something more for the improvement of environment in the region – they have decided to initiate and support also the environmental activities which are not directly connected with their production. Due to the reason mentioned above the campaign entitled “Attention(!) to the Environment” (in Slovenian “Pozor(!)ni za okolje”) has the purpose to improve the environmental consciousness of secondary school students. The campaign was performed in the Gorenjska region in the Northwestern Slovenia. The goal was that all

secondary schools from the region would participate. Nevertheless, in the school year 2010/11 the action was limited to the municipalities of Kranj and Škofja Loka. However, in the school year 2011/12 all of the secondary schools from the Gorenjska region actually participate in the campaign.

Besides secondary schools and Goodyear Dunlop Sava Tires company the partners in campaign were also all the municipalities from which derive secondary schools (Municipality of Kranj, Municipality of Škofja Loka, in 2011/12 also Municipality of Jesenice and Municipality of Radovljica), companies for municipal waste treatment and recycling, Institute of Public Health Kranj and Faculty of Organizational Sciences from the University of Maribor.

As mentioned, the campaign had goal to improve the environmental consciousness of students but it was particularly targeted in separate collection of municipal waste. The campaign included various activities as are lectures about various aspects of waste (economic waste management, waste and production, hazardous waste) and excursions. Modern and popular ways of communication like internet and facebook were used for the information of students about the campaign. However, the core of action was competition of secondary schools in separated collection of waste. Into this purpose a special commission was constituted. This commission consisted of students, professors and professionals from waste treatment companies, Institute for Public Health and Goodyear Dunlop Sava Tires. In the course of competition commission visited every school four times and during these visits which were not announced previously, bins and containers at every school were checked and the quality of waste separation assessed.

The part of the campaign was also the research about the relation of the students to the waste treatment and separated collection of municipal waste. The research was performed by a survey which was performed in two circles. The first circle was performed in September 2010, before the main part of the campaign (competition in waste separation). The second circle of the survey was performed in December 2010, after closing of the competition in waste separation. The results of the first circle of this survey are briefly presented in the continuation of this paper

3. CHARACTERISTIC FEATURES OF SURVEY

Survey consisted of 22 questions which were divided into five groups. All questions except one were of closed type offering one to five answers. The first group of questions was concerned with identification data (sex, type of secondary school, year of study). The second group of questions was related to the environmental awareness of student and their colleagues as well as their opinion about waste and separate collection. The third group contained more concrete questions regarding everyday practice of students in waste handling at their homes and the fourth group similar questions about waste handling at schools. The fifth group includes three questions which were like those in the second group concerned with student's personal view on the environmental issue.

The scope of inquiry was to get information about the relationship of secondary school students' population to the environmental issue and particularly to the separate collection of waste. It is expected that main obstacles for separate collection of waste can be recognized from the answers. This information can be helpful in searching possibility to improve the system and increase the efficiency of waste separation.

Survey was realized via internet with the open source tool Limesurvey (www.limesurvey.org) installed on swqlab.fov.uni-mb.si. Answers to survey provided students of seven secondary schools in Kranj and Škofja Loka. Total number of completed survey was 1617. This number presents a considerable part of secondary school students in Gorenjska region and therefore collected data have some statistical value. In the present paper due to lack of space some basic characteristics of answers are discussed only. Deeper analysis including statistical treatment of collected data has still to be done.

4. RESULTS OF INQUIRY

The first circle of inquiry resulted in 1617 answered inquiries. The profile of students' population was about 74% male and 26% female and relation of grammar school to the other types of secondary school was practically 50% - 50%. The greatest part of students was from the first class 41%, 21 % of students were from the second, 16% from the third and 22% from the fourth class.

Students opinion about waste and waste separation

As mentioned above the first part of inquiry (questions 4 to 9) was concerned with the students' relation to the environmental issue, waste and waste separation. All these questions were of closed type. There was only one possible answer except by the questions 8 and 9 where students were able to choose more answers. When students were asked about environmental awareness of their colleagues (Question 4) about 4 % rate it as very high, 19% as high, 60% as medium, 14% as low and 4% as very low.

The relationship of their colleagues to waste treatment (Question 5) was from the greatest part of students estimated as satisfactory (48%), 26% of students estimate it as good, 18 % as unsatisfactory and similar number (about 4%) as very good or very unsatisfactory.

Question 6 was "What kind of association you have at the word waste?" The majority of students (54 %) describe the waste as something that they would like to get rid of; 24% of students designated waste as something that has influence on the environment, 7% as a possible source of secondary raw materials, 3% as something which causes expenses and 8% do not think over waste at all. Question 7 asked students about their relationship to the separate collection of municipal waste. 58 % of students believe that separate collection is absolutely necessary, 12 % contrary believe that it is not important. 11% of students will separate waste when other people would do so, 9% think that separate collection is duty of municipal services and 8% do not think at all about separate collection.

Question 8 was about the responsibility for separate collection of waste (more answers were possible). The majority (75 %) of students are aware that everyone is responsible for waste separation, 38 % think that this is duty of municipal service, 30 % think that state and 18 % that local community is responsible for waste separation. 4% of students do not care about this. Question 9 asked about main advantages of separated collection (more possible answers). Saving of natural resources seems the most important advantage (58%), 51 % think that separate collection is important because of adequate treatment of hazardous waste, 33 % because of energy saving and 32% because of prolongation of landfill lifetime. 3% do not see any advantage in separate collection.

Waste separation in households

Third part of survey (questions 10 to 14) asked students about waste treatment at their homes i.e. in households where they live. Question 10 was concerned with the waste treatment at home and there was possible to select more answers. More than three fourth (77%) answered that they separate individual fractions (paper, glass, metal and plastic package, biological waste), 10% answered that they burn waste, 14% put all kinds of waste in the container for mixed waste and 27 % emit bulky waste in the case of collecting actions.

When students were asked to estimate the mass of waste produced daily per capita in their households (question 11) 40% could not decide for any answer, 5% do not care about this, 26 % think that mass is less than 1 kg, 23% between 1 kg and 2 kg and 5% more than 2 kg. Question 12 was concerned with the frequency of separate collection of individual fractions of waste. Answers are shown in Table 1.

Table 1: Answers on the question about frequency of separate collection of individual fractions of waste in households.

Fraction	always	often	rarely	never
Paper	63%	22%	8%	6%
Glass	58%	23%	13%	7%
Plastic bottles	57%	27%	10%	6%
Cans	47%	28%	17%	8%
Package	50%	28%	14%	8%
Biological waste	55%	23%	13%	8%

79% of students believe (question 13) that separately collected fractions are actually delivered into recycling process, meanwhile 21% think that separately collected fractions are mixed and deposited on landfill. Question 14 considered treatment of hazardous waste. 35% of students answered that they keep hazardous waste separately and emit them during the course of collecting action, 25% bring them in the collecting centre, 8% emit hazardous waste together with the other waste, 5% throw them away or pour

them in the toilet, 17% do not know how they handle with hazardous waste and 10% did not answer this question.

Waste treatment in schools

The topic of fourth group of questions (questions 15 to 19) was waste treatment in schools. When were asked about waste treatment system in their school (question 15) 21 % of students estimate it as very good, 41% as good, 25% as satisfactory, 7% as bad and 6% as very bad. In question 16 students were asked about motivation for more conscientious separate collection (more answers were possible). 34% of students answered that a greater number of waste baskets for separate collection would motivate them and 32% would like to contribute to cleaner school. More rigorous survey by teachers would motivate 9% of students meanwhile 17% answered that they could not be motivated by anything. 7% of students answered that some other things could stimulate them.

The greatest part of students (49 %) were informed about changes in waste collection system in school (question 17) when they had observed waste baskets for separate collection, 22% had got information from teachers, 3 % from other students. 7% heard announcement by loudspeakers, 3% read from the posters and only 2% were informed from the school webpage. 14% of students answered that they do not know anything about these changes. Question 18 was exception as it was of open type. Students were asked about proposals to improve their relationship to the separate waste collection in schools. 99% of students answered the question. However, because lack of space these answers cannot be discussed in the present paper. When separate collection would be successfully introduced schools can considerably lower expenses of waste treatment. Students were asked into which purpose the saved money should be used. 40% would like to use this money for excursion, 20% for educational purposes, 16% for cultural events (concerts), 15% for sport competitions and 7% for some other purposes.

Final questions

The last three questions (20-22) were like those in the first part more oriented to some general aspects of waste treatment. In question 20 students were asked about the possibility of pollution reduction with the change of habits. The majority (71%) answered that this is possible with separate collection of waste and recycling, 16% think that waste formation prevention is the most important and 3% favour waste incineration, 1% decided for some other ways. 4% think that decrease of pollution with the change of habits is not possible and 3% do not care about this.

In question 21 students were asked how they personally contribute to less polluted environment (more answers were possible). The majority of students (65%) collect the waste separately, 30% try to prevent waste formation, 20 % use paper bags or bags for repeated use, 21% cooperate in cleaning actions, 1% of students contribute in some other ways and 7% do not contribute in any way. The last question (22) asked students to estimate their personal environmental awareness. 12 % of students rate it as very high, 48% as high, 35 % as medium, 4% as low and 1 % as very low.

5. DISCUSSION

As mentioned earlier deeper analysis of the data collected during the inquiry will be performed later. The present paper brings only brief discussion of answers. It is interesting to compare the students' estimations about their own environmental awareness and environmental awareness of their colleagues. Results are graphically shown in Figure 1. It can be clearly observed that students have some better opinion about their own awareness than about awareness of their colleagues.

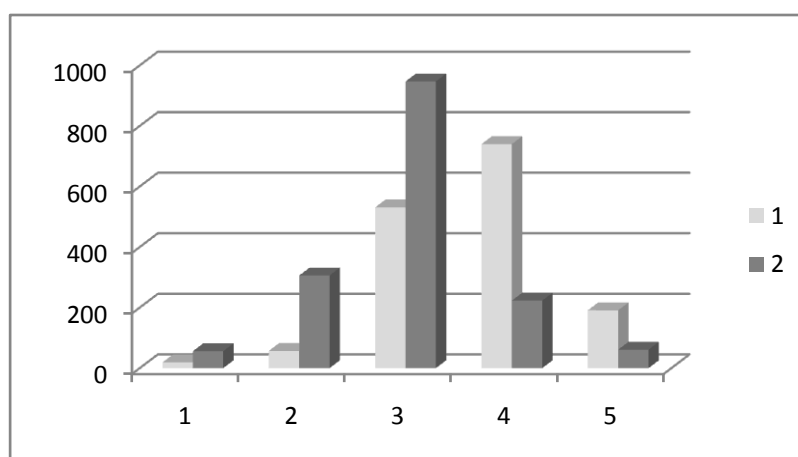


Figure 1: Evaluation of environmental awareness of students – 1 for their personal environmental awareness, 2 for environmental awareness of their colleagues. Marks: 1 – very low, 2 – low, 3 – medium, 4 – high, 5 – very high.

More than one half (58%) of students believe that separate collection of waste is necessary and 75% of them think that everyone can contribute to separate collection. More than one half (58%) of students think that separate collection is necessary because saving of natural resources, about one half (51%) because of adequate treatment of hazardous waste and one third believe that separate collection is important because of energy saving as well as because of landfills' life time prolongation. More than three quarters of students collect waste separately at their homes. When were asked about particular fractions the answers show that situation is similar for various fractions – something better is for collection of paper waste meanwhile collection of cans is under the average. Answers regarding hazardous waste can be reason for certain preoccupation. 5% of students answered that they mix hazardous waste with other waste, 17% do not know how they treat hazardous waste and 10% did not answer this question.

The great majority of students are content with waste treatment system in their school as only 13 % estimated it as bad or very bad. It seems that disposition of waste baskets is very important as one third (34%) of students answered that greater number of waste baskets is the most important motivating factor for separate collection and about one half of students (49%) learned about changes in waste treatment system in school as they observed baskets for separate collection. About one fifth (22%) of students got information about separate collection from their teachers. It is interesting that very small 'part of students learned about changes in waste treatment system from posters or school's web page. It can be indicative that similar part of students answered that anything could not motivate them for separate waste collection (17%) and do not know anything about changes in waste treatment system in school (14%).

Almost three quarters of students (71%) believe that separate collection is the best way to decrease pollution meanwhile 16% mentioned waste formation prevention as the best solution. Relative small part of students thinks that it is not possible to reduce pollution with change of habits or is not interested about this problem. Besides separate collection students contribute to reduction of pollution with waste formation prevention (30%), collaboration in cleaning actions (21%) or with the use of paper bags/bags for repeated use. Only 7% of students answered that do not contribute in any way to decrease of pollution.

6. CONCLUSION

The results of survey show that the majority of secondary school students are aware of significance of responsible relationship to the environment and adequate waste treatment. However, before making some conclusions the more detailed analysis and statistical interpretation of the results of survey should be done. Besides this during the competition in separated collection certain faultinesses of the waste treatment in schools as well as possibilities to improve the education system can be observed.

In the school year 2011/12 the campaign is taking part for the second time. As mentioned before, this year besides Kranj and Škofja Loka also the municipalities of Jesenice and Radovljica joined the campaign. The competition in waste separation has finished in April 2012 and inquiry started in the beginning of May 2012. It will be interesting to compare the results of competition as well as answers of inquiry for the year

2011/12 to those of the year 2010/11. In the case of such campaigns it is important that they are not taking place only once or twice but that they are organized continuously. The changes in everyday habits can be achieved only on long-term.

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URBAN TRAFFIC MANAGEMENT BASED ON MEASURING AIR POLLUTION LEVEL

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Abstract: *The subject of this work is exploring ways of traffic management by measuring the concentration of air pollution in urban areas. The goal of this research is to develop models of traffic management and air pollution. The method is based on 24-hour measurement of air pollution and connecting monitoring stations with Automatic Traffic Control System Centre. Based on the measuring results, signalling cycles are being activated in order to make a city traffic diversion. This way it is possible to manage air pollution in critical zones of the city and make traffic diversion to other city areas, which allows the air quality to be improved and within prescribed limits. Research Results show that in the case of Banja Luka the air quality has improved 60 minutes after the suspension of traffic in endangered areas (city centre). In order to maximize the effects of this method used for traffic management and air pollution control, it is necessary to define alternative city itineraries and conduct a population education program in time. The results of this research can be useful for companies engaged in manufacturing specialized traffic management software and also help them create new specialized software for air pollution control and forecast.*

Key words: air pollution, traffic management, air quality, pollutant measurements, SAUS, APVJGP

1. INTRODUCTION

Economy, technology and car industry development caused the increased number of vehicles in urban areas. Environmental problems in urban areas of today are numerous, causing very serious health problems and influencing the psychology of urban living. In urban areas, such as Banja Luka City, one of the main problems is undeveloped infrastructure. The Banja Luka City has no roundabout. Two transit roads pass through the city causing the increase of the pollution. Technological aspect such as the structure of the city, taxi and vehicle traffic, type of vehicles, not implemented SAUS (System of Automated Traffic Management) and APVJGP (Automated Public Transport Surveillance) systems, partial air pollution measurement, bad traffic infrastructure (no separate lines for taxi and public transport) and finally climate and meteorological factors, have direct influence on air pollution.

Small traffic infrastructure and fairly old vehicles are just some of the elements causing the increased air pollution in the city. Air pollution is also caused by certain type of vehicles, in our case vehicles that are 15.7 years old (Euro 2 Standard), (Statistics IDDEEA (2010)). The end result is ecology problems caused by increased pollution due to stop/go traffic waves and increased traffic during morning and afternoon rush hours. In order to solve the problem two possible solutions can be applied. The first is to set a traffic restriction which is not very popular solution for decreasing the air pollution in urban areas and traffic jams. The second is the method of traffic and air pollution control.

2. MANAGEMENT METHODOLOGY

Air quality level in urban areas is determined by different geographical, climate, meteorological and other factors (Knezevic, et al, 2008, 2009). Currently, the level of air quality in Banja Luka City does not match health requirements, i.e. pollution has negative impact on its population. In general, measuring results of air quality in past 3 years indicate Second Class of air quality in Banja Luka City area. Monitoring took place in 4 spots. Measuring results relating to pollution in the city centre (5th measuring spot) and measuring results relating to the pollution on no traffic day (Jankovic, et al, 2010, Knezevic, et al, 2008, 2009), show that the air quality keeps in range from Class I to Class IV., depending from the type of pollutant.

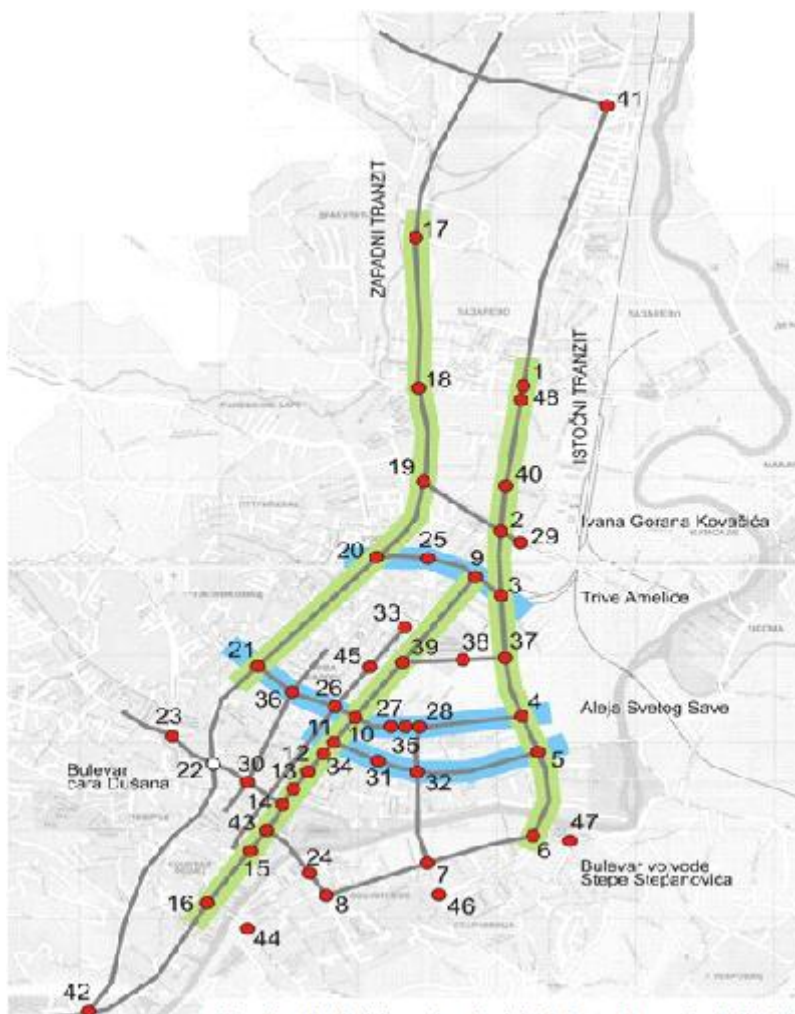
In order to apply the suggested methodology of traffic and pollution control, following actions are to be made:

- To install cable distribution system (DKR) throughout the city
- To integrate SAUS and APVJGP system

- To make a laboratory network for measuring the presence of each pollutant
- To install ArcGIS™ ESRI (Win/), Gis software-SelmaGIS
- To make professional teams for implementation of suggested actions
- To provide population education

3. THE ELEMENTS MODEL

DKR - Cable Distribution System represents an infrastructure system for data transfer and system management. This is very important issue because it also allows other elements of the system such as air pollution measuring units, air pollution street display etc., to be connected to data transfer system. For optical cable net (DKR), it is necessary to foresee a huge system which includes safety connections i.e. allows the system to function without the interruption.



Scheme 1: DKR - Cable Distribution System

The idea is to make the system work 24 per 7 and 365 days a year on online basis. Operating system must support audio or video data transfer i.e. alfa numeric information or services. It is of crucial importance to have this kind of system because it will allow the connection to the pollution monitoring network and sending information on current air pollution to street displays. In order to have emediate acces to all relevant dat, SAUS system also must provide complete database of traffic and air pollution information as well as information on the other services.

SAUS system provides both location and graphic network preview i.e. georeference vector map of urban area including georeference chart of crossroads controlled by traffic light, parking and public garage area, street cabinets with active and passive equipment, street displays, pollution measuring units on video wall.

A very important element of SAUS system is video surveillance of crossroads controlled by traffic lights and the detection. On specific locations it is necessary to install video cameras in order to achieve the following:

- Traffic and crossroad surveillance
- Driving direction of the vehicle detection (in case of driving wrong direction)
- Approaching of the vehicle detection
- Traffic jams detection
- Vehicle numbering
- Classification of numbered vehicles (it is the key element for pollution preview and the classification of pollutants is being done by Selma^{GIS} software)
- Lost cargo on the road detection
- Cross road and pedestrian surveillance

Video detection system provides detailed statistics for all required functions of detection cameras. It provides daily, weekly, monthly, quartal, 6-month and annual reports. All of this applies to air pollution statistics by pollutants). SAUS system architecture preview is given on Scheme 2.

SAUS system is advanced architectural information system for automatic traffic management (Scheme 2), that supports the following:

- reception, digitalisation and video formatting of the signal including the storage of all data related to video system and other peripheral elements such as temperature, air humidity and pollution level
- Broadcasting
- Data storage
- Client applications for video surveillance and system for independent diagnosis and maintenance

Monitoring and pollution measurement network consists of mobile EcoLabs that should be set on specific locations. Locations are determined based on traffic frequency i.e. spots with crowded streets and dense traffic during rush hours, when people are going to or coming back from work.

Monitoring and pollution measurement network is second phase in technical and organisational realisation of the model. Immediately after the realisation of SAUS system it is necessary to provide traffic counts on all crossroads and in a few iterations in order to get the exact figures of number of vehicles per hour or number of vehicles per crossroad. This will help define EcoLab locations for measuring of the pollution. (Soldatovic, 2010).

Measuring Lab - APNA 370E, (APNA 370E, HORIBA, 2012) has been used for continuous monitoring of atmospheric NO, NO₂ and NO_x. APNA-370 was selected because it uses an independent, internal dry-method to achieve the highest levels of sensitivity and accuracy. The dry method has been a preferred method for monitoring the atmospheric pollution, due to its minimal maintenance requirements and capability of continuous monitoring and instantaneous analysis of gas in its unaltered state. The APNA-370 uses a combination of the dual cross flow modulation type chemiluminescence principle and the referential calculation method. This gives it the advantages of the single-detector method plus the ability of continuous measurements of NO_x, NO, and NO₂. The design gives great stability and extremely high sensitivity (0.1 ppm F.S.)

APNA 370E is single rack-sized unit. For measuring of other pollutants such as CO, SO₂, O₃, LČ, ULČ, smoke and dust it is possible to connect mobile labs with the system. LED panels are to be installed on city entrance and other city locations displaying different information but with its main purpose to inform the population about the level of the pollution (especially NO_x). LED panels are set on city entrances in order to give the information related to city traffic such as traffic jams, car accidents, directions, speed limit warnings, temperature (T °C), air humidity (rH %), air pressure (mb), etc. LED panels are matrix colour displays with 20 mm pixel distance which are resistant to moisture and other weather and climate factors. (Soldatovic, 2010). ArcGISTM ESRI (Win/), GIS software-Selma^{GIS}

One of the most important elements of the model is the implementation of Selma^{GIS} software for graphic preview of pollutant emission on defined locations with mobile EcoLabs. Selma^{GIS} software is modular

software supported by ArcMap™ as a part of ArcGIS™ ESRI information system Windows based SelmaGIS,(2012). User interface is Windows compatible and consists of:

- Emission Factory/Emission Database
- Digitizing Tool
- Meteorology Factory
- Terrain Factory
- AUSTAL2000

Figures for pollution emissions for each pollutant (NO_2 , NO_x , PM_{10} etc.) in selected street can be obtained from Emission Factory SelmaGIS model. The system is used to determine pollutant dispersion in different seasons, vehicle structure which causes airpollution and meteorological conditions, type of source of airpollution (point sources: industries, energy production and heating industry), line sources (streets), diffuse sources (private heating, industries / energy production etc.). *AUSTAL2000* allows up to 300 x 300 grid points in the horizontal direction, i.e. the grid solution for simulation of region 25km x 25km.

Additionally AUSTAL2000 needs as physiographic parameters

- the topography height
- the aerodynamic roughness of the surrounding
- building information (building contours and building height)

AUSTAL2000 can treat the dispersion of the following gases: SO_2 , NO , NO_2 , NO_x (given as NO_2), Benzene, Chloroethane, Hydrogen Fluoride (given as F), NH_3 , Hg

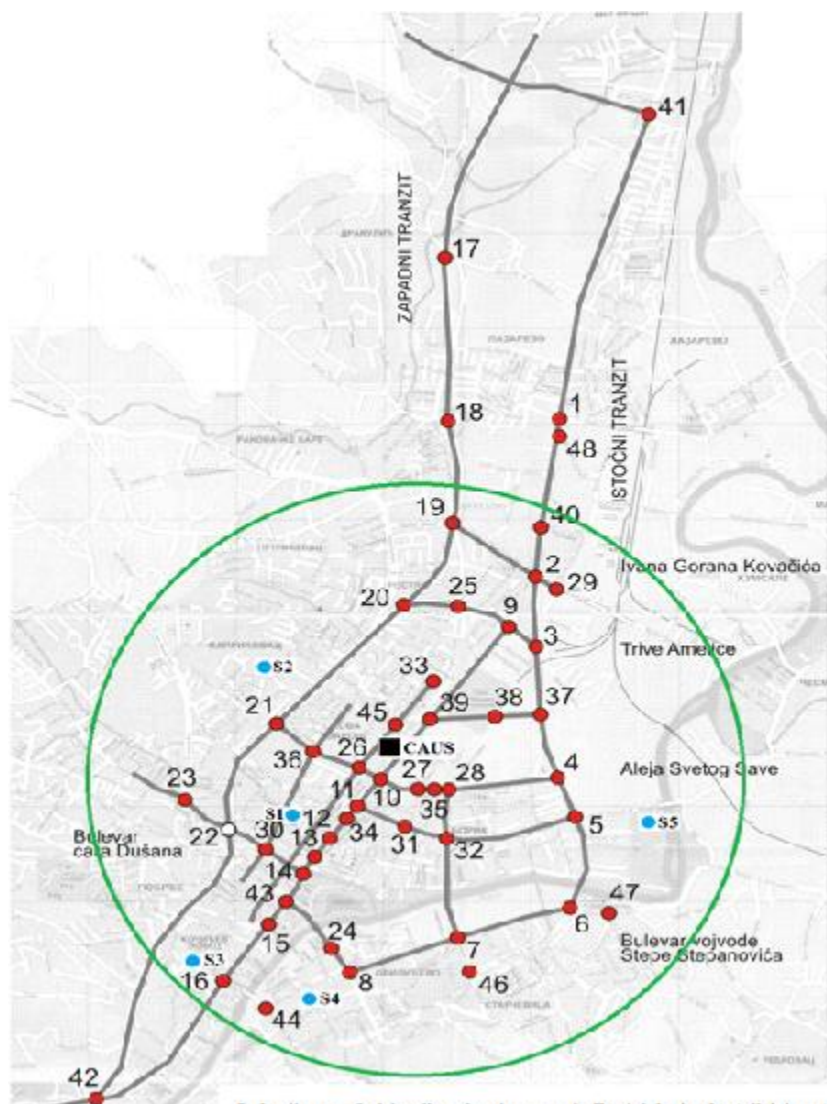
Meteorological conditions in defined area – When defining the model it is necessary to take into the account following meteorological conditions:

- Relative air humidity, (rH %);
- Air pressure, (mb);
- Wind roses, (direction, wind speed);
- Temperature, ($^{\circ}\text{C}$)

Above given parameters are being taken from Hydrometeorological Institute of Republic of Srpska and have a great impact to pollutant emissions (Jankovic, et al, 2010, Knezevic, et al, 2008, 2009). New public transport schedule, parking policy and raising the level of conscience of public transport users are of crucial importance for decreasing the air pollution up to 20%, in case of respecting public transport schedules. Constant reminding and education of the population allows rising of the level of their conscience and reducing the health problems caused by the pollution and increasing the percentage of using bicycle as a mean of transportation. New public transport schedule supported by SAUS has advantages such as pollution decrease, creating the pedestrian zones in the city centre and displacing parking areas out of the city centre to other urban areas. In order to finalize new public transport schedule it is necessary to change the old vehicles that are using liquid oil gas with new ones and, if possible, implement subway, tram or trolleybus transport system. The right means of transport should be implemented depending on the configuration of urban area and the financial resources and it is to be decided by the traffic performance study.

4. URBAN TRAFFIC MANAGEMENT BASED ON MEASURING AIR POLLUTION LEVEL

The method is based on air pollution 24-hour measurement and connecting monitoring stations with SAUS. (Scheme 2). Based on measuring results, signaling cycles are being activated in order to make city traffic diversion. This way it is possible to manage air pollution in critical zones of the city and make traffic diversion to other city areas, which allows the air quality to be improved and within prescribed limits. This method allows the implementation of automatic zero-zone i.e. no traffic zone in specific period of time.



Scheme 2: Traffic Management Model

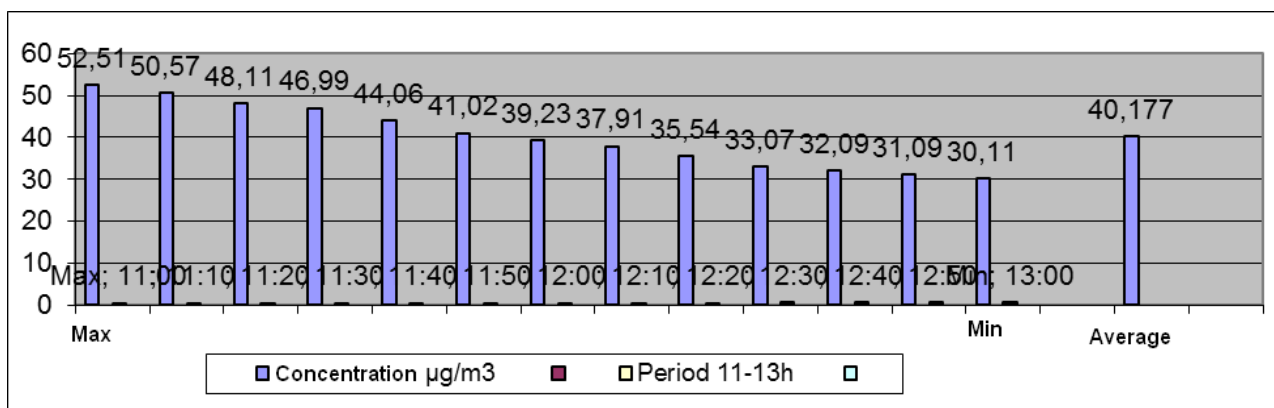
The level of air quality in urban areas is determined by different geographical, climate, meteorological and other factors (Knezevic, et al, 2008, 2009). Currently, the level of air quality in Banja Luka City does not match health requirements, i.e. pollution has negative impact on its population. In general, measuring results of air quality in past 3 years indicate Second Air Quality Class in Banja Luka City. Monitoring took place in 4 spots. Measuring results for city centre (5th measuring spot) and measuring results in during no traffic day (Jankovic, et al, 2010, Knezevic, et al, 2008, 2009), show that the air quality keeps in range from Class I to Class IV., depending from the type of pollutant.

Example: Bus line 14-9. This bus line covers the city center. As soon as pollution reaches its critical level with nitrogen dioxide concentration in the air, the SAUS system is to suspend bus lines 14-9 relocating the traffic to bus lines 14, 30, 22, 21, 20, 19 and 2. The measuring station (S3) that covers this line and city center is within SAUS system. Bus lines 21, 36, 26, 10, 27, 35, 28, 11, 31, 32 i 20, 25, 9, 3 would be suspended automatically and the traffic would be reallocated to bus lines 19, 2, 9 and to transit road lines , 2, 3, 37, 4, 5, 6, 7, 8, 24, 43, 15, 16, 42. City center would be covered only with city and taxi transport.

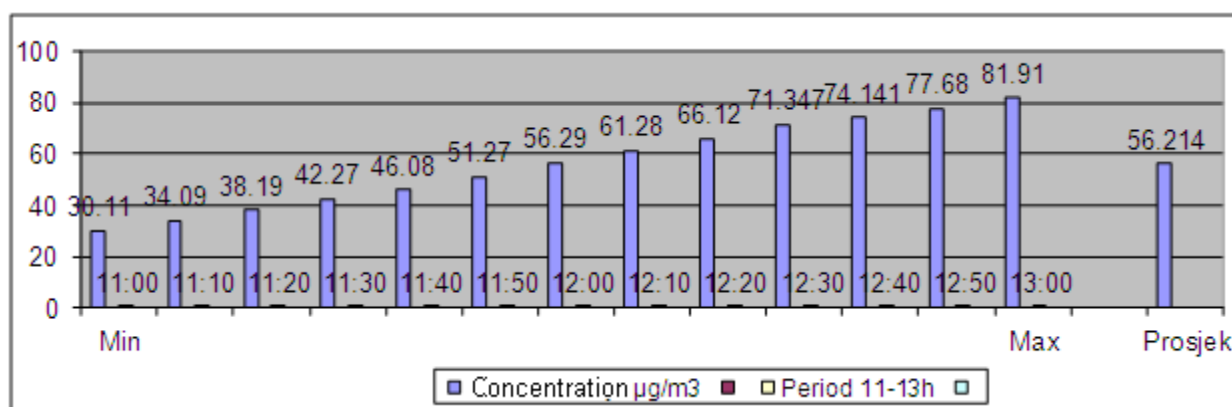
This was just a sample of city traffic organized based on pollution measurement results given by S1 station. Combining other measuring stations S2-S5 it is possible to make even more alternative itineraries depending on pollution level results. The most important element of traffic management is the infrastructure adjustment of city network necessary for alternative itineraries and pictogram plan for traffic

allocation. Before the system is put into the function it is planned to conduct education campaigns in cooperation with the Ministry of Internal Affairs.

Measuring results on No Traffic Day (Scheme 3) and the day after (Scheme 4) during the period from September 22 to September 23, 2010



Scheme 3: Results of measurements of nitrogen oxides in the day without traffic



Scheme 4: Results of measurements of nitrogen oxides in the day with active transport

Years are determining second class of the air (Table 1). Taking into the consideration air pollution measuring hypothesis, measurements were done on the most frequent street in the Banja Luka City Center. Constant measurements are being done even during days with no traffic and in a specific period of time.

Table 1: Air Quality Classification

Pollutant Concentration in $\mu\text{g}/\text{m}^3$	Air Quality Class			
	Air Class 1 (low air pollution, relatively clear air)	Air Class 2 (risk zone)	Air Class 3 (high level risk zone)	Air Class 4 (critical zone)
SO ₂ (Sulfur Dioxide)	Up to 30	30 - 50	50 - 100	> 100
NO ₂ (Nitrogen Dioxide)	Up to 30	30 - 40	40 - 80	> 80
CO (Carbon Monoxid)	Up to 1000	1000 - 2000	2000 - 4000	> 4000
Black smoke or soot	Up to 20	20 - 40	40 - 60	> 60

Measurements being done on the day with no traffic and the day after with active traffic during the period from September 22 to September 23, 2010 (Jankovic, et al, 2010) gave results as given in Table 1). Decrease of pollutants has been noticed during 2 hour period (10-minute measurements in 2010), especially nitrogen oxides. The values are double during the period with regular traffic. Scheme 4 and 5.

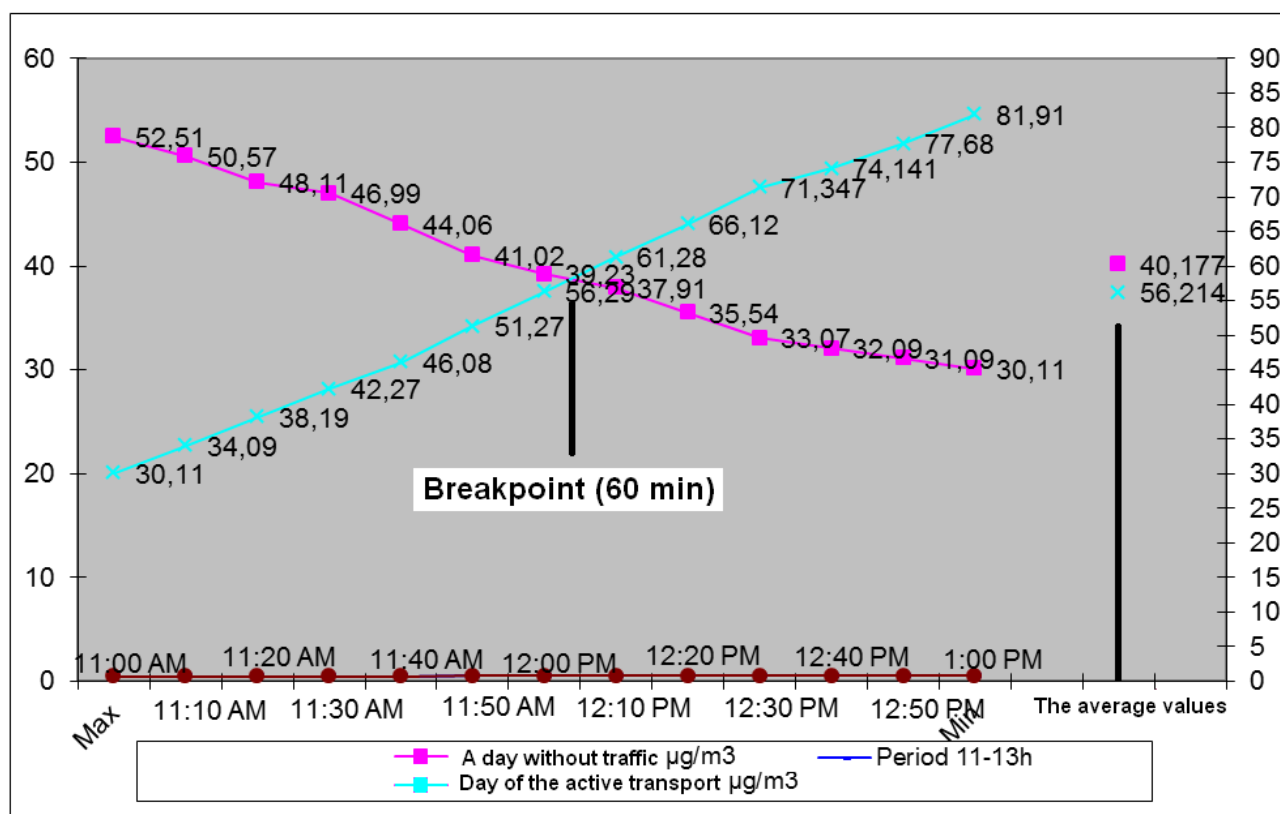
First Measuring Day took place on 22/09/2010 and it was the day with no traffic. An average NO_2 concentration during the measuring period was $28.232 \mu\text{g}/\text{m}^3$. When comparing an active traffic and no traffic period the decrease of an average NO_2 concentration in the air was evident.

During 2-hour measuring period (no traffic period on 22/09/2010, 1100-1300) First Air Class was reached (zone of pollution border value with an average of $28.2325 \mu\text{g}/\text{m}^3$) with low polluted air, i.e. clean air. NO_2 concentration during a no traffic period was within both target and border value according to the Regulations of Border Air Quality Value (Knezevic, et al, 2008, 2009).

Second Measuring Day took place on 23/09/2010 and it was the day of active traffic. An average NO_2 concentration during the measuring period was $45.282 \mu\text{g}/\text{m}^3$, maximum NO_2 concentration value $63.878 \mu\text{g}/\text{m}^3$. Based on the Decision of Pollution Air Protection in Banja Luka City (Knezevic, et al, 2008, 2009), the air quality can be classified according to the following criteria: During 2-hour measuring period (period of active traffic on 23/09/2010, 1100-1300) 3rd Class - High risk zone (Jankovic, et al, 2010).

It is obvious that dense traffic in Banja Luka City Centre influences the air quality, which confirms NO_2 pollutant concentration during no traffic day measuring period. If we take a look at the graph with active traffic period results we can see that there is a significant increase of pollution with NO_2 . The significant increase of pollutants is noticed even with other air pollutants.

If we make data crossing of time periods (with and without traffic, scheme 5) we can see that just after 60 minutes the air quality increases i.e.



Scheme 5: Crossed data measurements with and without traffic

This 60 minute period is a turning point when the air quality i.e. Nitrogen oxide NO_2 concentration level increases or decreases. Just after 60 minutes the air quality decreases to 2nd class. If we take into the consideration the fact that rush hours in Banja Luka City are between 07:00 and 08:00 and between 15:30 and 17:00, we can be safe to say that it is possible to manage air pollution efficiently both in the City Centre and other city locations, because the traffic infrastructure makes it possible. The highest level of air pollution was spotted in rush hour period between 15:30 and 17:00, when in short period of time large number of vehicles were on the streets. From the transportation aspect, it is necessary to coordinate

alternative routes for vehicles. However standard itineraries for public and taxi transport would have stayed unchanged. In the Automatic Traffic Control System Center special itineraries would activate after the critical point, i.e. alternative lines for traffic redirection from the critical zone.

6. CONCLUSION

It is not completely possible to eliminate the air pollution in urban areas. However, it is possible to control it using air pollution measuring stations i.e. allocate polluted air throughout the city. With a support of networked measuring stations it is possible to make pedestrian zones (automatic pedestrian zone) between 1700 and 2400. This way the air quality could be improved to 1st class.

The air quality is determined by measuring results and its comparison to the standard, which helps define certain aims and take necessary steps such as:

1. Protection rate activation in critical situations (total traffic suspension using CAUS System, defining of pedestrian zone and Ecopass zone)
2. Population health risk estimation (traffic suspension)
3. Procurement of basic data for town planning (traffic infrastructure and itinerary planning)
4. Audit of citizen complaints on air pollution

Basically, air quality results taken on 5 different locations in past 3 years show that the air in Banja Luka City is of 2nd class. If we take into the consideration measuring results in S3 centre and the results on no traffic day (22/09/2010), the air quality vary from 1st to 4th class (Jankovic, et al, 2010) depending on the type of pollutant. Finally, the results of the study show that it is possible to manage and control air pollution in urban areas.

Actions that can be taken in order to support these activities and help manage air pollution are closure of parking facilities in the city centre and supporting public and taxi transportation using price policies. Currently, the parking fee in the city centre is at least 5 to 6 times higher than in other city zones and restrictions on buses to remain in city centre other except on bus stations). Quality town management enables lower fuel consumption which decreases the pollution. The reason for that is that less time would be spent in searching for available parking space. Updated information on available parking spaces on public parking lots and public garages would be presented on crossroad displays and the data would be sent by Automatic Traffic Control System Centre.

Based on measuring station network it is possible to make pedestrian zone between 17:00 and 24:00 (implementation of automatic pedestrian zone) and this way improve the air quality to the 1st level. Decreasing the traffic frequency in the city centre would help bus and taxi drivers to drive on schedule, which would also decrease air pollution.

A study allows surveillance and present reading of air quality with immediate traffic dispersion in urban area. Also, the study shows that diagnostic analyses and air quality measurement depends on meteorological conditions. In this case, wind rose has a big influence as well.

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THE ROLE OF INSTITUTIONAL STABILITY AND POLICY-MAKING PROCESSES IN SUSTAINABLE DEVELOPMENT: THE CASE OF ALBANIA

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Abstract :Political stability is considerably influenced by the institutional stability within a political system. Scholars and researchers agree on the fact that institutional stability has a considerable impact on the economic development of a country and the society as a whole. Nowadays, national and international institutions are putting emphasis on the sustainable development as an element accompanying the economic, social and environmental development.

Based on this premise, this paper is aimed at presenting the relationship between the institutions and the sustainable development concept in Albania during the post-communist period. The focus of the study is the analysis of institutional stability as an important indicator in the framework of democratization processes focusing on its role on sustainable development, when the latter is incorporated in the formulation of policies. By making use of qualitative and quantitative data of the last 20-year-period in Albania, this paper argues that the low level of institutional stability has produced gaps in the implementation of sustainable development in the social, environmental and economic systems, even though in terms of the policy-making outcomes this concept is considered as an essential element.

Key words: institutional stability, institutional logics, sustainable development, policy-making process.

1. INTRODUCTION

If we attempt to compare today's world with that of at least twenty years ago, the answer would definitely be "things" have changed; political regimes have changed, societies have changed, world economy has changed, etc. Change has affected the microsystems positively in some respects and negatively in some others. Many new concepts have emerged in the course of this transition process and one of them is definitely that of *sustainable development*.

In the framework of the academic research for providing rationales and background to this concept, different definitions for *sustainable development* emerged. In the first definition given by the report of World Commission on Environment and Development (1987), sustainable development is considered to be *the development that meets the needs of the present without compromising the ability of future generations to meet their own needs*. Besides the variety of definitions to this concept, its importance cannot be put into question. It has been widely incorporated as part of the policy-making processes by many actors such as: states, national and international organizations, associations, etc.

In the last two decades, some regions and especially the Balkan region has been characterized by fundamental political, economic and social changes. The later have provided the grounds for different future considerations of the political and economic systems. Albania is part of this group of countries. After the fall of the communist regime, it entered the difficult path of democratization processes which included the reorganization of the economy and the political system as well. What is more, these changes coincided with the appearance of sustainable development as a new concept. That is why, this paper focuses on the roles that institutions themselves have had on the sustainable development in Albania. The logic that the paper attempts to shed light on is the way in which institutions involved in the policy-making process shaped the sustainable development of this country in the aftermath of the communist regime.

Nowadays, a considerable part of the literature in developing countries has been focused mostly on the relationship between politics and the economy of a country. By doing so, they further analyze economic indicators such as GDP, investments, redistribution, etc. related to the political system, its institutions, or other political indicators. As such, the quality of institutions for example, has been studied in relation to economic growth (Polterovich & Popov, 2007) or they are considered as integral to the amount spent on both the costs of transactions and the costs of transformation in the production process (Aron, 2000). Furthermore, Mamoon and Murshed (2009) put emphasis on the role of education in improving the quality of institutions. On the other hand, other authors such as Persson (2002) try to answer the question if it is the political institutions the ones which shape the economic policy. So far, little has been done in analyzing the role of the institutions within a political system regarding sustainable development, and there is almost a gap in literature focusing on this topic in the Balkans and more specifically in Albania.

The paper continues as follows: first, it provides a theoretical background of the concept of sustainable development and of the institutions involved in the process of policy-making; second, it continues with some conceptual underpinnings; third, it provides evidence on how the former has been shaped by the latter during a twenty-year-period in Albania; and finally, it presents some conclusions with future consideration for research on this topic in Albania.

2. CONCEPTUAL UNDERPINNINGS

The concept of sustainable development, even though a recent one, has grabbed the attention of many scholars and researchers, and especially international organizations which are aimed at providing assistance and support to the underdeveloped and developing countries. As mentioned above, the concept appears first in the Brundtland Report, which gives the standard definition used thereafter, and according to the International Institute for Sustainable Development, *it involves the concept of needs, namely the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs*⁴⁰. The idea of needs and limitations brings about the importance of decisions. Since the main political actors in the present world are the states, these decisions should be seen more in the light of the state institutional framework. In dealing with situations of restrictions, needs and objectives to be reached through decisions, the World Bank provides us with a structured puzzle of how the needs and objectives should be taken in consideration during the decision-making process.

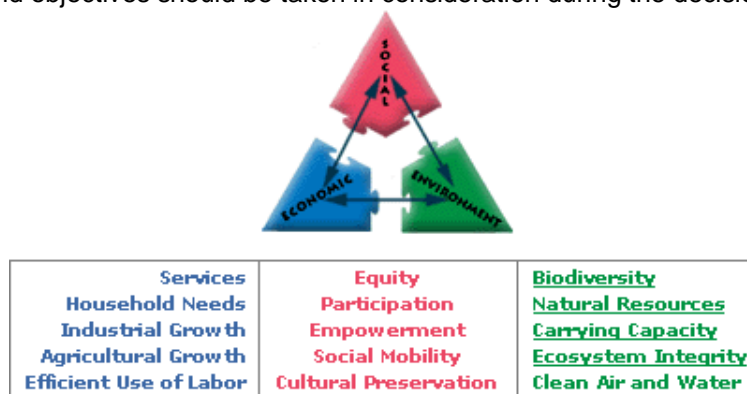


Figure 1. The puzzle diagram, Source: World Bank⁴¹

The concept of development involves the systematic interaction among the economic, social and environmental systems. However, these systems also represent the basic needs of the populations. Should there be put any priority on these needs? Kates, Parris and Leiserowitz, (2005) point out that in the Brundtland Report, *there were three quite distinct ideas about what should be developed: people, economy, and society*. A considerable part of the literature following the report has been mostly focused on the economic development since it is mostly in this system that outcomes are provided faster and the impact on the population can be measured much more easily. In the framework of such developments, a broader definition of it was provided by the Report of the World Summit on Sustainable Development (2002) which paved the way towards “a collective responsibility to advance and strengthen the interdependent and mutually reinforcing pillars of sustainable development—economic development, social development and environmental protection—at local, national, regional and global levels”.

As a result, the goal of sustainable development is to create and maintain prosperous social, economic, and ecological systems which are intimately linked: humanity depends on services of ecosystems for its wealth and security (Folke, Carpenter, Elmqvis, Gunderson, Holling, & Walker, 2002). At the core of these three pillars of the sustainable development, it is the other dimension, the institutions, which provide the input in feeding the other systems with outputs given in the form of decisions or policies. In pointing out the importance of institutions on the sustainable development of systems Gechev, points out *that the creation of an appropriate institutional framework is a necessary condition for the fulfillment of the criteria of sustainable development* (Gechev, 2008).

⁴⁰ International Institute for Sustainable Development. *What is sustainable development*. Retrieved from <http://www.iisd.org/sd/>, accessed on March 2012. (as cited in) World Commission on Environment and Development (WCED). *Our common future*. Oxford: Oxford University Press, 1987, p. 43.

⁴¹ The World Bank Group. (2001) *What is sustainable development?* Retrieved from <http://www.worldbank.org/depweb/english/sd.html>

My point here is that the institutional framework includes not only political institutions but other apolitical ones as well. Both types of institutions shouldn't be considered as static in their own performance of functions, because as Holmberg emphasizes *changes in the objectives and mechanisms of functioning are important and at some extent necessary* (Holmberg, 1992). During this process, institutions in a certain state create their own internal logics which lead to certain outcomes⁴² in the decision-making process. Because of the high importance of political institutions in producing these outcomes, the paper focuses only on state institutions.

The latter, which is also the definition used for this paper, are considered as *a set of values that orient the ways in which institutions are organized, the nature of the changes that take place, the resources distributed and the technologies that are purchased and developed* (Thornton & Ocasio, 1999).

A high emphasis by recent literature has been put on the existence of the institutional logics. A group of authors cited in this paper claim that there are multiple logics which interfere within an institution. *These multiple institutional logics present different realities to their members, and by so doing they are also shaped by the actors* (Thornton, 2002). Therefore in the decision-making process, conflicting institutional logics may arise. Thornton and Ocasio (1999) *also focus on the existence of contradictory institutional logics and potential conflict, mainly when there are different groups competing over issues of status and control*. Conflict might arise not only within an institution but also among different institutions, especially if they are part of the same decision-making process in producing the outcomes. *There are multiple institutional logics, we need to attend to ongoing negotiations and conflicts that emerge within and between institutions* (Blacker & Regan, 2006). Furthermore, the importance of different present institutional logics becomes important during periods of transformation, especially in those countries which are in a transitional phase, like Albania.

I argue that, it is the important role of institutions, their nature and institutional logics that affect the way how sustainable development is carried out within the institutional decision-making process in Albania. By doing so, the institutions provide the premises for low or high considerations on sustainable development in this country. Considering the goals of the Albanian state and especially its foreign policy, the main logic which can be noticed among institutions is its aspiration towards European integration. Despite, different suggestions, comments or ideas on how integration should be involved within the policy-making outcomes, Albanian institutions incorporate in this process, issues and elements which are important to this overwhelming goal, including the concept of sustainable development, as it can be evidenced below. On the other hand, political stability is an interfering external factor that should be taken in consideration when it comes to the real implementation of the sustainable development.

3. INSTITUTIONS AND THE SUSTAINABLE DEVELOPEMENT IN ALBANIA

Institutions are considered to be a very important element in the long run perspective of sustainable development. Moreover, it is the institutions themselves which contribute to the framework and ways of carrying out sustainable development in a country. Looking back to Albania, with this specific regard, *"among many problems that Albanian decision-makers are facing today, institutional empowerment and law enforcement are the most important ones"*⁴³. This is because institutions are not only confined to framing policies in considering sustainable development, but also in monitoring the implementation of such policies. *"Even though public policies in Albania are oriented at a considerable level in incorporating the modern concept of sustainable development, reforms and other policies are slowed down by lack of implementation capabilities and monitoring indicators"*⁴⁴.

Among the variety of sectorial reforms, in this country, sustainable development tends to be more emphasized on those sectors where the impact and relationship between the systems is much more evident, such as: agriculture, tourism and economy. A recent example is that of a touristic municipality in

⁴² In this paper I use the term outcomes, as the result coming out from the policy-making process including: strategies (general or sectorial ones), decisions, plans or reforms.

⁴³ Qendra për Nxitjen e Zhvillimit Njerëzor (HDPC). (May 2002). *Shqiperia dhe Objektivat e zhvillimit te mijevejarit*, Tirana, pg.55. Retrieved from http://www.exclusion.net/images/pdf/604_hefam_mgdsh.pdf

⁴⁴ Department of Sustainable Social and Environmental Developments for Europe and Central Asia. World Bank. Ministry of Agriculture and Food. Albania. (2002). *Strategjia e Zhvillimit Rural per Shqiperine. Mbeshtetje per rritje ekonomike dhe zhvillim te qendrueshem*, pg 64-65. Retrieved from <http://siteresources.worldbank.org/INTALBANIA/Resources/AlbaniaRuralStrategyAlbanian.pdf>

Albania (Vlora Municipality), which adapted the concept of sustainable development as part of its territorial plan⁴⁵.

During the last years, attention has been paid in the long-run analysis of factors which contribute to the sustainable development. With this regard, *specific attention has been put over roles of geography, integration into the economic world and institutions in the economic growth* (Nicol, Jano & Harri, 2003).

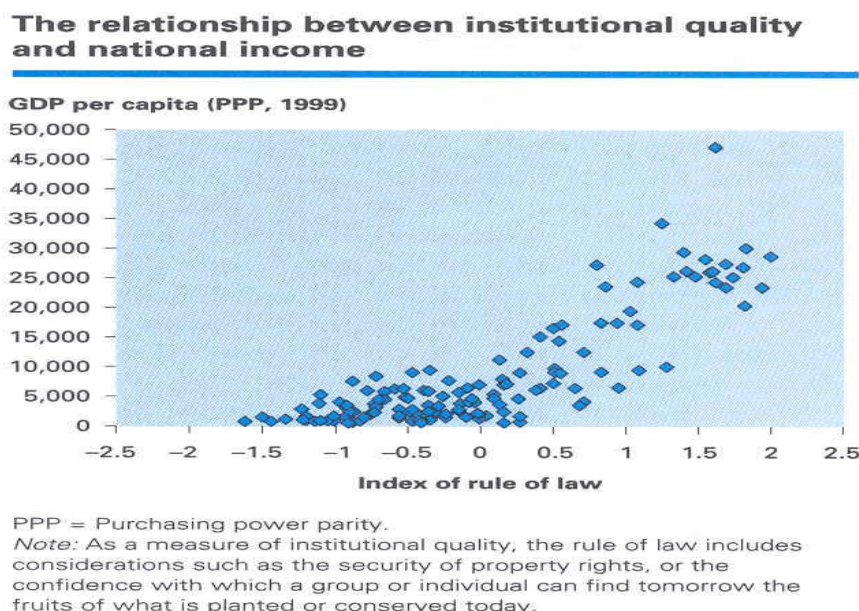


Figure 2. The relationship between institutional quality and national income, *Source: World Development Report, 2003. World Bank, Washington, D.C.*

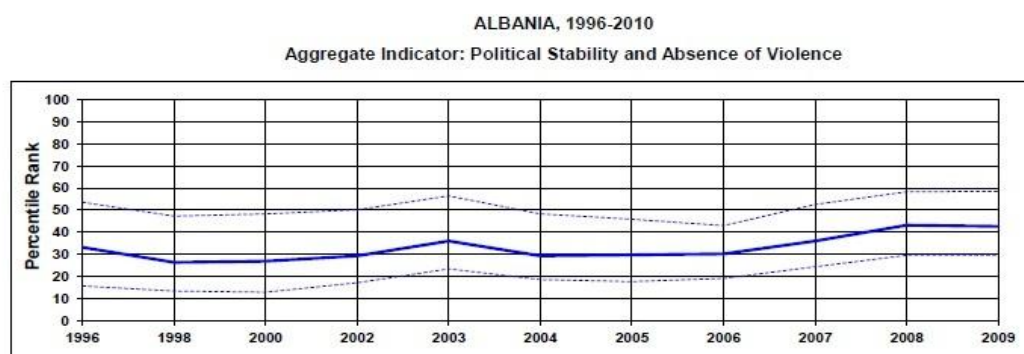
“A sustainable and fast development will help in reducing the poverty. Social development will enable participation of all persons in the society” (pg. 72). This is how the National Strategy for Development and Integration incorporates sustainable development in its vision. Again at the center of sustainable development is the interaction between the economic and social systems, which is also in compliance with the Millennium Development Goals (MDGs) that Albania aspires to fulfill.

A crucial moment in the role of institutions regarding sustainable development has been the transition from communism to democracy. Thus, recognizing the importance of the institutional framework in achieving sustainable development, the Sectorial Strategy for Tourism 2007-2013 points out that *“Even though there have passed 4 years, important aspects of the strategy and action plan that still remain unfulfilled are related to: sustainable development of production, and the development of the sustainability principle in all levels”* (Strategjia sektoriale e turizmit 2007-2013/Sectorial strategy for tourism 2007-2013, pg.2).

Besides the policy-making process in providing outcomes with considerable emphasis on the sustainable development in this country, the ability to fulfill and implement these outcomes is also important. With that regard, institutional stability in the country becomes a matter of high importance. Armingeon and Careja (2008) point out that *institutional change after the institutionalization of the post-communist regime is limited and lock-in effects are strong in post-communist countries such as Albania*. On the other hand, *institutional stability is influenced at a considerable level by internal political struggles* (Feilcke-Tiemann, 2006).

The World Bank Institute which provides the Worldwide Governance Indicators for different countries, with regard to political stability provides the most recent data for Albania as well. The graph shows that the level of political stability in this country is still low.

⁴⁵Bashkia Vlore. (2010). *Gati Programi i Zhvillimit te Qendrueshem Urban te Vlores*. Retrieved from the Vlora Municipality official website: http://www.bashkiavlore.org/index.php?option=com_content&task=view&id=531&Itemid=151&lang=en



Graph.1. Political Stability and Absence of Violence, Albania 1996-2010. *Source: Worldwide Governance Indicators for Albania World Bank Institute.*

Furthermore, institutions which are at the center of the political system will not be able to perform as efficiently as they are supposed to under low levels of political stability, especially during the implementation of policies and other institutional outcomes such as (decisions, strategies, etc.) Well-established institutions pave the way to higher institutional efficiency, thus, helping and providing support for the economic, environmental and social systems.

In the Albania's case, even though there is enough evidence in showing the institutional general support towards sustainable development, there exists a gap in information about the way how the institutional outcomes have been implemented and their impact in the country's sustainable development. Up to now, I have showed that the prevailing institutional logic of euro-integration and the need to further continue democratization processes are influencing factors in putting the sustainable development concept at the core of the decision-making process, especially in the institutional outcomes produced by it such as: strategies, reports and plans. What is more, if institutional instability is present, when it comes to the implementation process for consolidating all the systems that the sustainable development includes the situation is different. There isn't enough data to prove or show how the systems have been developed and sustained.

CONCLUSIONS

There is a general tendency among Albanian political institutions to put at the center of the decision-making process and of the institutional outcomes the concept of sustainable development. High emphasis on this concept can be seen in different sectorial and national strategies, reforms and plans. A strong rationale of this type of approach can be explained at a considerable extent by the country's euro-integration goals. Thus, the social, environmental and economic systems seem to have been at the center of the decision-making process especially during the last decade, acknowledging the importance of the resources and of the future.

On the other hand, when it comes to the implementation of these institutional outcomes, institutional stability as an indicator is of high importance. The data show that political and institutional instability is an issue of high concern. It considerably interferes in the process of implementation of those outcomes by slowing down their implementation. There is a need, for further deeper research on these rationales, in attempting to measure and evaluate the real implementation effect of the institutional outcomes on sustainable development.

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IT, INNOVATIONS AND SUSTAINABILITY

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Abstract: *Today there is a growing need for questioning the use of various resources based on the limitations that inevitably exist regarding that use. This pattern is especially noticeable in dynamic and fast developing industry areas such as the area of information systems and technology. In this area particularly, it is necessary to stress how development and innovation produced in that process are affected by sustainability. This is one of the topics which this paper deals with. Also, this paper is trying to highlight the importance of that influence and how organizations are affected by it. This is done by reviewing actual research in this field of study. Special attention is given to the definition and recognition of terms such as sustainability and innovations, so that the consequences and the ways of dealing with them could be easily comprehended and accepted. The implication of this paper, that could be both academic and practical, presents us with the goal of sustainability that society and organizations will need to achieve in the future as one of the milestones of progress and development.*

Key words: *Sustainability, Innovations, Sustainable development, Information systems and technologies*

1. INTRODUCTION

One of the key characteristics of every natural resource is his limitation. This limitations transfer to today's economy and society as very strong influence. They have very important place at the beginning of every business or social activity, but also in the end as a final goal that should be achieved. On these influences can be looked from a different perspective such as ecological, social, economic, etc. Although they have various approaches, all of them are focus on same problems, and can be covered by the one term and that is sustainability.

Today's world characterizes big progress and innovations, in almost every direction. Maybe the most dynamic one is field of information technologies and systems. By looking just on previous ten years of innovations in that area it becomes clear why is that true. With information technologies and systems and innovations expansion, interaction between them and sustainability becomes stronger and more significant. To be able to examine that mutual influence between information technologies and systems, innovations and sustainability it is important first to explain some key concepts.

2. SUSTAINABILITY

Term sustainability is widely use and known, but despite that it is not simple to define it. This is the case because sustainability definition is very much determined with the point of ours views and believes. Because of that for biologist sustainability will be to preserve some species, but on the other hand for engineer sustainability will be possibility to reuse energy. Therefore, we can define sustainability in two different ways, those are weak and strong sustainability. Weak sustainability proposes that general well-being can't be decreased, which means for example that any use of natural resources is not bad while is doing well to people. On the other hand we have strong sustainability that separate resources that are created by nature, from one that people create. This means that natural resources are limited and if people transformed them, their value can't be reused again. (Jamieson, 1998; Vucetich, 2010)

Sustainability could be also observed from other perspectives according to Gladwin, Kennelly and Krause (1995) such as:

- **Technocentric view**
This point of view is similar to strong sustainability. According to this view natural reassures are exploitable without special limitations, humans are superior to nature, economy is isolated from nature and it encourages global growth.
- **Ecocentric view**

This point of view is more similar to weak sustainability. Value of this view promotes earth as alive, fragile and sensible to human's actions, where human population is already reached maximum.

- Sustaincentric view
This point of view is trying to reconcile previous two. His main characteristics are that earth and humans are connected in one system, population must be stabilized, economy and ecological system are underpinned.

Beside this definition, sustainability can be also defined from different understanding of time line. For one point of view, period that is important is present, but for the other that is future. In this sense sustainability should satisfy present needs or to satisfy needs of future generations (Jamieson, 1998). Although sustainability can be defined on more than one way, it is important to remark that every one of them is both correct and incorrect depends of perspective and beliefs. This is one of the reasons that make difficult to give one unique definition of sustainability, but common to all of them is that sustainability bring positive things to their creators.

3. SUSTAINABLE DEVELOPMENT

Sustainable development represents the processes or means that are used to achieve the goals of sustainability (Diesendorf, 2000). By observing previous definitions of sustainability it is easy to notice connection with economy, industry or in one word organizations. Primary goal for almost every organization is to obtain profit. On that way goals of sustainability often don't corresponds with goals of organizations, but still need for organizations to be sustainable is present.

According to research, main reasons for that are: competitiveness, legitimating, environmental responsibility. This reasons impact differently on organizations. First there is competitiveness which main goal, from organizations perspective, is to gain long-term profit and competitive advantage by being sustainable through managing waste and energy mater, obtain higher output for same inputs, green marketing, etc. Second reason, legitimating, refers to organizations need to adopt standards from their area of business, so that they could achieve stakeholders satisfaction. Third reason is mainly merit of strong individuals in company, and as a result gives satisfaction and feels good effect. These and other motivators don't stand alone, but they are effect by many other influences, which twist and change them and on that way change the perspective and actions of organizations. (Bansal and Roth, 2000)

After the motivation that drive companies to be sustainable is known, it is necessary to explain how they can achieve that goal through sustainable development. Here again it is come to the different way that sustainability is understood. As it is mention before, sustainability could be hard or soft. Now looking on this from the perspective of organizations, some of them give sustainability as a goal more attention in manner how to achieve it. As a result of this action it is possible to produce negative ecological impacts. Solution for this could be ecological sustainable development, which is trying to reconcile hard and soft tendencies from organizations perspective. There are four mechanisms how organizations can reach ecological sustainable development:

- total quality environmental management
- ecologically sustainable competitive strategies
- technology transfer
- corporate population impact controls

This will give to companies quality guide lines, but unfortunately this it is not often enough, because beside this there are also external factors as governments and consumer that must be involved on that way, so that true ecological sustainable development could be achieved. (Shrivastava, 1995)

4. SUSTAINABILITY AND IST

Previous description of sustainability and organizations refers to more general approach to this topic, but there is one more specific part that is very important, not only for organizations, but also to other parts of society, and that is Information Systems and Technologies (IST). Not so long ago field of IST was not of big inters for sustainability, but thanks to fast progress in that field things are now changed. First opinion

for IST was that it will just help with sustainability, now there are a lot of reasons that question that point of view (Ijab, Molla, Kassahun and Teoh, 2010). Because of this, today there is a strong bond between IST and sustainability, and need to research that bond better. As information system and information technologies complete each other, further below they will be looked as unity (Hevner, March and Park, 2004).

Relationship between IST and sustainability can be divided in two parts. First part is concerning negative effects that production, usage and disposal of IST can have on sustainability. Beside this IST can effect on sustainability in other totally opposite direction, as a great force that drive companies and society to achieve goals of sustainability. (Watson, Boudreau and Chen, 2010; Davison, 2004)

To explain how IST can help to achieve sustainability in organizations, further in text, institutional theory will be explained. Information systems supported by information technologies can act in three ways:

- automate
- informate
- transfer

Automation improves efficiency of processes by replacing manual labour with cheaper and faster automated IST processes. IST helps to inform individuals and organization by connecting different parts of a system. Transfer have important role in reorganization of systems, where as a good example is application of Internet. (Chen, Boudreau and Watson, 2008). Now when actions of IST are known, question is where these actions should be directed so that could help in achieving goals of sustainability? Answer to this question according to Thomas and Kai, (2002) is: eco-efficiency, eco-equity and eco-effectiveness. Those are three goals of sustainability that IST can improve.

Eco-efficiency represents an economic pressure on companies or individuals which force them to be sustainable so that they could achieve bigger profit. Eco-equity is time oriented and suggests that all generation should have the same chance and right to consume common recourses and effect on surroundings. Eco-effectiveness represent complete change of approaches and believes that are connected with sustainability, rather than improving individual parts of systems. (Watson, Boudreau and Chen, 2010)

Bearing in mind properties of previous IST actions and goals that could be improved, it is easy to notice how they can be pair up. So there is: automate and eco-efficiency, informate and eco-equity, transfer and eco-effectiveness. According to institutional theory suggest that by applying different types of pressures like mimetic, coercive and normative to these actions of IST, individual goals can be accomplished and at the same time sustainability. Important to say is that these types of pressures are not the only one or necessarily the right motivators. (Chen, Boudreau and Watson, 2008)

This is the case because they could be differently structured as according to Kuo and Dick (2009) there are: competitive pressures, legitimating pressures, social responsibility pressures, organizational factors and technological constraint.

Beside positive effect that IST can generate, there is also negative one. This dimension is especially important, because of growth that IST industry have. This statement supports facts that IST industry created 5.4% of global GDP in 2008 and predictions are that in 2020 this would be 8.7% of global GDP. (Soumitra and Irene, 2010). Best way to overcome problems that IST can create in field of sustainability is to distinguish them first. According to Vykoukal, Wolf and Beck (2009) there are three fields of IST that can affect sustainability and those are:

- Green Design and Manufacturing
- Green Use
- Green Disposal

Every one of those fields refers to different aspects of IST life cycle, which means that IST is always possible threat for sustainability. For example production processes can be inefficient during production, then during usage power consumption is not managed right and in the end of life cycle there could be irregular disposal. For dealing with this problems we could say that there is no wrong way to that, but only more and lees efficient one. So by improving individual aspects of life cycle, or by suggesting special approaches as implementation of Grid infrastructure, some efforts will be made toward removal of threats for sustainability. (Vykoukal, Wolf and Beck, 2009)

5. INNOVATIONS

The term innovation is used today very widely and often, but this doesn't mean that is used correct and in the right context. Simply said innovations represent something new or some newness. But newness is not necessarily an innovation and other way around. So some newness could be innovation, despite the fact that all elements of that newness are very well known, but the different application and understanding made that newness to innovation. (Slappendel, 1996)

From this it is possible to conclude that definition of innovation is more relative, than strict term. To be able to put definition in theoretical frame, Johannessen, Olsen and Lumpkin (2001), propose examination of three dimension of newness:

- What is new?
This question should define true values that distinguish innovation.
- How new?
Here the orientation is on degree that newness contributes to innovation, for example there are radical or incremental innovations.
- New to whom?
Main meaning of this question is to explain that innovation can affect different sides, such as for example: company that created innovation, customers and competitors.

As mentioned above innovations can be looked from different perspectives. Most important are perspectives of organizations and users. Organizations are among biggest creators of innovations. Besides that, organizations that don't embrace innovations, risk to fail in achieving their goals (Bower and Christensen, 1995). Because of these it is important to evaluate their relation with innovations.

Relation between innovation and organization can be looked from the individualist perspective, the structuralism perspective and the interactive process perspective. First perspective assumes that main forces of innovation in organization are individuals. For this to happen, individuals need to have predisposition for innovative behaviour. Second perspective totally opposite from the first one define source of innovation from organizational characteristics. In the end there is perspective that tries to account first two and explain that innovations in organization are produced by combining actions of individuals and structural influences. (Slappendel, 1996)

Main problem with previous explanation of sources of innovation in organization is that there are included only inner factors, without taking in consideration very important outer one, such is users. According to Bogers, Afuah and Bastian (2010), users are very often the source of innovations and their influence rise all the time. Also Von Hippel (2007) suggest that very often users of goods are one the initiate develop of new products, which can be best seen on example of rapidly changing industries such as mobile industry and open source industry. In addition to mentioned field of innovation creators, there is also one more dimension that is very important. This is relation between innovation and sustainability. Especially today mutual relationship between innovations and sustainability is very much apparent (Davison, 2008).

As sustainability today present very actual question, companies are trying to get involved in that area. One of the reasons is measures of governments, but more important one is competition. In this field companies struggle with dilemma to chose sustainability and then to be in disadvantage regard to competition that didn't chose that way. Answer to overcoming this dilemma faster lies in innovations. This connection has reciprocal character, because sustainability also represents the strong encouragement to innovate. Model that support achieving booth sustainability and innovation suggest five stages for that:

- viewing compliance as opportunity
- making value chains sustainable
- designing sustainable products and services
- developing new business model
- creating next-practice platforms

By going true these stages and achieving sustainability company will gain different opportunities to innovate, like to experiment with new sustainable materials, use clean energy, develop new packaging,

create business models that combine digital and physical infrastructure, use by-product energy. (Nimolu, Prahalad and Rangaswami, 2009)

6. CONCLUSION

Resuming everything that is previous mentioned it is obvious to see that sustainability, information systems and technologies and innovation advancing with high speed to future. On that way, fact is that they are becoming closer and more connected by each day. Although that mutual relationship could have also some negative effects, they are just small obstacles that will eventually be overcome. If this trend continues to rise at same rate, it is very possible that in future there will not be need to talk about this topic. Reason for that is because both innovations and information systems and technology will already have included as goal, in every activity, to achieve sustainability. Researching these topics from theoretical point of view helped us to recognize future trends that will inevitably occur. This will facilitate organizations to direct their efforts for progress in a way that will be beneficial both for them and also for others around them. As most researches about some topic starts first with theoretical overview, in that sense this research will highly benefit from further qualitative and quantitative research that will support this topic with appropriate data in order to gain in-depth understanding about it. These efforts will speed up shifting and applying of mentioned principles to practice.

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SUGGESTIONS FOR PLANNING AND MANAGING PROTECTED AREAS, THE CASE OF TITEL LOESS PLATEAU AS A POTENTIAL GEOTOURISM DESTINATION

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Abstract: *The link between protected areas and tourism is vital. This mutual relationship is complex, sometimes opposing, but tourism is always a critical component to consider when planning and managing protected areas, such as potential geoparks. Sustainable tourism practices in protected areas represent long-term commitments. Protected area planners and managers can do much to build a more constructive relationship with the tourism sector. Additionally, success partly depends on actions taken by governments, for example, in updating legislation related to protected areas and tourism or introducing economic incentives to encourage sustainable forms of tourism. Nonetheless, planners and managers play a critical role by working with a broad range of stakeholders. Moreover, they can do much to ensure that tourism works for their protected area and for the people living within or nearby a geopark. Geotourism has been considered a form of niche tourism or special interest tourism, an actively growing tourism market. Vojvodina has several potential geotourism destinations—Titel Loess Plateau is one example and the focus of this commentary. This paper presents several strategic guidelines for planners, managers and other stakeholders for planning and managing the Titel Loess Plateau. This paper is a consideration of sustainable tourism opportunities with respect to local conditions and communities. It focuses on community practice and planning, implementing a management plan, and tourism services and infrastructure with the aim to guide suggestions for planning and managing the Titel Loess Plateau.*

Keywords: Protected Areas, Geotourism, Planning, Management, Titel Loess Plateau

1. INTRODUCTION

It is suggested that geotourism opportunities allow current and future generations to understand geologic phenomena specific to a particular location (Burlando et al. 2011; Dowling 2011; Newsome et al. 2011; Vasiljević et al. 2011). Geoheritage techniques, or geoparks, as such locales are considered, are aimed towards conserving natural landscapes and benefiting local/regional economies (Farsani et al. 2011; Frey et al. 2006; Hose 2007; Novelli 2005). According to Newsome et al. (2011), interests and investments in geologic tourism opportunities have been increasing in recent years as visitors are interested in seeking out diverse landscapes/viewsapes of distinct geosystems. Furthermore, it is important to focus on conserving geological heritage because it integrates scientific and cultural significances, and thus encourages planning sustainable developments to manage touristic opportunities (Hiwasaki 2003; Kavčič & Peljhan 2010).

An early definition suggests geotourism refers to “the art of explaining the meaning and significance of sites visited by the public” (Badman 1994: 429). According to Hose (1995), it is important that geoparks assist tourists in interpreting knowledge and understanding a places underlying geomorphology beyond just scenic aesthetics. This form of tourism encourages natural and cultural experiences, as historically romanticized appreciations for natural and cultural heritage is rapidly becoming a nascent economic generator for the tourism industry—especially as domestic and international tourists in recent years seek preserved destinations (Dowling & Newsome 2006; Kozak & Baloglu 2011; World Tourism Organization 2002). This increasing demand for ‘geo’ appreciations has led to the development of geotourism attractions based on geological formations, such as, and not limited to karst topography, volcanic craters, thermal springs, and waterfalls. Such physiographic landscapes, transcribed as geotourism products, have encouraged many regions to brand places around geotourism opportunities.

Geotourism destinations have been known to attract copious numbers of tourists, and poses great potential for many regions (Burlando et al. 2011; Dowling & Newsome 2006; Hose 2007; Kavčič & Peljhan 2010; Newsome et al. 2011; Pforr et al. 2006). This paper focuses on the Titel Loess Plateau located in the Vojvodina Region of Serbia. As a potential geopark, Titel Loess Plateau represents an ideal location

where future geotourism opportunities will allow visitors to experience the areas unique geologic phenomena. To further contribute to conservation practices, it is important to suggest some professional knowledge for the management of future geotourism sites. This paper begins with a brief geographic and topical overview of the region. The commentary thereafter offers and suggests some practical guidelines to assist tourism managers and subsequent stakeholders concerned with planning and managing the Titel Loess Plateau. With an emphasis on developing sustainable tourism opportunities in a manner respective of local conditions and local communities, suggestions for planning and managing the Titel Loess Plateau offered in this paper is developed around: 1. community practice and planning; 2. implementing a management plan; and 3. tourism services and infrastructure.

2. CASE STUDY: TITEL LOESS PLATEAU, VOJVODINA, SERBIA

The Titel Loess Plateau of Vojvodina, Serbia is geographically situated at the confluence of the Danube and Tisa Rivers, in the southeast of the region, directly east of Novi Sad (Figure 1). Physiographically, and according to Vasiljević et al. (2011: 113) “this isolated loess island and unique geomorphologic phenomenon, with a rich diversity of the loess landforms (e.g. loess “cave”, pyramid, gully, cliffs, etc), dominates its lower surroundings which makes it aesthetically and visually attractive.” Vasiljević et al. (2011: 113) also mention that “previously, there were no activities concerning loess conservation or geotourism at this site.” Then, by 2007, an application was prepared by the Institute for Nature Conservation of Serbia to list Titel Loess Plateau as a protected Special Nature Reserve, called Titelski breg. The environmental ministry responsible for spatial planning operations has yet to confirm when the area will be given protected status. However, in the application for the Titel Loess Plateau the Special Nature Reserve, the Institute for Nature Conservation of Serbia recognized the importance of preserving local flora and fauna. According to the Program Rada Javnog Preduzeća Titelski breg za (PRJPT) 2010 (The Working Programme of the Public Enterprise Titelski breg for 2010), 123 species of birds and 630 species of flora have been identified, and officials are putting much emphasis on protecting the areas loess landforms. It is not mentioned nor indicated what specific area will be designated as the geopark in the PRJPT report; however, the most vulnerable areas of Titel are located on the north-eastern slopes along the Tisa River (shown in images below).

Figure 1 presents the location of Titel in Serbia. In total, the Titel Loess Plateau landform covers an area of 8,197 hectares (Vasiljević et al. 2011); the entirety of this area would represent the potential geopark. Thick loess deposits ranging from 35 to 55 meters are separated by five main pseudo-complexes deposited over the last five glacial/interglacial cycles. Steep cliffs include several loess exposures (Figure 2), essential to understanding climatic and physiographic evolutions that occurred during the middle and late Pleistocene (Vasiljević et al. 2009). The suggested method for protecting the entirety of the Titel Loess Plateau is based upon the IUCN (1994) classification system, consisting of three categories. According to the PRJPT 2010, 70.6 hectares were declared Category I, which means Strict Nature Reserve/Wilderness Area, needing protection and management. An additional 264.3 hectares were declared Category II (National Park), and already has protected ecosystems and recreation management. The remaining 7,862.1 hectares are considered Category III (Protected National Monument), meaning this land is protected for the conservation of specific natural features.

To acknowledge settlements of the Titel Loess Plateau, Titel Municipality represents the only town immediately within in the vicinity. In addition to Titel, there are five villages in the periphery surrounding the Loess Plateau, these being: Šajkaš, Mošorin, Gardinovci, Lok and Villovo (Figure 1). According to the 2002 census, the Titel Municipality (this includes the town of Titel and the five villages listed), had a population of 17,600. In most settlements, except the town of Titel and the village of Šajkaš, the number of inhabitants has been decreasing over the last 20 years, common in many areas across Vojvodina. It must be noted the majority of the population has been dependent upon rural jobs, agriculture, animal husbandry, forestry, hunting and fishing. Many of these rural jobs have seen drastic declines. As a result, many of the productive population cohorts are departing rural areas, seeking service oriented employment in towns and cities. To reduce rural population declines, investments in tourism related activities will generate opportunities for area residents to gain employment in their respective rural areas without being forced to leave (Farsani et al. 2011).

At the moment there are no designated geoparks in Serbia, only protected areas. Therefore, geotourism of the Titel Loess Plateau will represent change—towards protecting the area’s natural setting and for improving economic situations. Ecotourism, geotourism, rural tourism and various types of sport tourism

were each suggested as possible types of tourism in Titel. Marković et al. (2005) were the first to suggest a geopark be designated to assist preservation efforts and tourism at the Titel loess plateau. The Titel loess plateau is significant because the geologic makeup of the area provides much insight into how these unique and important landscapes in Serbia formed as a result of natural and climatic changes during the Middle and Late Pleistocene (see Bronger 2003; Marković et al. 2008; Vasiljević et al. 2011). Moreover, such tourism techniques, according to Vasiljević et al. (2009) are encouraged to conserve Titel's natural and cultural heritage, in addition to generating employment opportunities for young people and establishing a contemporary economic base. This work contributes to earlier suggestions because no management plan assessments have been done to overview potential tourism developments of Titelski breg. Several visits to the town of Titel and conversations with stakeholders involved with Titel's future plans were important in understanding the locale and nature of problems concerning tourism development. It must be noted that local tourism officials have not yet decided what to include in the geopark. Therefore, if/when Titel becomes a geopark, the purpose of the following commentary is to suggest and present some guidelines for planners and managers to assist facilitating the potential Titel Loess Plateau geopark.



Figure 1: Location of towns associated with the Titel Loess Plateau



Figure 2: Images of the Titel Loess Plateau (Photographs by first author)

3. SUGGESTIONS FOR PLANNING AND MANAGING THE TITEL LOESS PLATEAU

Community Practice and Planning

Immediate community participation, involvement and awareness of tourism practices are essential for managers and planners of protected areas (Farsani et al. 2011; Hiwasaki 2003). Collectively, they can develop a sense of ownership and responsibility towards protected areas, even prior to drafting a geopark management plan. Besides local peoples living within and adjacent the Titel Loess Plateau, numerous other stakeholders interested in the geopark should be invited to collaborate, such as governmental authorities, investors and experts from a variety of academic background (such as geology, geography, history, biology, tourism management, etc.), to assist future decisions and educational approaches. Tour-related companies, whether servicing transportation or accommodation, must gain the support of local communities to assist serving the destination, engaging in sustainable practices and tourists' wellbeing.

Planning is essential to ensure Titel's desired sustainable future becomes a reality. Employing external consultants whom specialize in different fields is recommended. Furthermore, encouraging community volunteerism represents a way of connecting and exchanging ideas amongst officials and locals. To begin, a professional local destination management organization (DMO) in Titel needs to be established. This involves a local office employing tourism managers who will prepare planning and oversee procedures within and around the protected area. The PRJPT 2010 notes that, the public enterprise Titelski breg was established in 2009. Titelski breg currently employs three people, with plans to employ several more in upcoming years. An expanded management team must begin by analysing and documenting all potential and existing resources, such as available services, tourism infrastructures and finances. Titelski breg has already assessed both natural and cultural heritage in the Titel Municipality, noting events and gathering cultural, historical, archaeological, ethnographic, and other natural heritage materials for inclusion in a museum (as described in the PRJPT 2010). Additionally, Titelski breg will have to determine what and when further programs will occur, and who will assist with funding future management plans. This is where community involvement and collaborations with investors and planners becomes crucial, regarding the methods, timetables, actions and resource allocation for developing the destination.

Tourism in protected areas always produces benefits, risks and costs; however, such variables interact in complex ways (Dowling & Newsome 2006). It is the management team's responsibility to maximize benefits, while minimizing costs, when preparing tourism development policies supportive of long-term economic development. This involves maximizing local employment to promote social benefits locally, so monetary instalments exchanged reinforce the community economy. To see local economic growth over a longer term, marketing techniques must encourage and attract larger volumes of visitors, and promote increased lengths of stay to benefit local products and services (Kozak and Baloglu 2011). Vertical and horizontal integrations involve diversifying market niches aimed at attracting budget travellers and higher spending tourists (Novelli 2005). Again, community involvement becomes pertinent when planning and investing in tourism related infrastructures, especially when considering/offering local services to filter money directly into the local economy. According to Eagles et al. (2002), farmers have the potential to generate supplemental income by hosting cultural events displaying local cuisine, wine, artwork, crafts and community festivals.

Tourism developments should be designed to protect host communities. Protected areas sustained by tourism income not only create jobs and raise incomes, but also supplement benefits including improved communication infrastructure, educational and training facilities. Additionally, health care accessibility and other services become more widely available to park staff, visitors and community members (Eagles et al. 2002). In acknowledging benefits, it is important to consider risks associated with investments, local sustainability and the environment. Foremost, if the management of a protected area is not well planned, the site may be perceived as having only short term benefits by investors. Areas seen as having only short term benefits result in the rapid construction of various structures (i.e. hotels) that are not as environmentally sustainable and do not always contribute to the local economy, especially when local residents are excluded from business and entrepreneur opportunities. If locals are excluded from such opportunities, then they may also be distanced from decision making and participating in management programs/strategies. This takes away from the local attractiveness of a destination and often disconnects the community from visitors and the attraction.

Other physical risks are always present in tourism areas and must not be overlooked in natural areas, on trails and driving routes, therefore superior planning techniques can assist mitigating risk. Professional management teams from DMO's need to be constantly aware of risks, and strategically develop plans for organizing and manoeuvring visitors efficiently in times of emergency. Furthermore, to minimize risks, planners and managers need to develop a system for inventorying existing/potential hazards. Mapping

techniques are recommended here because spatial awareness of the entire site will allow for strategically allocating sign posts, access points and rerouting options. Being aware of such risks and mapping hazards allows planners to efficiently navigate emergency personnel on trails or road routes when needed.

Implementing a Management Plan

Next, the management team needs to secure resources to implement a management plan by evaluating employment, budgets, available funds and potential policy changes at least quarterly, or when attention is needed. Implementations need to be monitored to ensure that established goals written into the management plan are achieved. Therefore, frequent monitoring done by the management team must involve systematic and periodic evaluations to indicate the progress of each desired goal. Once Titelski breg's management team agrees on goals, policies and management plans, they need to communicate all viable information to stakeholders. In this regard, the most efficient method of communication is via a well designed internet site. This way information is readily available, understandable and current. Furthermore, a published document, such as a monthly or quarterly newsletter, should be posted online and also distributed amongst the community and to stakeholders who do not frequently access the internet. It is also suggested that management teams recognize community members that actively promote and sustain the management process and motivate other community members (Hiwasaki 2003). The awareness and the desire to make a difference and support a well-designed management plan will offer potential visitors a better experience, and thus ensure the destinations competitiveness.

Management plans are oriented to finances, support and supplemental funding as many protected areas have been managed through public finances (Kozak & Baloglu 2011). Unfortunately, however, many protected area management agencies have insufficient funds to effectively respond to tourism and conservation demands. Currently, most governments do not fully fund protected areas, since protected area staffs in developing countries earn low wages. Developing countries, like Serbia, can gain access to funds from international assistance programmes, non-governmental investors and independent donors. It is crucial management planners be creative when raising funds to develop a destination. As tourism generates potential income, it alone cannot generate sufficient funds for all aspects of natural and cultural heritage protection. Some potential income sources for protected areas that require consideration in management plans include: park entrance fees, recreation service fees, special events/services, accommodation taxes, equipment rentals, food sales and merchandise sales (i.e. souvenirs, clothing), in addition to outside donations and foreign aid (Eagles et al. 2002).

Zoning plans for protected areas are also important towards managing visitors within different sections of a geopark. To this regard, protected area managers need to spatially consider/identify recreational usage areas by archiving sites within the park and concentrate or disperse activities as deemed necessary. Again, well-developed mapping techniques will greatly assist spatial organizations when evaluating the entire site, and DMOs should allocate specific areas for certain uses—such as where tourism related and recreational activities are allowed, where conservation practices are required, and restricting some sites solely for scientific research. Immediate services within the geopark involve interpretation posts, transportation networks, sanitation facilities, accommodations, food/drink sales and shopping. One of the most important parts of organizing services within geoparks is providing informational and educational materials and programmes making visitors aware of natural and cultural heritage. Therefore, site management of significant places involves several considerations: the nature of the terrain and the maintenance of infrastructure, the needs of visitors, and the needs for environmental conservation and restoration (Pender & Sharpley 2005).

Providing Tourism Services and Infrastructures

This third section builds upon management planning specific to tourism services and infrastructure. Basic tourism related services for protected areas include visitor information centres, interpretative postings and accommodations. Additionally, other infrastructures include motor transportation routes and trail/path networks. All infrastructure projects developed must be strategically located, designed and operated to not be intrusive to the physical environment. In this regard, well developed management plans assist functional designs and organization of specific tourism projects to attract and cater to more visitors. Moreover, well developed management plans must identify simple solutions for efficiently maintaining recreational services at costs most effective to set budgets (Kozak and Baloglu 2011), as successes often

depend upon maintaining the geopark. Tourist services, facilities and infrastructural programmes within protected areas should act as standard-setters, promoting environmental sustainability.

Visitor information centres are often times a tourist's first stop when entering a park. However, visitor centres sometimes fail to fulfil their tasks and roles, due to poor location, out-of-date design, inappropriate messages or lack of maintenance. Having well designed facilities forge lasting first impressions and may be a deciding factor in how much time a patron spends, and if they suggest a place to others. Visitor centres are important because they are sites for revenue generation, being centralized locations for hotel accommodations, souvenir shops, restaurants, cafes, toilets and car parking. This crucial investment will inform tourists not only about the protected area, but will make them aware of such services, park safety measures and a layout of the parks recreational sites. For the aspiring Titel Loess Plateau geopark, audio-visual presentations at the visitors centre represents a proven and successful method for engaging visitors with the site and what the park has to offer; this strategy is widely used in protected area around the world. The ability to concentrate visitors in an area is important for sustaining high visitor yields and represents a crucial part of visitor management.

Visitors often require overnight accommodations. If the protected area is small, as the case with the Titel Loess Plateau, tourists will have to be accommodated in nearby towns or villages. Decisions on the location of accommodation in relation to protected areas involve issues such as finances and the influx of crowds. Wherever accommodations are constructed, it should always be carried-out in the most culturally and environmentally sensitive way. Here, cultural aesthetics and historical ambiances offer future clientele unique accommodations in quaint structures with natural vistas. Such settings potentially encourage visitors to stay longer, bringing more money into the local economy. Many home owners across the region rent a spare room of their house to tourists to gain supplemental income, often advertised with signs that read: Rooms, Sobe, or Zimmer. This type of accommodation better allows tourists to experience local culture and everyday community life.

When visitors need to be accommodated outside the protected area, there is particular need for well-developed transportation networks. Transportation infrastructures (i.e. roads, tracks, boat landings) within a protected area serve as efficient access points, providing opportunities for visitors to understand, appreciate and enjoy geoparks. Preferably, roads providing access to and within the protected area allows visitors to navigate to focal points, such as: information centres, public transportation lots and take-off points for walking trails and toilets. One downfall is motorized transport often has negative impacts, including noise and pollution, as dust can impact local fauna, damage flora and affect water quality. Transportation infrastructures often have significant impacts on protected areas, even when its primary purpose is allowing better access, unless specifically designed to reduce negative impacts on protected areas. In addition to transportation infrastructures, another difficult and expensive component for bringing tourist into protected areas is building and managing trails.

Associated with well-developed transportation infrastructures are well-developed footpaths/trails. Trails are important because they assist operational flows of visitors through the park and enhance visitor appreciations of natural areas. When constructing footpaths, it is important to consider entering and exiting points, direction plans and visitor safety regulations need to be posted. Physical concerns regarding paths are widening and erosion, path hardening and water channelling, in addition to what materials should be used for maintaining footpaths. Another issue is what types of signage and resting points should be made available along footpaths and additional facilities. Furthermore, all footpath development needs to be consistent with the nature of the terrain that it traverses. The combination of information centres displaying walking and hiking opportunities, trail accessibility from parking lots and toilet facilities, each promote visitor satisfaction. All such infrastructures must minimally intrude upon the natural environment to ensure authentic natural experiences for visitors, which acts as the attractant to encourage visitation (Pender & Sharpley 2005).

Routes, trails and paths are designed to safely manoeuvre visitors through the geopark and direct tourists to sites of interest. Signposting and other interpretable information are often used to influence a visitor's behaviour towards protected area management and their fragile eco-systems. Signposts may be simply directional or may contain interpretative educational information specific to a certain point in the geopark. Moreover, where signs are located and there included content should be carefully considered—regarding the structure of the signpost (appearance and height) and the amount of information being conveyed.

Since signs represent focal and orientation points, appropriate locations for signs are at park entrances, trail entrances, and at trail junction points, to ensure visitor safety and general whereabouts.

According to the PRJPT report, plans for more trails have been suggested, and bike trails already exist and cross much of Titelski breg. Appropriate maps with distances, lookout spots, interpretation maps and resting points need to be indicated. Future plans include the designation of a walking trail, consisting of pavement and wooden paths along the northeast sections of the park below the slopes next to the Tisa River (see images in Figure 2). This area represents one of the significant characteristics of Titel, but there is a concern of flooding. This section of the park has been known to flood and there is concern that trails may be destroyed or eroded. Walking trails atop the slopes of Titelski breg would be easier to design and maintain. Atop the slopes are old farmers' trails leading to traditional farmhouses (Salaš) and currently have been converted into spaces for rural tourism lodging.

4. CONCLUDING REMARKS

Even without the designation of geopark, the Titel Loess Plateau has a management system with baseline information suggesting site assets and potential attractions. Currently, the number of tourism activities is low, and few plans for recreational activities exist. However, before, or when, the site is potentially designated its protected status as a geopark, more management is needed to support anticipated tourism increases. A detailed management plan for the sites future development is essential for the parks development and local economic impact. Foremost, Community involvement within the Titel Loess Plateau and adjacent periphery is important for future touristic endeavours to establish lasting relationships with future visitors. Thus, activities deemed unlawful within the protected area boundaries will have to be concentrated in the periphery. Also important, the management of geoparks need to be inclusive of the local community. The community represents a gateway to the site and must be inclusive towards the planning and management of developing tourism opportunities.

DMO managers and tourism developers must build necessary tourism infrastructures, and guides need to focus on preparing itineraries which take into consideration environmental impacts and cultural significances to ensure long-term interests. Foremost, transportation networks towards and within the site needs to be efficiently organized to manoeuvre visitors. It is also important that local guides create a variety of environmental and cultural experiences to encourage tourists to stay longer periods and support promoting the site. Suggested activities within the Titel Loess Plateau involving general rural, leisurely and recreational opportunities include: nature viewing walking trails, swimming, horseback riding, boat tours, animal/bird watching sanctuaries and designating areas for hunting and fishing. Also, cultural activities such as local theatre and enogastronomic tours greatly diversify sites for visitors. All sites, potential or declared, should be first protected and then well managed to preserve these fragile areas. Preparing a professional tourism management plan for the potential Titel Loess Plateau geopark will provide this location and other future geoparks in the Vojvodina Region of Serbia to become competitive and attractive destinations in the near future. To conclude, designating Titel as a potential geopark provides opportunity to further encourage visitors to appreciate the loess plateau's natural phenomena without harming to the physical environment.

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THE TRAFFIC IMPACT OF DEVELOPMENT ON THE ENVIRONMENT

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Abstract: *Traffic has a special importance, as a particular means of transport representing the sources of significant negative external effects, such as noise, air pollution, traffic accidents, land use etc. Traffic jams are a specific problem as they result in a succession of negative effects increasing the energy consumption, time loss, as well as the emission of contamination gasses. To settle the conflict of objectives by the increase of mobility and the decrease of negative environmental effects, it is important to embrace a comprehensive, integrated approach in creating a contemporary policy of transport, traffic and communication within urban development. This paper presents various types of traffic in different ways that affect the environment, the influence of radiation on the environment, and the impact of technical and technological hazards on the environment.*

Key words: *traffic, environment, effects of radiation, technical and technological hazards, pollution.*

1. INTRODUCTION

Traffic plays an important role for society as a whole because it connects the nations and regions, and thus spreads the culture, customs and other human knowledge which will be used for further economic and social development. Therefore, traffic is considered as a key factor in economic and social organization. Traffic can be seen as an industry that aims to transport people, goods and information from different places in the procurement function and the appropriation of goods necessary for life and develop the productive forces of society. Traffic has a huge significance for both the economy and social welfare. It is an essential element in the production and distribution of goods and services, and without it, we cannot think of trade and regional development. Traffic allows expansion of production and thus competition.

Modern trends on roads and air transport, lead to overloading, pollution, loss of time, health, life, and economic losses altogether. The various types of traffic have different influence on the environment. The emission in transport (especially road and air) is an important part of their overall emissions: over 90% goes to lead emission, and over 30% of the total emissions of volatile organic components. It is necessary to limit the impact of infrastructure development on land use, traffic density and reduction of the works on roads (particularly in urbanized regions), to eliminate or reduce the risk during transport of hazardous or waste materials.

It can provide:

- improved coordination of planning and investment in transport infrastructure networks and services;
- increase the competitiveness of environmentally sound forms of transport such as rail, marine and cargo transport;
- development of transport which gives priority to public transport, technical improvements in vehicle and fuel use;
- encouragement in environmentally rational use of passenger cars with the changes of traffic rules and habits.

The effective results in this field will depend on the whole complex of interrelated measures and efforts. For example, the habits of the car owner in most cases depend on the availability of other forms of transport, quality of infrastructure, price of parking and so on. The information education programs will not work if the choice is limited. The optimization of traffic types and infrastructure capabilities, network investment may also serve private interests, the interests of national economy and the environment.

2. TRANSPORT, TRAFFIC AND ENVIRONMENT

In this field there is a wide range of intervention measures which have a positive impact on the environment: technological advancements of various transport modes, fuel consumption, quality infrastructure and services that can reach the technological development of transportation systems. The short-term measures go to the three main intervention areas:

- The restriction to urban centers access for private passenger cars or heavy motor vehicle traffic, which are a major source of congestion and pollution;
- The reorganization of urban freight transport, and;
- Technological improvement of transport such as orientation to the automobile catalytic converters and better power engine efficiency.

The first intervention policy has already been implemented in many European cities. For example, access to the historical center of Milan is halved by restrictive measures for passenger cars and car parks have been removed to other parts of the city center. The practice shows that the traffic restrictions in urban areas give good results if applied to smaller areas. Larger threatening prohibited zone optimizes the access to urban areas. Another area of policy intervention concerns the reorganization of the goods distribution in cities through the implementation of logistics and combined road / rail transport. These measures are widely used in Germany in order to reduce noise and pollution.

For example, the largest Swiss retailer Migros is located in a warehouse next to its railway lines and 56% of its merchandise is distributed by rail. Distribution of goods in the local town shops remains a problem partly solved by introducing smaller trucks with engines with efficient energy utilization.

The third area of intervention is the technological improvement of the mechanical parts of cars and vehicles in general. Catalysts and technological application of similar mechanical parts can significantly reduce air pollution. The long-term measures of integrated transport policy development and the environment are numerous, and one of the most common is to improve public transport measures that are widely used in developed countries. It involves construction of the subway / light-rail transportation systems in large, and the improvement of services in smaller towns. It is also of increasing importance to regulate and improve effective communication with passengers.

3. THE EFFECT OF RADIATION ON THE HUMAN ENVIRONMENT

This area has long been neglected and even deliberately ignored by the big companies that were the main source of radiation, although it is well-known what harmful effects of electric and magnetic fields are, for instance. A French physicist and radiesthesist Bovis has differed most diverse terrestrial and cosmic radiation, even then when it is used by different devices. It is known that Chinese were able to detect cosmic and terrestrial radiation a long time ago. The Chinese emperor had the specially trained professionals who had always been there before constructors started building a residential site in order to explore it thoroughly, because it could not be built at the place where "evil spirits" came, which brought misfortune and illness according to their belief. Old Persians, Celts, Egyptians and other ancient peoples were also familiar with a healthy and harmful radiation.

We detect two types of radiation: *natural* and *artificial*. The artificial radiation involves the technical one too, and it comes from various appliances, particularly household appliances, as well as the proximity of substations, transmission lines, transformers and various other transmitters and antennas, which overloaded urban environment. Today's science directly confirms that the harmful radiation directly affects the people's health and feelings. People are constantly exposed to radiation, which comes from radionuclides in the environment. The sources are varied, and the types of radiation energy, that people are exposed to are different to. What is difficult to perceive for our senses, a reliable technique can recognize. There is the study and measurement itself, which provides insight into the nature of the processes occurring in irradiated areas, as well as a piece of information on how much a person is exposed to radiation. Cosmos is a significant source of radiation for the human kind on the Earth. The cosmic radiation is a consequence of electromagnetic waves (and charged particles) that come from the stars, or are ejected at high speed in a giant explosion. They receive an additional boost on their way through the magnetic fields in cosmic expanse acting like giant accelerators.

4. TECHNICAL AND TECHNOLOGICAL HAZARDS

In technical-technological hazards, particularly the fundamental role of accidents that occur in nuclear plants and chemical industry, are transport of hazardous materials, waste disposal, fires, industrial and car accidents. In addition to the use of nuclear energy for various means of mass destruction, it is increasingly used as an energy source since it is estimated that the supply of fossil fuels will last until 2025 (the liquid) or 2400 (the strong). The first nuclear power plant of 3 MW was built in Obninsk, a place 50 km away from Moscow, and it started its operations on 27 July 1954. The United State had its first headquarter built three years later in Illinois. At the end of 1985 there were 374 nuclear power reactors located in the world. Although nuclear plants were withdrawn, compared to the classical notion of technological industry perfection, security and reliability, such as airplanes, after all, the means of transportation should not forget that the possible failures of nuclear reactors can lead to serious consequences including the loss of lives. We know that the radioactive substances into the aquatic environment are mainly used for carrying out the time-intensive tests of nuclear weapons, and more recently for constructing a nuclear waste plant.

5. TRAFFIC SAFETY

Road safety issues occur in all countries, regardless their economic development. A problem of the organization and provision of traffic on roads and streets, has attracted a great attention in all countries, because the development of motorization is followed by large casualties and material damages suffered by individuals and social communities. A research has shown that 60-70% of the traffic accidents occur as a result of human factors (driver's misconduct or pedestrian's), 10-15% because of the malfunction of the car, and 20-40% because of the situation and noncompliant elements of the road. A number of traffic accidents and the consequences as well, depend on the weight of the composition of the road network, traffic organization, discipline of drivers and pedestrians, and the reliability of vehicles too. Increase in road safety is achieved by four factors that have a major impact on the traffic safety:

- *man,*
- *vehicle,*
- *environment and*
- *road*

A man (driver) as an active participant in the traffic, is one of the most common causative agents of disruption in road safety. According to the data in the 2004 for the European Union (25 countries) have often suffered:

- *drivers, even 62%,*
- *passengers 20%,*
- *pedestrians 18%*

It is interesting that the total number of victims are represented mostly as men (77%). There are many causes for the accident, but most frequently mentioned are:

- *alcohol,*
- *fatigue,*
- *lack of knowledge or skills for the safe management,*
- *speeding etc.*

6. PROTECTION AGAINST NOISE

The state and the general elements of the policy:

It is estimated that a large number of Europeans are exposed to the negative effects of environmental noise from various sources (traffic, industry, recreational activities, etc.). Making noise is one of the main local environmental problems with significant consequences for public health. However, only the 1993rd European Community has announced a policy change in this area in accordance with relevant solutions in the Fifth Action Program. The European Commission Green Paper (1996) explicitly defined the problem about the noise as the environmental problem. Furthermore, it led to an open discussion of policy in the field of noise and further measures. Two courses of action were set hereby: general policy in the field of noise (a common method for assessing exposure to noise, establishment of a joint index of exposure to noise, limiting the noise transfer, information exchange and experiences, improvement the of the program coherence research (in the field of noise) and emission reduction at the source (road, train, air traffic, and noise from equipment used outdoors).The most important part of EU policy in this area is aimed to reducing noise through the introduction of mandatory technical standards for products or through the establishment of emission limit values for certain products (motor vehicles, motorcycles, airplanes,

household appliances, various equipment and etc. One of the objectives set out in clause 1, Article 7. of The Sixth Community Action Programme points out the problem of reduction in the number of people who are long-term above-average level of noise affected by a particular noise from traffic.

7. MODERN EUROPEAN TRANSPORT POLICY: SUSTAINABLE MOBILITY

Today's transportation system of the European Union is faced with a growing conflict between the increased demands for mobility which has a negative impact on the environment that is becoming more and more critical, and unquestionable contribution of transport to the overall economic development on the other hand. Practically, the argument related to increased traffic congestion, poor service quality, safety prejudice to the environment and isolation of certain regions, are being confronted by the fact that confirms the economic importance of the sector: the total cost of transport in the EU amounts to about 1000 billion, the share of the gross domestic product (GDP) is over 10%, and the sector employs over 10 million people. The assessment that shows the intensity of transport in the EU is growing, both for people and goods, exceeding the GDP growth, proposes the transport separation concept from economic activity. It was discussed at the highest political level in the EU, and the fact is, that the Gothenburg European Council established the concept of economic separation and transport growth pointing it as a key factor in sustainable development strategy.

Also, the European Commission has founded and supported the project on the separation of transport intensity from economic growth, known as SPRITE project and called for political scenario of sustainable mobility, also known as POSSUM project. All these activities are a part of integrated effort to implement the concept of "sustainable mobility" in the EU, now enlarged to ten Member States. The starting point of this is the new White Book of the European Commission "European Transport Policy for 2010: "time decision".

8. CONCLUSION

The effects of intense climatic changes in recent decades are reflected in almost all parts of the world. Increasingly, disasters caused by weather conditions concern human society, but they also show a willingness to continue to mitigate climate changes or prevent them. For this purpose it is necessary to reduce emissions of greenhouse gases whose concentration in the atmosphere suddenly increased, primarily as a result of the use of fossil fuels in transport and industry. As for the transport sector, one of the main measures for achieving this goal is the diversion of cargo flows to environmentally friendly transportation industries. The development of combined land transport that best promotes the benefits of two different aspects of transport by rail and by road, is gaining importance.

The combined land transport is environmentally "friendly" mode of transport and its effectiveness is a manifold for reducing emissions, noise levels and lower fuel consumption, reduction of the number of road vehicles, or reducing congestion and the road network burden, traffic safety increase and others. For effective development and implementation of technology in the field of combined land transport in Serbia, it is necessary to create the appropriate institutional, technical and technological basis. Anthropogenic pollution of the environment and pollution itself are a result of traffic. Traffic is a major source of pressure on the environment - the air pollution and other environmental media (emissions from the combustion of fossil fuels and waste), the noise and pressures on biodiversity, land and coastal the territory due to the construction of transport infrastructure. Transportation is a major part in the overall pollution of the atmosphere of about 50% and is one of the biggest polluters today. Therefore, we must pay a special attention to the anthropogenic pollution of the environment as a consequence of traffic.

It is a known fact that the major air pollutants such as: transport (transport of people, goods transport), energy and industry (thermal power, nuclear, chemical, textile, paper, pharmaceutical, metallurgical industry, building materials and steam), are individual furnaces.

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PROTECTION OF WATER RESOURCES IN RURAL AREAS OF SLOVENIA WITH ENVIRONMENTALLY ACCEPTABLE SUSTAINABLE METHODS

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Abstract: Water is the most important resource in the world - for human life, plants and animals, environment, social and natural prosperity. In Slovenia and North European countries, we have almost enough water at the moment, but some countries located south and in the Mediterranean, have a lot of problems to provide more natural and healthy water for normal life and use. We can see in Africa and some other countries in Middle East, how important water is for survival. Water deficiency has been the reason of many wars in the past and still is today, and it will, unfortunately, represent the same reason in the future, as well. Especially because water reserves drop every year for different reasons - climate changes, greenhouse gases, we must provide a solution how to reduce consumption and after that clean municipal waste waters for repeated use. In Slovenia, problems which arise yearly are the quality of water as well as an old water carried systems, where over forty percent of water has been lost. Another problem is also the quantity of municipal waste water, which must be reduced in our everyday life. In this topic we will introduce methods of "Plant Cleaning Devices (PCD)", used for cleaning devices to reduce normal drinking water and to protect areas where these resources of water exist. These methods are successfully used in practise and environmentally and naturally acceptable. The PCD applied methods which flow in nature for more than several thousand years. Methods described in this article are mostly used in rural areas where big cleaning systems are not acceptable, because of geographical and technical conditions.

Key words: water sources, municipal waste waters, plant cleaning devices, healthy water, natural methods,

1. INTRODUCTION

Slovenia has a lot of water, according to current statistics. 34 billions m³ flows every year in rivers and streams. 98% has been pumped from ground water and only 2% from flowing water on the Earth. In 2010, 125 million m³ of water was consumed in our country for various purposes. Most of the water is used for households, other are counted on table 1.

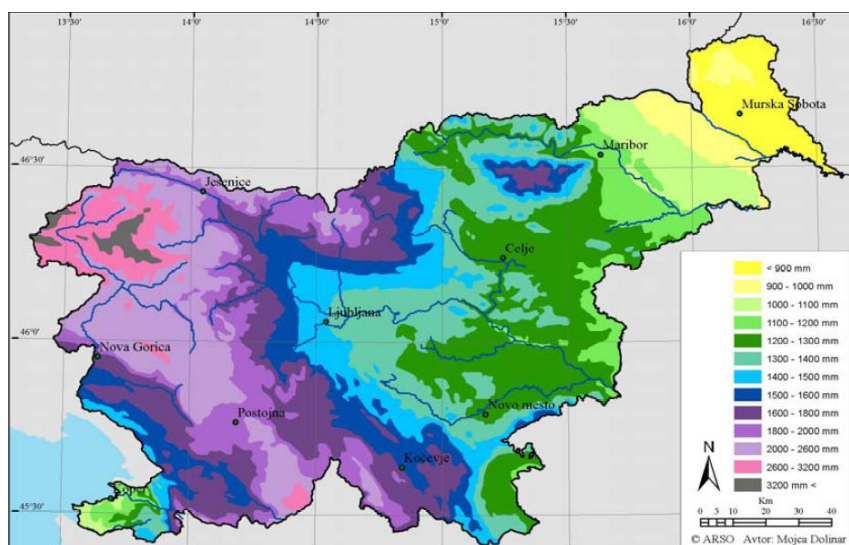
Table 1: Consumption water in Slovenia 2010

quantity/millions of m ³	consumer
85	householders
31	economy and other supporters
6	other water systems
3	water consumption for fire workers and cleaning streets

Household water consumption and water consumption in economic and non-economic activities per capita has not changed much since 2008: in recent years, total water consumption decreased by 0.2%, i.e. to 84.5 million m³ or 57 m³ per person in 2010, which is around 117 litres per person per day.

In 2010, most water per household member was consumed in the Osrednjeslovenska statistical region, 57 m³. In Gorenjska and Obalno-Kraška regions 42 m³ of water per household member was consumed, in Notranjsko-Kraška and Goriška 37 m³, in Savinjska and Podravska 36 m³, in Zasavska 34 m³, in Spodnjeposavska and Jugovzhodna Slovenija 33 m³, in Koroška 30 m³ and in Pomurska 27 m³ (SURS, 2012).

In some regions, like Prekmurje, Štajerska and also in Primorska, problems with water rise up several years. Because in this areas there is not enough precipitation, which would fill underground water sources and on the other side, water is polluted because of non-adequate agricultural preparation. For farmers and citizens, which are dependable on quantity of waters, this represents problems for their economy and normal life.

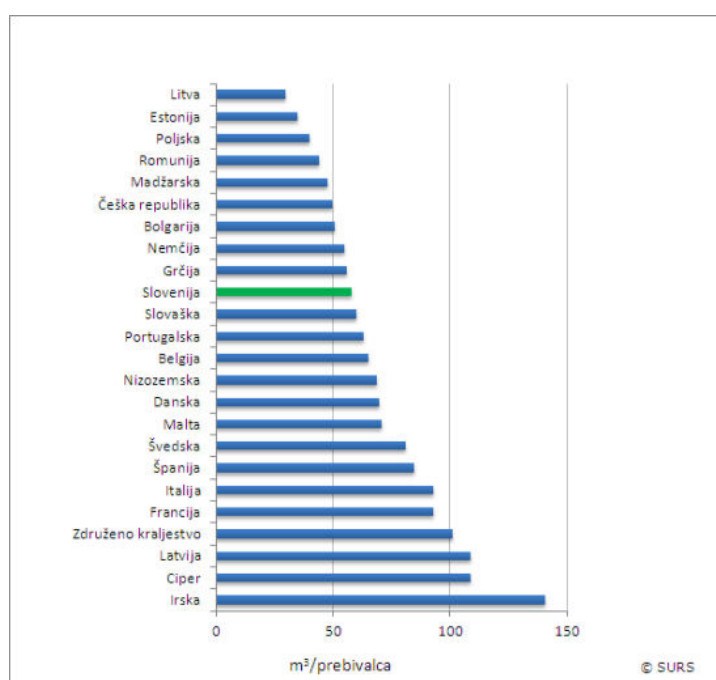


Picture 1: Precipitation map in Slovenia for period 1971-2000
(Agency republic of Slovenia for environment, 2012),

Picture 1 represents areas in the country and its precipitation in Slovenia between 1971-2000. In the North East part of Slovenia, as we can see on the map, there is less than 900mm, in the other areas, a quantity of precipitation rise between 1.000 to 2.000 mm. Almost whole West Slovenia except Primorska region, have a lot of rains. In part of Julijske Alpe this average is almost 3.200 mm. These conditions are result of south west and relative warm and moist air. Also important, for accumulation of precipitation water in groundwater, are geographical and earth structures (ARSO, 2012).

2. WATER CONSUMPTION IN SLOVENIA AND EU

Every citizen in Slovenia consumes 42m³ water per year, 117 litres per day (2010). Comparing to year 2009 consumption is lower for 16m³. If we look at European statistics, Slovenia is on the 10th place among 24 EU members (2009). The lowest consumption is in Lithuania with about 30m³ per year. On the other side the highest spenders in EU 24 are Cyprus and Ireland with 110 and 140m³.



Picture 2: Consumption water on citizens in EU24

Average water consumption in EU is between 51-75 m³, less water consume only six countries, Czech Republic, Estonia, Lithuania, Hungary, Poland and Romania. The per capita water consumption (in m³) greatly differs between EU Member States. According to Eurostat data, in EU Member States on average 70 m³ of water per capita was consumed in 2008/2009. The latest data on water consumption in one year (in m³ per capita) are available for different periods: for Belgium, Bulgaria, Denmark, Estonia, Lithuania, Hungary, Poland, Portugal, Romania and Slovenia the data are for 2009, for Cyprus, the Czech Republic, Italy and Spain they are for 2008, for Greece, Ireland, Latvia, Germany, Slovakia, Sweden and the United Kingdom they are for 2007 and for France the last available figure is for 2001. Quantity of water supplied from public water in Slovenia, for 2005 is 165.219.000 m³. And for 2010, 166.223.000 m³ (EUROSTAT,2012).

3. PUBLIC WASTE WATERS IN SLOVENIA

Uncontrolled releases of municipal water into the environment significantly affect the quality of water resources. In 2010, Slovenia produced 173,3millions m³ wastewaters from different sources. 0,3% from agriculture, forestry and fisheries, 8.6% from industrial activities (mining 9.9% in manufacturing 84.4%, from the power supply 3.9% of a building industry 1,8%), 5.2% from other activities, 34.3% of households, 51.7% and other waste water (rain water, back water...) Or 2,9% more than 2009. Over 2/3 of wastewaters are purified in 2010. Almost 73,2%, only 26,8% are unrefined. Of a total of 46.4 million m³ of untreated wastewater were 71.2% directly discharged into surface water, 28.8% in the groundwater? Treated wastewater to total 127 million m³ were almost completely released into surface waters (87%), only a small percentage of water (13%) has been released into the groundwater(SURS,2012).

Table 2: Wastewater into a source of pollution, Slovenia, 2010

Sources of wastewater	1.000 m ³
total	173.326
waste water from agriculture, forestry, fisheries	506
waste water from industrial activities	14.831
mining	1.465
Remarkable activity	12.516
electricity	575
construction	275
waste water from other activities	8.931
waste water from households	59.395
other waste water	89.663

3.1 METHODS OF TREATMENT WASTEWATER

For cleaning wastewaters we used three basic systems.

- primary
- secondary and
- tertiary

All three systems are different in the manner and degree of purification (Vuk,2010). **Primary** cleaning is based on mechanical or chemical cleaning processes, including the deposition particles of the substance. Primary treatment can be another clean-up procedure, which reduces theBPK₅⁴⁶, less than 20% and the amount of suspended solids by at least33%before release water into environment. Primary process reducing smallest part of organic pollution.

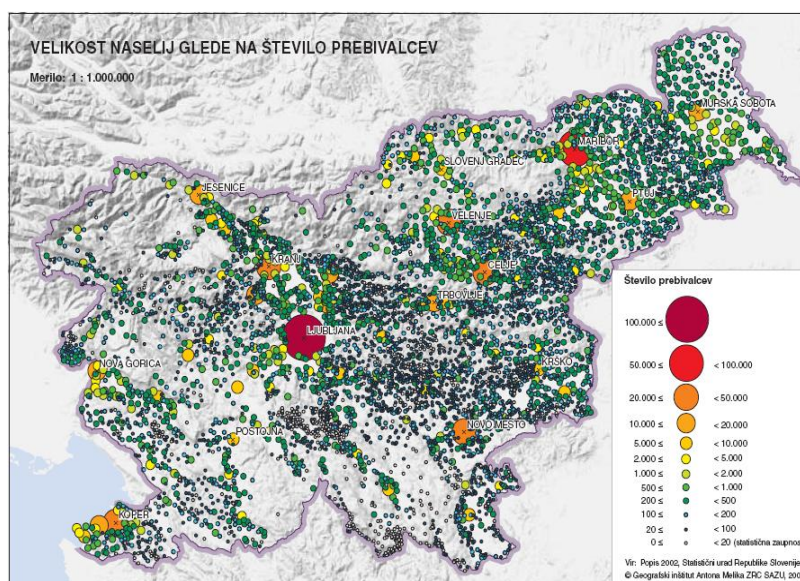
Secondary is biological and reduce organic particles and about 20 – 30% of nutrient.

Tertiary system reduce all organic and almost all nutrients. It was mainly used to reduce nitrogen and phosphorous substances. And to minimize the impact of secondary treatment (Vrhovšek, Vovk.,2009)

⁴⁶BPK₅(SLO) or BOD₅, biochemical oxygen demand, which is factor for biological pollution in water

4. SOLVING THE PROBLEMS OF ABSTRACTION AND WASTEWATER

In general, Slovenia is characterised by high proportion of dispersed settlement. 6.028 villages are mostly located especially in mountainous and hilly areas. These areas represent 30.5% of the whole territory inhabited by 38.5% of the total population. In areas with less than 2.000 PE⁴⁷ live 52.3% of all residents. Slovenia has 98.4% of such settlements. Legal frameworks for areas less than 50 PE do not provide public services in the care of drainage and sewage, but they leave people alone. Also, individuals are left to costs associated with solving the problems of urban waste water, which often leads to poor and inadequate systems. Appropriate solutions exist, but are left to local communities and individuals, who often opt for environmentally inappropriate technological solutions and cost (SURS, 2010).



Picture 4: The size of settlements in terms of population
(Anton Melik Geographical Institute, 2012)

4.1 ERM – ECO REMEDIATION METHODS

The regulation of wastewater treatment, which includes utilities, is now used by many processes. Among them, over the past few years, there is the most efficient way through ERM⁴⁸ processes, which include PCD⁴⁹ in the context of small sewage treatment plants. PCD became permitted technology, the government adopted a decree on the emission of waste water discharged from small sewage treatment plants, which are defined in the Act as a cleaning device, with a capacity of less than 2.000 PE. In remote areas or in areas where the installation of conventional water treatment plants is impossible due to geographic or other restrictions, PCD represent the best solution (Žnidarič, 2011).

4.1.1 PLANT CLINING DEVICES-PCD

Ecoremediation methods have an essential role in addressing the negative environmental interventions of the past. This means inadequate regulations of rivers and streams, and wetlands areas that have historically represented a habitat for plants and animals. PCD also enable us to revitalise the stagnant water sources for irrigation and drought prevention, in different areas that were previously reclamation of land by drainage. (Žnidarič, 2011).

⁴⁷PE population equivalent PE is a parameter indicative of load expressed as a unit and PEB60 g / (capita per day) is obtained by dividing the actual load expressed in g BPK5/day the value of 60 g / (capita per day.)

⁴⁸ERM is abbreviation for Eco Remediation Method

⁴⁹PCD or Plant Cleaning Device is natural system to cleaning wastewater, particularly in rural or dispersed areas

PCD eliminate water pollution and promote the preservation of water resources and their arrangement. It is important for:

- protection of water used for abstraction or intended for public drinking water supply or for the manufacture of beverages.
- reduction and more careful use of water
- maintenance of the quantity and quality of groundwater
- renaturation of water bodies
- reduction of pollution of water bodies

PCD consists of sandbank beds that are separated from the surrounding area with foil. Substratum and plants in beds have been used for purification. Important parameter in PCD is the flow time of waste water through substrate and plants roots, where microorganisms reduce pollutants in the water.

PCD is divided into two basic types:

- surface flow, or the free surface or **FWS** (free water surface) and
- by an underground stream or **SSF** (subsurface flow)

Waste water flows on the surface or just below it and slowly percolate through the substrate. Treatment plants in this way, exploiting the properties that such systems are utilized in nature. As in the swamps and backwaters of rivers. Irrigation plants which are inhabited with algae's and microbe processes allows to cleaning water.

Primary weakness of this method of cleaning is that water comes into contact with air and the potential option to spread of vermin and odour. The positive side of this method is on the other side, that we can observe the system and, if necessary, take immediate action.

Plants used in the device are separated by the treatment plant:

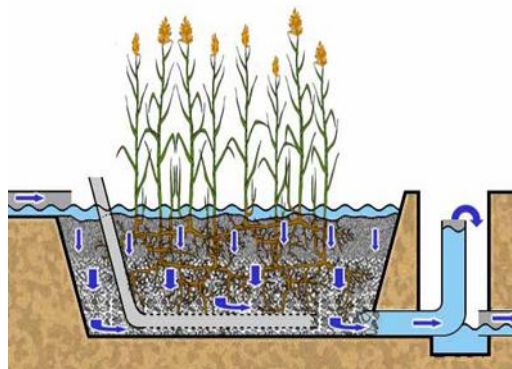
- emergent macrophytes
- the free float and
- rooted floating and submerged macrophytes

How plants and used in PCDs, depending on pollutants and their concentrations in the water load. We can see on picture 4. and 5..

polluted water flowing over the surface effect and slowly percolate through the substrate.

4.1.1.1 PCDs WITH THE SURFACE FLOW

This system consists of a shaft, which is a substrate in which they are rooted macrophytes. Laden water flows through the substrate below the surface so that in this case does not come into contact with oxygen and the potential odor. The difference between the surface and underground flow, and CW, is that the latter represents a greater surface area for biofilm development macrobic and thus more effective treatment. Plants used for these princes PCDs are: *Phragmites australis*, or common reeds, *Typhalatifolia* or two rushes and broadleaf *Scirpus lacustris* (Vrhovsek, Vovk, 2009).

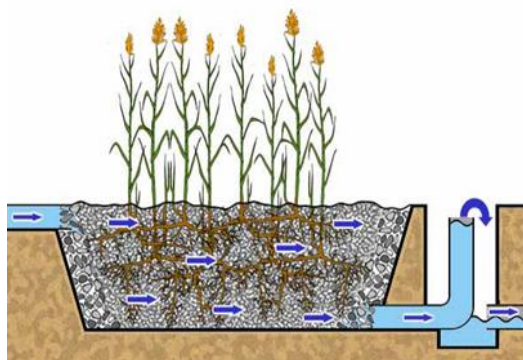


Picture 4: PLC with the surface flow (LIMNOS, 2010)

4.1.1.2 PCDs UNDER SURFACE FLOW

This system consists of a shaft, where is a substrate in which macrophytes are rooted. Water flows through the substrate below the surface, and in this case does not come into contact with oxygen and the potential odor. The difference between the surface and underground flow in PCD is, that the latter represents a greater surface area for bio film which enabling cleaning of waste water.

Plants used for these processes in PCDs are: *Phragmites australis*, or common reeds, *Typhalatifolia* or two rushes and broad leaf *Scirpus lacustris*.



Picture 5: PCD under surface flow (LIMNOS, 2010)

4.2 MECHANISMS OF TREATMENT IN PCD-S:

Mechanisms are interrelated and include:

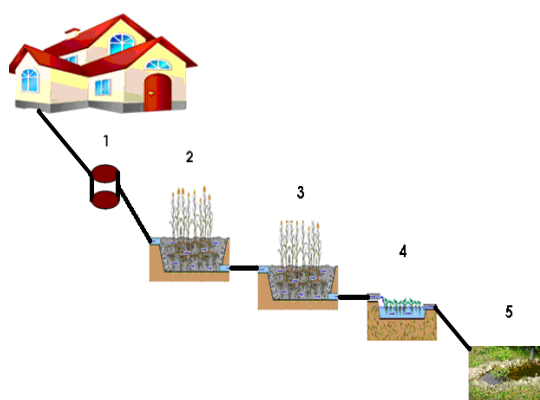
- settling of suspended particles of insoluble parts
- filtration and chemical precipitation
- chemical transformation
- adsorption and ion exchange across the surface of plants, substrate, sediment and plant waste
- decomposition and transformation of pollutants and nutrients through the microbial and plant
- predation and natural die off
- biological reactions:
 - photosynthesis
 - respiration
 - fermentation
 - nitrification
 - denitrification and
 - microbial removal of phosphorus (Vovk, 2008)

4.2.1. CONSTRUCTION OF URBAN WASTE WATER TREATMENT USING PCD

Constructed wetlands (PCDs) mimics the self-cleaning ability of nature. Operates without mechanical and electrical equipment. The system consists of several successive basins insulated with foil and filled with the substrate. With the participation of micro-organisms and wetland plants as well as active, pre-planned role of physical and chemical processes, the water is cleaned to the required standards for the sustainable way through the natural flora. Microorganisms on the roots cleaned 80% and plants 20% waste waters.

Waste water is captured in septic pits or special jaws of liquid is swept in treatment plants, where the water clean. To provide a major share of cleaning bacteria that live on, or between the roots of specific types of plants. Only this can make maximum use of the natural environment in which we intend to put PCD. Thus increasing the efficiency of the device, since the bacteria and plants have adapted to the work environment.

For 1PE is required from 2 to 2.5 m² (LIMNOS, 2010). For family with 4 persons, we need 12m² place (10m² and 2m² more, because of 20% losses in winter). And its costs about 3.500 EUR in Slovenia. Which contains material, documentations, monitoring and work on the building PCD.



Picture 6: System for individual houses (Davorin Žnidarič, 2011)

PCD or Plant Cleaning device (**picture 6**) is a natural system cleaning wastewater, especially in rural or dispersed areas.

- 1 existing septic pits, septic tanks
- 2 PCD filtered garden - secondary treatment phase
- 3 cleaning garden
- 4 polishing garden
- 5 purified effluent (pool or surrounding area)

5. CONCLUSION

We must protect water because of us and our future generation. Methods exist, but they must be ecologically and environmentally acceptable. Plant Cleaning Devices are one of the best and successful devices. They are suitable for rural and scattered areas where other systems cannot be set, mostly because of geographical or other reasons. Our article /introduce only one solution to protect natural resources with ecological and suitable systems. But everything is in our deliberation. When we will change relation to the nature and its sources, we will rescue our lives and our future.

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MANAGING INNOVATION – A FACTOR OF COMPETITIVENESS IN THE GLOBAL CONTEXT

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Abstract: *In this paper, the authors highlight the importance of innovation for the global competitiveness index in the example of the European Union countries. Over the past period, the importance of innovation has been increasingly pronounced, which leads to a revolution in business and economy. Besides the success of knowledge-based economy, innovations also enable people, communities and countries to enhance their impact on business, politics and society. The World Economic Forum defines competitiveness as a set of institutions, regulations and other factors which determine the level of productivity of a particular country. The indicator of the level of competitiveness is called GCI (Global Competitiveness Index - GCI) and deals with measuring average values of numerous microeconomic and macroeconomic components.*

Key words: *innovation, global environment, innovation index, global competitiveness index*

1. INTRODUCTION

The new focus of competition is innovation as the ultimate source of differentiation and market success. Research and development activities of companies are increasingly clustered in order to overcome their resource requirements.

Pervasive pressure of competition causes companies to be in a good form. Improvement of products, production processes, efficiency increase, greater market power and influence and development potential represents the processes for which companies strive in order to survive in intense competitive struggle and increase their competitive advantage. It is precisely for these purposes why companies use innovation and invest in research and development so that they can be adequately utilized.

Such activities can affect the growth of competitiveness and recognition which can conquer new markets and sales growth, which further leads to more spending on research and development to keep pace with other market players and the environment in which they operate.

2. THE IMPORTANCE OF COMPETITIVENESS FOR ECONOMIC DEVELOPMENT

For creating competitive advantages the strategy of the national economy, by which a certain country mobilizes and develops its production capacity to achieve economic development and international competitiveness, is also very important. It is essential that the government creates an environment that stimulates companies to gain competitive advantage. For this reason, the purpose of this study is to highlight the importance of a positive link between innovation and the creation of global competitiveness in the example of the European Union countries.

In calculating the GCI a well-balanced average of many different components is used. Each component represents one aspect of a complex reality, which is called competition. These components are grouped into 12 columns, which are called the *12 pillars of competitiveness*. These pillars are divided into sub-indices; "General requirements", "Improving efficiency", "Innovation and sophistication factors" that are organized as follows:

- Basic requirements:

- Institutions
- Infrastructure
- Macroeconomic stability
- Health and primary education

- Improving efficiency:

- Higher education and training
- The efficiency of goods markets
- Labor market efficiency
- Financial market sophistication
- Technological readiness
- Market size

- Innovation and sophistication factors:

- Sophistication of business
- Innovation

Table 1. Overview of GDP per capita in EU countries

Country	GDP pc - 2009 (US\$)	GDP pc - 2010 (US\$)	GDP pc ¹ (%)
Sweden	43,403.916	48,874.608	0.48
Germany	40,831.659	40,631.243	3.96
Finland	44,555.810	44,488.643	0.25
the Netherlands	48,188.414	47,172.140	0.91
Denmark	56,051.559	56,147.143	0.27
UK	35,315.270	36,119.846	2.94
Poland	11,298.879	12,300.126	0.97
France	42,409.874	41,018.597	2.90
Latvia	11,465.612	10,694.594	0.04
Austria	45,685.879	44,986.583	0.45
Bulgaria	6,421.320	6,334.337	0.12
Greece	29,328.084	27,301.544	0.44
Slovenia	24,450.310	23,705.694	0.08
Portugal	22,027.594	21,558.780	0.33
Lithuania	11,055.520	11,043.838	0.08
Italy	35,250.810	34,058.720	2.39
Hungary	12,893.958	12,879.296	0.25
Slovakia	16,187.482	16,103.985	0.16
Romania	7,609.603	7,542.252	0.34
Cyprus	29,617.930	28,236.971	0.03
Spain	32,030.269	30,639.295	1.84
Malta	19,576.591	19,746.380	0.01
Belgium	35,315.270	42,630.113	0.53
Luxembourg	106,550.822	108,831.704	0.05
Ireland	49,863.415	45,688.759	0.23
Estonia	14,402.462	14,835.960	0.03
Czech Republic	18,170.868	18,288.284	0.35

Source: <http://www.imf.org/external/pubs/ft/weo/2011/01/weodata/index.aspx>

¹ GDP per capita as a percentage (%) of the total worldwide number

The influence of each of the pillars of competitiveness varies from country to country, depending on the stage of economic development of the given economy. There are three stages of economic development: "The stage driven by factors", "Efficiency driven stage" and "Innovation-driven stage." These stages are taken into account when calculating the index, giving different weights to pillars (http://www.famns.edu.rs/skup2/radovi_pdf/vucenov_cosic.pdf).

World Economic Forum provides a detailed assessment of the productive potential of countries around the world. The report contributes to understanding the key factors that determine economic growth, help to explain why some countries are more successful than others, especially when it comes to increasing the levels of income.

Competitiveness contributes to innovation, business and overall economic growth. But if the competitiveness is poor in the market then the national economy suffers. Competitiveness is defined as a set of institutions, policies, and factors that determine a country's level of productivity.

The table shows GDP per capita in EU countries. One of the most important and most frequently used indicators of the level of economic development of a certain country is **gross domestic product** – GDP. Luxembourg has the biggest GDP per capita of 108,831,704 US\$, which can be seen in the graph, while Bulgaria has the lowest GDP of 6,334,337 US\$.

Behind Lukseburga are Denmark, Sweden, the Netherlands. These countries are among the top twenty most competitive economies in the world. Romania, Latvia, Poland by Bulgaria have the lowest GDP per capita. Bulgaria is located at 71 place, Romania is at the 67th place and Latvia takes 70th place in the global competitiveness index.

In Bulgaria in 2010 there was a fall of GDP per capita compared to 2009 from 6,421,320 US\$ to 6,334,337 US\$. Ireland recorded a decline of GDP per capita from 49,863,415 US\$ to 45,688,759 US\$, while Luxembourg recorded an increase from 106,550,822 US\$ to 108,831,704 US\$. Behind these figures on increase and attained level of GDP per capita, there are substantial changes of main drivers of development and major structural changes in the economic systems of individual countries.

Their dominant driver of growth is innovation while investments and factors driving the development have much smaller effect on the development. Innovation and innovative activity in these countries is reflected in both the technological-productive as well as entrepreneurial-managerial sphere.

Most EU countries have higher annual GDPpc than 17,000 USD, which means that they are in the third phase of development, i.e. innovation driven economy. Their knowledge-based economy offer high paid jobs and highly valuable products and services. These countries have a high innovative capacity and high competitive skills.

From the tabular and graphical representation we can see the ranking of EU countries according to the global competitiveness index. Scandinavian countries, Germany, Great Britain, France and the Benelux countries (Belgium, the Netherlands and Luxembourg) are at the top of the list and all are in the top 20 most competitive economies in the world. Sweden is on second place as the most competitive economy which is two places higher than the previous year and its GCI is 5.56. Germany is on the fifth and its GCI is 5.36. But the sources of their economic strength are different. Most other EU countries are among the 50 most competitive economies at the global level but there are five member states that do not have good results of competitiveness. Greece has bad economic indicators and it is found on the 83rd place which is 12 places lower than the previous year and its GCI is 3.99.

This economic decline of Greece in 2010 is due to severe deterioration in its macroeconomic environment which is caused by poor institutional adjustment and low efficiency of the market. The group of countries in the middle of the table whose rank is from 29th to 50th place and whose competitiveness index ranges from 4.74 to 4.34 is very significant. Here most countries have a worse position than the previous one. Bulgaria is located at 71st place which is five places higher as opposed to the previous year.

The first twenty states of the EU has GCI index over 5.00. From the table we can see that Sweden, which is in the second place, has a very high level of competitiveness of 5.56. The results of the index of competitiveness show that Poland with 4.51 GCI and the countries above it have a high level of competitiveness that ranges from 4.51 to 5.50. GCI shows that good institutions and competent and skillful

macroeconomic management, together with education and a focus on technology and innovation, represent successful strategies for achieving competitiveness in the growing global economy.

Table 2: EU Global Competitiveness Index

Country	Rang 2010.	Score	Rang 2009.	Change 2009.-2010.
Sweden	2.	5.56	4.	↑ +2
Germany	5.	5.39	7.	↑ +2
Finland	7.	5.37	6.	↓ -1
Netherlands	8.	5.33	10.	↑ +2
Denmark	9.	5.32	5.	↓ -4
the UK	12.	5.25	13.	↑ +1
France	15.	5.13	16.	↑ +1
Austria	18.	5.09	17.	↓ -1
Belgium	19.	5.07	18.	↓ -1
Luxembourg	20.	5.05	21.	↑ +1
Ireland	29.	4.74	25.	↓ -4
Estonia	33.	4.61	35.	↑ +2
Czech Republic	36.	4.57	31.	↓ -5
Poland	39.	4.51	46.	↑ +7
Cyprus	40.	4.50	34.	↓ -6
Spain	42.	4.49	33.	↓ -9
Slovenia	45.	4.42	37.	↓ -8
Portugal	46.	4.38	43.	↓ -3
Lithuania	47.	4.38	53.	↑ +6
Italy	48.	4.37	48.	
Malta	50.	4.34	52.	↑ +2
Hungary	52.	4.33	58.	↑ +6
Slovakia	60.	4.25	47.	↓ -13
Romania	67	4.16	64.	↓ -3
Latvia	70.	4.14	68.	↓ -2
Bulgaria	71.	4.13	76.	↑ +5
Greece	83.	3.99	71.	↓ -12

Source: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2010-11.pdf

3. THE ANALYSIS OF CONTRIBUTION OF INNOVATION TO THE COMPETITIVENESS OF COUNTRIES

In addition to macroeconomic stability national economies must have and microeconomic stability in order to be competitive. Business activities in these national economies benefit from well-developed institutional framework and accountability within public institutions, and excellent infrastructure is an additional positive feature of the business environment. In recent years, innovation is increasingly gaining in importance which creates a revolution in business and economics. Recognizing the key role of innovation for growth and development of each country, the Confederation of Indian Industry together with INSEAD (The Business School for the World) and Canon India has developed the Global Innovation Index.

Table 3. Comparing Global Competitiveness index and Global Innovation index

Country	Global Competitiveness index	Global Innovation index
Sweden	2.	5.
Germany	5.	8.
Finland	7.	3.
the Netherlands	8.	13.
Denmark	9.	10.
the UK	12.	14.
France	15.	19.
Austria	18.	20.
Belgium	19.	15.
Luxembourg	20.	16.
Ireland	29.	22.
Estonia	33.	37.
the Czech Republic	36.	27.
Poland	39.	54.
Cyprus	40.	38.
Spain	42.	46.
Slovenia	45.	34.
Portugal	46.	32.
Lithuania	47.	51.
Italy	48.	50.
Malta	50.	48.
Hungary	52.	41.
Slovakia	60.	85.
Romania	67.	87.
Latvia	70.	77.
Bulgaria	71.	92.
Greece	83.	79.

Source: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2010-11.pdf

The objective of measuring this index is to show the growth of innovation by the states, as well as to detect any obstacles that prevent the full profits of innovation for companies, government, and population (http://www.famns.edu.rs/skup2/radovi_pdf/vucenov_cosic.pdf).

Global Innovation Index classifies countries according to parameters such as "The institutions and their policy of doing business", "Human Capital", "Infrastructure", "Technological sophistication", "Business Markets", etc. The index has been in use since 2007 and compares 130 countries while using more than 90 indicators looking at different aspects of innovation.

The basic principles on which the Global Innovation Index (GII) is based:

1. There is a difference between input and output between measuring innovation in the economy. Inputs are factors that contribute to facilitating innovation while outputs show the results of innovation within the economy.
2. Global Innovation Index observe five input factors: Institutions and their policies, Human capital, General and IT infrastructure, Sophistication of the market and Business sophistication.
3. Third GI shows three output factors that make the results of innovation of economies: Knowledge development, Competence and Wealth creation.

In addition to Global Competitiveness Index, the World Economic Forum shows the Global Innovation Index, which is also measured on a scale of 1 to 7

From the given table we can see that if we compare countries that have a competitiveness index ranking to the 30th place these countries rank to 22nd place with the innovation index. Countries whose competitiveness index is ranked up to 50th place have innovation index which rank to 50th place but one country holds 54th place. Up to 83rd place of the competitiveness index, innovation index is up to 92nd place.

From the table we can see that countries whose competitiveness index is up to 30th place and also have a high index of innovation. Finland, which is on the 5th place of competitiveness index is on the 3rd place of the index of innovation. Sweden, which takes 2nd place in the competitiveness index has a 5th place when it comes to the index of innovation. Benelux and Nordic countries compensate for the small size of the market with constant innovation. By constant innovation, countries that have a high index of innovation also have a greater competitiveness index.

Because of this economies should be based on constant innovation. By constant innovation companies achieve competitive advantage which results in microeconomic stability.

Research and experimental development (R & D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of a man, culture and society and the use of this fund of knowledge to devise new applications (*Lynch, Harrington, Stackpoole, Shimiyev, Doyle & Lee, 2002*).

Research is collecting knowledge about various phenomena and then selection of the relevant knowledge that helps us in solving problems. In these days of globalization Research and Development become a priority and a risk. Investment in research and development does not always mean that we will gain. Those who do not invest, they will drop out of "race" in the market very soon and will be taken over by competition, because in terms of strongly expressed competitiveness which is caused by the increasing number of participants in the global market, competitive advantages are changing and disappearing in a short period of time.

States and organizations need to invest in R&D to create a society based on knowledge, innovation and modern technologies. Investment in R&D does not only economic development of each country but results in a reduction of inequality of entire regions (*Huggins, Izushi, Davies & Shougui, 2008*).

Applied knowledge, science, education and research and development become the dominant factors in the development of modern economy and its competitiveness. It requires international cooperation because of the presence of a globalization and environment where innovation, originality and knowledge are the primary factors of development is necessary to achieve competitiveness.

We can conclude that investments in research and development, which increase every year, have had positive impact on the innovation index, speaking for all members of the European Union. Changes in the index of innovation caused by the increasing percentage share of gross domestic product in investments in research and development. Looking at the relationship between the index of innovation and global competitiveness index, we can conclude that there is a positive correlation. The change of the global

competitiveness is index caused by the growth of the index of innovation, which confirms the fact that the growth of competitiveness of an economy depends on the growth of innovation.

Innovations are the key drivers of long-term competitiveness, national prosperity and global economy. Innovative leaders in the EU are Sweden, Germany, Finland, Netherlands and Denmark, whose innovation performance are well above the average of EU countries. In the long run, innovations contribute to increasing GDP and increasing spending on research and development which further encourages innovations that contribute to competitiveness, economic development and improved living standards. In short term, states should support the development of innovations by all their measures.

4. CONCLUSION

Generally, when innovations are implemented, they must bring positive results to our environment, economy or society. They allow the reduction of production costs, new business organization, the introduction of new products. We must invest in research and development to keep pace with other market players. Significant investments in research and development are among the most important factors that enable many world economies to improve their ratings and increase GDP. States should invest in R & D to create a society based on knowledge, innovation and modern technologies in order to participate in market competition. Companies that appear on the market and apply innovation will be more profitable, more efficient, will provide new products which enables their prosperity, that is, they will be more competitive.

The problems of production management, which is connected to the concept that integrates and manages all production and service operations in businesses, can be solved by innovation whose application includes promotion or development of products, services, processes, technology, new ways of work organization which further increases productivity, improves quality products and services that contribute to the competitiveness of the organization.

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TECHNOLOGY AND INNOVATION MANAGEMENT EDUCATION IN SERBIA

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Abstract: *This paper presents the results of a research study conducted in the area of Technology and Innovation Management (TIM) education in Serbia. A questionnaire-based mail survey was used to collect necessary data. The survey targeted two populations – professors who teach TIM courses at state and private universities, and practitioners who are responsible for managing technology. The results indicate that the curriculum of TIM requires prioritization and changes, and that business executives need to be better educated in different TIM knowledge areas. Some of the results obtained may be a consequence of small sample groups, and the future intention of the authors is to expand the samples, as well as to further examine and verify the findings presented in this paper.*

Keywords: *Technology Management (TM), Innovation Management (IM), education, Serbia, TIM knowledge areas, research*

1. INTRODUCTION

Technology management (TM) simply defined is “the process of effective integration and utilization of innovation, strategic, operational, and commercial mission of an enterprise for gaining competitive advantage”. (Badawy, 2009) The US National Research Council defines management of technology as “linking engineering, science, and management disciplines to address the issues involved in planning, development, and implementation of technological capabilities to shape and accomplish the strategic and operational objectives of an organization”. (Nambisan, 2003) The TM field has emerged from its relative obscurity during the 1970s and 1980s to mainstream business management during the 1990s (Nambisan and Wilemon, 2002). Managing technology and innovation has emerged as distinct and crucial functional area of business organization with specific strategic and operational roles.

Orientation towards strategic management issues in the practice of firms today is evident, with a focus on dealing with problems of long-term survival, growth and development in the uncertain and turbulent environment. Operational tasks and the capability to perform operations according to defined criteria are considered as a necessity and competence that firms develop today as a “must”. Organizations are focused at dealing with the problem of “what” to offer as new value (products and services), and “how” to perform the necessary operations, which points to the significance of strong links and interweaving of the strategic and operational dimensions of the key firm operations. Technology at the base of firm operations determines the new value offered in the form of products and services (answer to the question “what”) and the processes by which the output is created (answer to the question “how”). (Levi Jakšić, 2011)

The perspectives of micro and macro management of technology and innovation are becoming more closely related in an integral approach, as a significant dimension of the new technology and innovations management paradigm. TIM, as specific set of competencies in the competency based competitiveness approach, is recognized as the critical success factor for firms, sectors, economies and regions. The integral TIM concept is focused at managing technology as external force and internal factor of the firm meaning that both the innovative and technological infrastructure and the technology and innovative capacities of the firm are taken into account. Managing technological diversification is a significant dimension of the new paradigm leading to operations competitiveness of the firm closely related to its innovative capabilities. The success rate in the implementation of new technology and the development of new ideas for its application is an organizational challenge. Essential to technology management success is how we manage the innovation

process and the development of technology, and technology utilization in business and industry. (Badawy, 2009)

The strategic alignment of technological assets with a company's direction and management is a major issue in terms of impacting profitability and growth. Unfortunately, there have often been important mismatches between the graduates of universities and the skills needed by today's technology-based organizations (Nambisan, 2003, Mignogna, 2002). In highly dynamic environment, there is a constant need to research the knowledge and skills needed in practice and their compatibility with current programs at different educational levels.

2. RESEARCH BACKGROUND

The last two decades of historical development have shown a rise in the research interest in the field of technology and innovation management. That is clearly seen by the steep rise in the number of published works and authors that deal with these problems in theory and practice and by the results they have achieved. The rise is also seen in number of diverse educational programs in this field. In the US and in a few Western European countries, TM programs are now housed under the various academic schools (business, engineering, science, etc.) and have considerable diversity in their themes, focus, and course offerings. (Nambisan, 2003) Research studies in this field have been oriented at investigating TM and IM study programs and their relevance for practice. These studies have used different approaches and different expert and research groups.

Members of IAMOT (International Association of Management of Technology) and MINT (Management of Innovation and New Technology) were used as a research groups in the study conducted by Yanez et al. (Yanez, 2010). The authors wanted to answer three questions: 1. Did a body of knowledge for Technology and Innovation Management education make sense for the stakeholders in the field? 2. Do they have the right topics, and, if not, what was missing? 3. Are there any differences in the relative perceived value of some groups of these topics to an educational program? The results showed that some of the "most commonly found topics" were not included in their knowledge areas. They have developed the ranking based on *Knowledge discipline importance* to TIM education and the best ranked areas were: Strategic TIM, Innovation Management, Integration of Technology and Business Strategy, Fundamentals of TM, R&D Management, Product development management, Knowledge management, and Technology entrepreneurship. (Yanez, 2010)

The study conducted by Mallick and Chaudhury explored TM education in MBA programs in the United States (Mallick, 2000). Research has identified knowledge and skills that are necessary for effective TM. The study showed that there was general agreement between professors/academicians and executives/practitioners as to what knowledge and skills are important for effective TM. They were: knowledge of business strategy and competition, strategic role of technology in business, new product development (NPD), and understanding the issues related to implementation of new technology.

In the qualitative study (Levin, 2008) realized jointly by academics and technology managers from a number of large industrial firms, 27 technology management routines were identified. They were organized into a framework consisting of four categories: producing scientific and technological knowledge, transforming knowledge into working artefacts, linking artefacts with user requirements, and providing organizational support. According to the authors, this study is valuable for academics also, providing a descriptive baseline of the TM routines used in large corporations.

A global study of graduate TM programs involved over 50 universities and recognized the following key issues: TM programs are still evolving, industry involvement has increased, IT, related knowledge and international perspectives are becoming crucial, technology management education is important a graduate and undergraduate levels. (Nambisan, 2003) Liao classified TM methodologies using eighth categories: TM framework, General and policy research, Information systems, Information and communication technology, Artificial intelligence/expert systems, Database technology, Modeling, and Statistics methodology. One of the conclusions from the survey was that TM methodologies tended to develop towards expert orientation and that TM applications development was a problem oriented domain. (Liao, 2005)

There is still an evident need for research in this field, having in mind the dynamics of technological change, especially in production and services based on ICT implementation. These studies are very important today

as the role of university is changing. University has an indirect impact on entrepreneurship (Levi Jakšić, 2011, Levi Jakšić, 2012), playing a key role in high education and having the central mission of developing study programmes, with curricula and module syllabi that will prepare the future highly qualified work force to contribute with the highest capacity to the creativeness, innovativeness and entrepreneurship in the sustainable development of the economy and society. This is the crucial social responsibility of universities today. (Philpott, 2011)

Innovation and opportunity at the base of entrepreneurship is viewed in the perspective of the critical role of institutions in the promotion of innovation defined by national innovation systems, and universities are cited as critical institutional actors in national innovation systems. (Mitra, 2012) Therefore the role of TM and IM educators is of crucial importance. They are attempting to better serve their students' professional requirements and meet industry needs. (Nambisan, 2003)

The field of Technology and innovation management (TIM) has been studied in the Republic of Serbia at state and private universities for many decades. The first introduction of this field in undergraduate faculty programmes was in 1971 when the first generation of students at University of Belgrade, Faculty of organizational Sciences (UB FOS) studied Technological Systems as one of the compulsory modules. Today, many programs and modules are housed under the state and private universities. The relevant modules, disciplines and faculty branches, are presented in Table 1.

Table 1: Overview of faculties teaching the TIM modules at state and private universities in the Republic of Serbia

STATE UNIVERSITIES	PRIVATE UNIVERSITIES
University of Belgrade	University Business Academy in Novi Sad
<i>Faculty of Organizational Sciences (UB FOS)</i>	<i>Faculty of Economics and Engineering Management</i>
Management of technology and development	Management of technology transfer processes
Development of small and medium enterprises	University UNION Belgrade
Technology strategy	<i>Faculty of Business Industrial Management</i>
Management of technological operations	Technological processes
Innovation Management	Technological systems
Innovation systems	Theory of innovation
Business Innovation	Production processes management
Managing innovation projects	Innovation management
Global technology and operations management	Product management
Management of technological development	Singidunum University
Sustainable development	<i>Faculty of Management</i>
Joint European innovation programs	Computer Integrated Manufacturing – CIM
Strategic technological cooperation and entrepreneurship	Innovation Management
Quantitative methods in technology management	<i>Business Faculty in Belgrade</i>
Managing new product and service development	Advanced production-technical systems
<i>Technical Faculty in Bor</i>	Megatrend University
Analysis of technological processes and environmental protection	<i>Faculty of Business Studies in Belgrade</i>
Basics of technology and merchandising	Operations management
Management of new technologies and innovation	Basics of technological management
University of Kragujevac	Research and Development management
<i>Technical Faculty in Čačak</i>	<i>Faculty of Management in Zaječar</i>
Technological processes	Production management
Production technologies	Basics of industrial technologies
CAD/CAM technologies	Research and Development management
Entrepreneurial innovation	Management of new technologies and innovations
Basics of technology and merchandising	<i>Faculty of Business Studies in Požarevac</i>
Product management	Management of operations and technologies
Innovations and entrepreneurship	<i>Faculty of Business Studies in Vršac</i>
New technologies	Operations management
<i>Faculty of Engineering Sciences in Kragujevac</i>	Production processes management
Branch: Industrial management	Management of new technologies and innovations
Branch: Industrial engineering	Research and Development management
University of Niš	European University
<i>Faculty of Technology in Leskovac</i>	<i>Faculty of European Business and Marketing</i>
University of Novi Sad	Operations and supply management
	<i>Faculty of Engineering and Operational Management</i>

<i>Faculty of Technical Sciences in Novi Sad</i>	Theories of industrial systems
Technology transfer processes	Theory of innovation in the industry
Management of innovation and changes	Industrial engineering
Processing product technology	Management of new technologies and innovations
Company development processes	High technology management
Innovative product development	Innovation management
Product management	Technological management
Technology and business forecasting	Technology and innovation
Product lifecycle management platform	Operations management
Development and product management during the lifecycle	
<i>Technical Faculty "Mihailo Pupin" in Zrenjanin</i>	
Management of technological development	
Engineering and innovation	
Processing product technology	
University of Priština	
<i>Faculty of Technical Sciences in Kosovska Mitrovica</i>	
Branch: Technological Engineering	

The changes in syllabus of TM modules at UB FOS were in line with the development of the scientific field and the research topics in the environment. Comparative overview of changes in TIM scientific field and introduction of new thematic units into relevant modules - Managing technology (TM) from 1987 to 2005 and Management of technology and development (MTD) from 2006 until present, are presented in Table 2.

Table 2: New findings in the academic field of TIM and thematic units at relevant modules at UB FOS (based on Levi-Jakšić, 2011a)

Contributions in scientific fields of TIM		Thematic units in TM/MTD
1970-2000		
W. J. Abernathy, J. M. Utterback, K. B. Clark F. Denison P. Clark, R. H. Hayes, K. B. Clark, C. Lorenz, T. Allen C. K. Prahalad, G. Hamel, D. J. Teece, R. Sanchez, A. Heene J. Sundbo, H.E. Cook, M. Fransman, K. Pavitt, N. S. Levy, T. Proctor	Technology life-cycle model; technology innovation models. Technological progress and productivity. Studies in technology transfer – ‘center-periphery’ model and ‘imitation’ model; productivity-technology dilemma; dual character of technology. Key firm competencies; competitiveness based on competence; resources, capabilities Integral innovation management theory; managing products; innovation systems; high technology management particularities; managing creativity.	Technology forecasting Technological development – indicators Technological systems, processes and operations Strategic management of technology Technology transfer Globalization Management of technological innovations
2001-2008		
E. Huizenga, J. Goldenberg, D. Mazursky, D. Rainey, M. Dodgson H. Greve, A. Neily, M. Meyer H. W. Chesbrough; O. Granstrand M. Dodgson; T. J. Fetterhof; A. Fosfuri; D. L. Rainey S. Chakravarty, E. Haruvy, F. Wu, F. Malerba, S. Brusoni, R. Nelson, J. Fagerberg, T. Bresnahan, B. Lundvall, G. Dosi, S. Metcalfe B. Laperche, D. Uzundis, N. V. Tunzelmann, M. Isabelle, A. Ilardi, C. Serfati J. C. Westland	Innovation management in the ICT sector; creativity enhancement processes; creative, innovative products. Technological diversification and competitiveness; technology and innovation management and global competitiveness. Open innovation concept (OI) and gaining profit from technology, Technology management and OI; Sustainable business development and sustainable technology management and development NPD and product performances in open innovation sources; Knowledge management, knowledge based economy, public policy and new roles of technology and innovation in economic growth and development Relation between intellectual property rights and open approaches to knowledge. Integrated patent systems, spin off and licences in new ventures Innovations in technology and new business models	As for 1971-2000 plus: Organization and technological performance management Technology and development strategies Strategic technological cooperation – new models Technological entrepreneurship Sustainable development New product and service development - models Creative problem solving in technological development
2009-2011		

D. C. Mowery; Bjorn Lomborg; S. Shane; Z. Acs, D. Audretsch, R. Strom K. R. E. Huizingh; D. Chiaroni; U. Lichtenthaler; S. Lee; G. Park; B. Yoon, J. Park ; D. Easley; J. Kleinberg; P. K. Ahmed; C. D. Shepherd; V. A. Gilsing E. Huizingh; S. Conn; M. Torkelli; A. Spithoven	R&D models in third industrial revolution, technology <i>spill-over</i> ; sustainable technology development and global crises, entrepreneurship in strategic technology management, entrepreneurship through all phases of technology life cycle, entrepreneurship in context of technological and economic policy Advancement of innovation performances by OI, OI and technology exploitation, technological entrepreneurship, OI in SMEs and network models, new technologies and social networks, Measuring technology innovations influences by indicators of competitiveness, new technologies and knowledge management Development of absorbing capacities for OI adoption, OI in services	As for 2001-2008 plus: Technology management and OI models, Knowledge management Role of technology and innovation in sustainable development New technologies, ICT and service development New business models
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3. RESEARCH DESIGN

Target population, method and objectives: In order to examine the knowledge needed in TIM practice and their compatibility with the current programs at different educational levels in Serbia, a mail survey was conducted in the period February – April 2012. The survey targeted two populations – professors who teach TIM courses at state and private universities in Serbia (presented in Table 1) and business executives/practitioners who are responsible for managing technology in the industry of Serbia. This approach firstly allows comparison between the areas of TIM that professors considered important for curriculum and areas considered necessary by practitioners. Secondly, as the field of TIM in Serbia does not have a standardized curriculum and as there is no consensus on its content, it needs efficient prioritization. Professors have the primary responsibility for curriculum development in business schools. They teach what they consider to be important for students to learn and students learn what professors intend to teach. But, the voice of practitioners should be present as a guide to any professional program. They are in a better position to identify the needs that are relevant to the challenges they encounter in their everyday practice. (Mallick and Chaudhury, 2000)

Survey instruments: A questionnaire-based mail survey was used to collect the necessary data. Two separate survey instruments were developed for two targeted populations. Firstly it was made for professors who teach TIM and then some topics were modified to make it suitable for practitioners. Questionnaires were divided into two parts. The first part was focused on information related to university/faculty affiliation, methods used for teaching and the background of the respondent (for professors) and on information related to organization and the background of the respondent (for practitioners). The second part consisted of 37 knowledge areas, which were divided into five main groups: 1. Basic concepts of TM and organization development, 2. Strategic role of technology in business, 3. Strategic technology management, 4. Operational management, 5. Links of TM and other disciplines. The respondents were asked to rate the importance of each area using five-point Likert scale (1 = Not important at all, 5 = Very important). Professors were also asked to rate the coverage of each area in their curriculum (1 = Not covered at all, 5 = Very well covered) and the practitioners to rate their proficiency in each area (1 = No proficiency at all, 5 = Very good proficiency). They were also asked to give additional comments to the survey. Less than 2% of the respondents gave additional comment, so it can be concluded that the knowledge areas in the questionnaire were well covered.

Data collection: A database of the professors who teach TIM related courses in Serbia was made. Survey instrument was mailed to 44 professors. Twelve completed questionnaires were returned, resulting in 27% response rate. In order to reach the second targeted population, questionnaire was sent to 310 companies in Serbia. Thirty-four completed questionnaires were returned, resulting in approximately 11% response rate.

4. RESULTS AND DISCUSSION

4.1 Essential knowledge areas of TIM – importance, coverage, proficiency: professors vs. practitioners

Table 3 presents the findings related to the knowledge areas relevant for TIM and the responses from both groups: professors and practitioners. For each knowledge area in column 1 respondents were asked to rate

its importance in managing technology. Columns 2 and 8 present the average importance ratings for professors and practitioners, respectively. Professors were also asked to rate the coverage of areas listed in column 1 in their programs. The average coverage ratings for all respondents are presented in column 4. Practitioners were asked to rate their proficiency/knowledge in all areas listed in column 1. The average proficiency ratings are presented in column 10. The differences between importance and coverage level of all listed knowledge areas is calculated to obtain a level of deficiency for each area and are presented in column 6. In the same way, column 12 presents deficiency between the importance of knowledge areas to practitioners and their proficiency in those areas. The rankings of knowledge areas based on professors' importance ratings, coverage and deficiency are presented in columns 3, 5 and 7, respectively. The rankings based on practitioners' ratings of importance, proficiency and deficiency are presented in columns 9, 11 and 13, respectively. Items in column 1 are presented respecting their importance rank by professors.

The rankings in the column 3, based on professors' importance ratings, reveal that the top ten important knowledge areas are: Corporate, business and functional strategies, Technology strategy, Competitive strategies, Integrating business and technology strategies, Technology forecasting, Innovation processes, R&D management, Entrepreneurship, Performance management of technology and organization, Measurement and control of technology efficiency in the organization. The least important knowledge areas include Business - production - technological systems, Internal value chain model - primary/secondary operations and Legal aspects. Column 5 indicates that the best covered areas in TIM courses are Entrepreneurship, Creativity and product, service and process development, Technology strategy and Technology forecasting. Knowledge areas with the lowest coverage levels are: Legal aspects, Internal value chain model - primary/secondary operations, Basic business functions and operations, Sustainable development and Performance management of technology and organization. These results show that the best covered areas are some of those that professors marked as the most important, but some important areas are not covered sufficiently. Top five areas in which the TIM courses are most deficient (column 7) are: Performance management of technology and organization, Measurement and control of technology efficiency in the organization, Corporate, business and functional strategies, Sustainable development and Financial aspects. Areas in which courses are the least deficient are: Globalization, strategic alliances and partnerships, Organizational structure, The meaning of the concept of technology management in the organization, Technology and value creation in the form of products / services and Creativity and product, service and process development.

The rankings in column 9, based on practitioners' importance ratings, reveal that the top ten knowledge areas are: Financial aspects, Information technology and business, The acceptance/adaptation of new technology for the organization, Creativity and product, service and process development, Integrating business and technology strategies, Acquisition of technology – ranking and selection of technology, Knowledge Management, Sustainable development, Technology and value creation in the form of products / services and Business – production – technological systems. Results show that Models, qualitative and quantitative methods as a support, Globalization, strategic alliances and partnerships, Internal value chain model - primary/secondary operations, Competitive strategies and R&D management are the areas that practitioners ranked as the least important. This is a worrying fact, because some of these areas are actually the most important in today's business world. Column 11 indicates that the top five areas in which practitioners consider themselves as most proficient are: Internal value chain model - primary/secondary operations, Management of technology portfolio and R&D projects, Marketing aspects, Globalization, strategic alliances and partnerships and Technology forecasting. The respondents consider themselves as least proficient in the following areas: Sustainable development, Internal factors of the organization and Acquisition of technology – ranking and selection of technology. The highest deficiency is present in Intellectual property rights, Sustainable development and Technology transfer, which is another worrying fact because these are some of the most emerging topics in today's business.

Table 3: Knowledge content of TIM as perceived by professors and practitioners in the Republic of Serbia

1	2	3	4	5	6	7	8	9	10	11	12	13
Knowledge area	Professors						Practitioners					
	Importance		Coverage		Deficiency		Importance		Proficiency		Deficiency	
	Mean val.	Rank	Mean val.	Rank	Mean val.	Rank	Mean val.	Rank	Mean val.	Rank	Mean val.	Rank
Corporate, business and functional strategies	4,67	1	3,67	15	1	3	4,12	18	3,09	33	0,85	9
Technology strategy	4,67	2	4	3	0,67	17	4,12	19	3,47	23	0,36	33

Competitive strategies	4,56	3	3,67	16	0,89	8	3,85	34	3,64	12	0,66	17
Integrating business and technology strategies	4,56	4	3,63	21	0,93	7	4,44	5	3,26	28	0,72	15
Technology forecasting	4,56	5	4	4	0,56	25	4,06	27	3,91	5	0,94	6
Innovation processes	4,56	6	3,89	7	0,67	18	4,12	20	3,50	21	0,30	35
R&D management	4,56	7	3,67	17	0,89	9	3,94	33	3,59	14	0,76	13
Entrepreneurship	4,56	8	4,11	1	0,44	32	4,15	17	3,55	18	0,65	18
Performance management of technology organization and	4,56	9	3,22	33	1,33	1	4	29	3,61	13	1,03	4
Measurement and control of technology efficiency in the organization	4,56	10	3,56	22	1	4	4,06	23	3,56	17	1,03	5
Efficiency and effectiveness indicators of innovation activities	4,44	11	3,78	10	0,67	19	4,06	26	3,79	9	0,53	27
Creativity and product, service and process development	4,44	12	4,11	2	0,33	33	4,47	4	3,47	22	0,59	24
Technology transfer	4,44	13	3,89	8	0,56	26	4,06	28	3,88	6	1,06	3
Financial aspects	4,44	14	3,44	27	1	5	4,68	1	3,21	29	0,79	12
Marketing aspects	4,44	15	3,78	11	0,67	20	4,12	21	3,91	4	0,59	22
Human Resource Management	4,44	16	3,56	23	0,89	10	4,15	15	3,29	27	0,41	30
Knowledge Management	4,44	17	3,67	18	0,78	11	4,35	8	3,18	30	0,69	16
Internal factors of the organization	4,33	18	3,78	12	0,56	27	4,26	12	2,97	36	0,64	19
External environmental factors	4,33	19	3,56	24	0,78	12	4,06	24	3,85	8	0,94	7
Strategy based on core competences	4,33	20	3,78	13	0,56	28	4,21	13	3,39	25	0,47	29
Acquisition of technology – ranking and selection of technology	4,33	21	3,67	19	0,67	21	4,44	6	3,00	35	0,38	32
The acceptance/adaptation of new technology for the organization	4,33	22	3,56	25	0,78	13	4,53	3	3,12	31	0,91	8
Organizational structure	4,33	23	4	5	0,33	34	4,21	14	3,03	34	0,83	10
Sustainable development	4,33	24	3,22	34	1,11	2	4,38	7	2,91	37	1,09	2
The meaning of technology management in the organization	4,22	25	3,89	9	0,33	35	4	31	3,47	24	0,18	37
Technology and value creation in the form of products / services	4,22	26	4	6	0,22	36	4,32	9	3,32	26	0,36	34
Information technology and business	4,22	27	3,67	20	0,56	29	4,64	2	3,09	32	0,75	14
Change management	4,14	28	3,5	26	0,64	24	4,09	22	3,85	7	0,82	11
Management of technology portfolio and R&D projects	4,11	29	3,33	29	0,78	14	4,06	25	4,03	2	0,59	21
Intellectual property rights	4,11	30	3,33	30	0,78	15	4	30	3,67	11	1,09	1
Technological systems / processes / operations	4,11	31	3,44	28	0,67	22	4,26	11	3,58	16	0,57	26
Basic business functions and operations	3,89	32	3,22	35	0,67	23	4,15	16	3,50	20	0,24	36
Models, qualitative and quantitative methods as a support	3,89	33	3,33	31	0,56	30	3,66	37	3,59	15	0,59	23
Globalization, strategic	3,89	34	3,78	14	0,11	37	3,71	36	4,00	3	0,38	31

alliances and partnerships												
Business - production - technological systems	3,89	35	3,33	32	0,56	31	4,29	10	3,53	19	0,62	20
Internal value chain model - primary/secondary operations	3,89	36	3,11	36	0,78	16	3,85	35	4,15	1	0,57	25
Legal aspects	3,78	37	2,78	37	1	6	3,97	32	3,69	10	0,48	28

The given analysis shows the results within separated populations, and indicates the knowledge areas that should be reexamined first. The results show that there are relatively strong deficiencies between importance of knowledge areas to professors and their coverage in the courses. Differences are present also in the importance of knowledge areas to practitioners and their proficiency in those areas. Thus, these results confirm that on one side, the curriculum of TIM needs prioritization and changes and, on the other side, business executives need to be more educated in technology and innovation management.

4.2. Relative importance of TIM knowledge areas: professors vs. practitioners

A comparison of importance ratings between the sample groups – professors and practitioners, using t-test, identified only five statistically significant differences ($p < 0.05$), in the following knowledge areas: *Management of R&D* ($p = 0.049$), *Measurement and control of technology efficiency in the organization* ($p = 0.037$), *Technology strategy* ($p = 0.025$), *Corporate, business and functional strategies* ($p = 0.023$) and *Competitive strategies* ($p = 0.005$). In order to see the level of these statistically significant differences, eta-square was calculated for each of the five areas. Results showed that there is a high influence for Competitive strategies ($\eta^2 > 0.14$) and medium influence for other four areas ($\eta^2 > 0.06$), which shows that these areas are the ones that should be reexamined first. The obtained result may be the consequence of the small sample groups. The intention is to expand the samples in the future and to examine and confirm the preliminary findings given in this section.

5. CONCLUSION

The study presented in this paper confirmed that there is a constant need to research the knowledge desirable in practice and their compatibility with current programs at different educational levels. This is specially the case in the field of Technology and innovation management where there is an evident rise in number of diverse educational programs. The dynamic field of TIM and turbulent market conditions in Serbia are the major challenge in itself. The survey of the knowledge needed in TIM practice and programs at different educational levels in Serbia revealed significant differences in educational programs and respondents' attitudes. The field of TIM in Serbia does not have a standardized curriculum and faculties have considerable diversity in their themes, focus, and course offerings. Based on the survey, the least important areas for practitioners and the areas where practitioners have the lowest competence are some of the most emerging areas in today's business. We can conclude that: 1. The curriculum of TIM needs prioritization and changes, hearing the voice of practice, and 2. The business executives need to be more educated in different TIM knowledge areas. In addition to curriculum changes, seminars, conferences and other forms of knowledge transfer are needed. This research can be considered as a research in progress and some of the results obtained may be the consequence of the small sample groups. Nevertheless, the results are showing that further research is needed. They can be considered as action alerts, also. The future intention of the authors is to expand the samples under consideration and to further examine and verify the findings presented in this paper. With a large sample, it would be possible to examine the relationship between respondents' educational and professional background and their attitude toward specific TIM knowledge areas.

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THE ELECTRONIC LEARNING STANDARDS

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Abstract: *The majority of the existing e-learning systems are faced with problems due to a non-standardized data model, unstructured content and education platform incompatibility. Such systems contain educational content that is formatted in a single system, this way being useless in others, making them incompatible systems. These facilities are therefore not used in other systems. This is a basic deficiency of the existing e-learning system. For these reasons it is necessary to carry out the standardization process of e-education. With the rapid expansion of various forms of e-learning, the market has been overwhelmed by a large number of platforms from different vendors (LMS - Learning Management System), whose main purpose is storing, managing and distributing learning materials to the end users, students.*

Key words: *e-learning standards, SCORM standards and definition, SCORM components, meta data and standardization of e-learning.*

1. INTRODUCTION

The development of quality instructional materials for learning needs a considerable expenditure of time and money and is therefore very important that the teaching materials presented are compatible with various platforms for e-learning, their versions and operating systems on which they have been built.

Before the advent of learning material standards, the producers had the same materials to create multiple versions in order to cover the different systems. The materials which were created in one school could not be used in another one because it has a different platform for e-learning. All these have significantly influenced the increase in prices or prevented the handout of teaching materials to educational institutions. Therefore, a need arose to define standards that will accept a platform for producers and creators themselves.

In that case, all the teaching materials were consistent with this standard and also based on the standardized platform for e-learning. The first standards were being made by the IMS Global Learning Consortium and the World Society of Electrical and Electronics Engineers the IEEE. In January 1999 the large US organizations launched an initiative whose role was to determine precisely the standardization of teaching materials for learning to be generally accepted.

Their initiative was joined by a large number of educational institutions and interested companies. The first task of ADL-a practical definition of standards and the recommendations was to create teaching materials for learning. The result is a document given to the specification of standards, called the SCORM with the current versions of SCORM.

2. SCORM STANDARD-DEFINITION SCO

SCORM standard introduces the concept of shared content object SCO (Sharable Content Object), which is the basic unit of learning materials (Eng. Learning Object). SCO is the equivalent of one lecture, the electronic exchange and it can consist of a text, images, video sequences and even the interactive content such as flash or java applications.

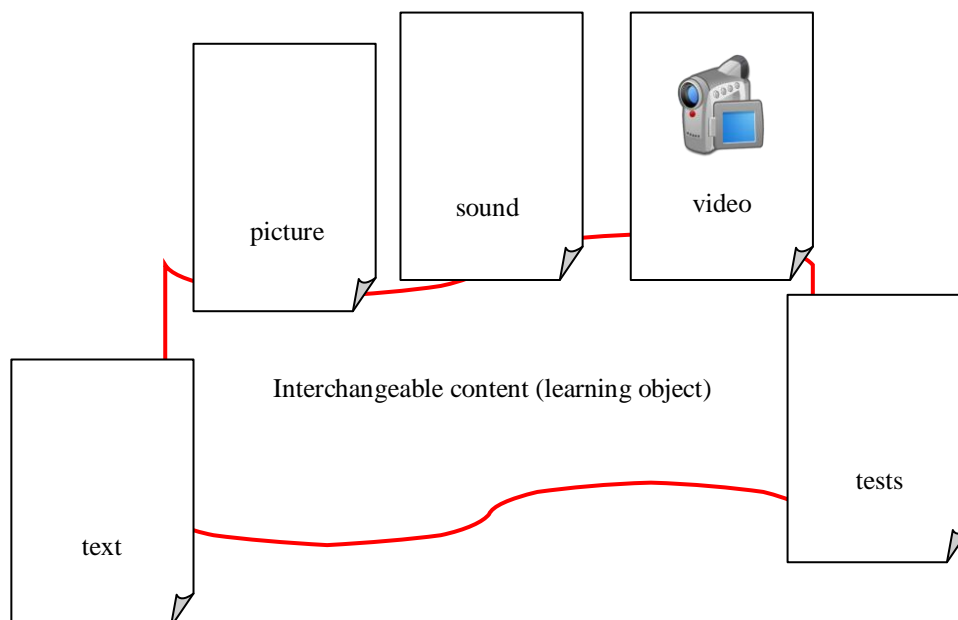
SCO is described by metadata, which allows finding the lessons in various technical and pedagogical criteria.

Each SCO should represent a logical and complete whole, which is not too extensive and that can fit into the whole e-course. These lessons may include lectures or tests with different types of responses (single or multiple choice, completing, etc.). Structuring of electronic course content is done by selecting and arranging the SCO in a specific order.

2.1. STANDARDIZATION OF ELECTRONIC MATERIALS

The majority of existing e-learning systems are closed systems. They include courses that are created and authored tools for a particular system. These facilities therefore are not be used in other systems. This is a basic lack of existing e-learning system.

For these reasons it is necessary to carry out the standardization process of e-education. The main task of the standardization process of e-education is to develop a standardized data model and standardized structure of the educational content that will enable their use, regardless the tools they were created by and the environment they will be located in. This involves cooperation between different LMS.



Picture 1: Learning objects (Sharable Content Objects - SCO)

Electronic educational materials are usually made within a standard known as SCORM (Sharable Content Object Reference Model). SCORM is a set of standard web-based technologies and protocols that allow the authors of electronic course content and to exchange information (Sharable Content Objects - SCO) in different LMS. Content objects that are interchangeable (SCO) may be: sound, image, text, video or any other electronic medium. The basic concepts of standard e-learning and SCORM model are:

- **Durability**

Once created a material can be used during the relevant time period in spite of the outdated version of software and hardware (which provides that, despite technological progress, they can be used as educational material designed for e-learning, if they are made by the SCORM standard)

Learning materials can be exchanged between different LMS systems (Platform for e-learning). Once designed electronic learning materials at any SCORM compatible platform can be delivered regardless the tools that are being designed and educational platform.

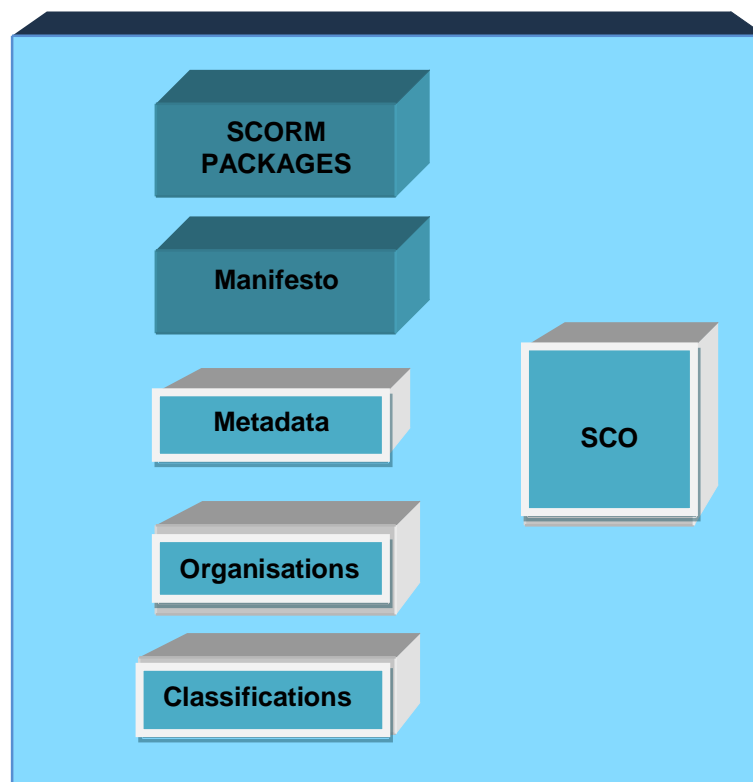
- **Reusability**

Each SCO can be repeatedly used as a part of various educational entities, in different contexts and for different learning objectives.

- **Accessibility**

SCORM materials can be classified and find thanks to meta data. A complete SCORM package is described in the manifesto.

The picture shows the structure of the SCORM package:



Picture 2: The structure of SCORM packages

The **manifesto** describes the entire package through a structured XML document. Reading the manifesto, LMS receives all information about the content of the package, the organization structure and collection of resources included.

Metadata contains a descriptive and administrative information about the package, as well as the information that defines the package for compliance with the SCORM standard.

Organizations represent one or more activities that can be inserted as needed. This list of activities is the manner and sequence that will provide student with resources. SCORM package must have at least one organization.

Classification of attributes describes the package and their use. They are to be included in the catalog and global search. A SCO is typically composed of multiple files (html, flash, video and audio, interactive media ...) that the student follows as common or interactive lessons, and may represent different types of tests.

SCO can be treated as a mini web site with their directory structure and content. All links in the SCO framework must be relative to be independent of the physical location of distribution. Standard SCORM contains proposals for:

- Formatting content (Lesson content is divided into learning objects (learning objects))
- Describe the content (metadata to describe learning: types of educational content, the level of interaction, the target group, length of learning, etc.).

2.2. SCORM COMPONENTS

SCORM components are units of educational content that is delivered to students:

- *The basic elements* - the basic unit of educational content (text, images, Java applets, audio).
- *Learning objects* (Sharable Content Objects - SCO) that comprises the smallest indivisible unit of educational content being delivered to students (web pages).
- *Aggregation of content* - area teaching a course or a structured set of SCO-components with defined behavior. The most commonly used to group related educational content.

2.3. META DATA

A growing number of educational facilities are available in the Internet environment, hence, there is the need of simple tracing enabling their reuse. For the purpose of locating simple, educational resources meta-data (metadata) is being applied.

Metadata are "data about data ". They give information about the group of data that make up an educational facility (document, image, content modules, etc.). Most are encoded in the programming language XML (eXtensible Markup Language) and describe the educational facility, or other digital source used in the educational process. Meta-data have a role to facilitate re-usability and interoperability, usually in the LMS. Each component is being developed for the purpose of defining a set of meta-data in order to be used later as the same resource, creating the appropriate design patterns for components of the course to be used for entering a pre-determined set of meta-data. Thus created and completed, they are meant to be put in the appropriate place to keep the folder structure, exchanging themselves with other team members-developers who will create these documents. The specification that defines the elements required by the type of components:

- type,
- the author / owner / publisher,
- description,
- language,
- date,
- terms of distribution,
- format and pedagogical attributes (educational style, the style of interaction).

3. THE ROLE OF TEACHERS IN THE SYSTEM OF DISTANCE LEARNING

Standardization of e-learning:

The main role of standards in the implementation of e-learning is reflected in the tendency to develop standardized data model and standardized structure of the educational content enabling their use regardless the tools that created them and the environment within which they are being used.

Standardization process to ensure the following properties of e-learning:

- *interoperability*, which ensures the possibility of electronic exchange of materials between different LMS systems,
- *reusability*, which involves the use of educational materials in different courses for different students or whatever authoring tools are used to create them including LMS systems as well.,
- *manageability*, where we observe the system's ability to record relevant information about student and program content,
- *accessibility*, indicating the possibility that the author and students from any location can access the contents of e-learning and
- *durability* , which provides the functionality of the system in case of being upgraded and improved.

Creating standards is often a long-lasting process that takes place through the following four iterative steps: Research and development in order to find possible solutions to problems, development of specifications, testing and activation of pilot programs and accreditation by official bodies.

Developing standards in the field of e-learning to deal with many organizations, institutions and initiatives such as: AICC (Airlaine Industry CBT Committee), AIMS (IMS Global Learning Consortium), ADL (Advanced Distributed Learning), ALIC (Advanced Learning Infrastructure Consortium), ARIADNE (Alliance of Remote Instructional Authoring and Distribution Networks for Europe), CEN (Committee European de Normalisation, European Committee for Standardization), IEEE (Institute of Electrical and Electronic Engineers), ISO (International Standards Organization), GESTALT (Getting Educational Systems Talking Across Leading edge Technologies), PROMETEUS (PROmoting Multimedia access to Education and Training in European Society)...

At the initiative of the Department of Defense (The U.S. Department of Defense) and the Directorate of Science and Technology, White House (The White House Science and Technology Office) is an initiative created ADL (Advanced Distributed Learning), whose greatest contribution in the field of standardization is reflected in the development of SCORM reference model (Sharable Contents Object Reference Model-Reference model of tradable content objects). SCORM is a standard in the legal sense because it is not accredited by an official body that verifies the effectiveness of the applied set of specifications and

standards. It was drafted in collaboration with standardization bodies such as AICC, IMS and IEEE to integrate their specifications into one cohesive, usable, comprehensive model defining the key interrelationships between their standards.

The first version of the ADL's SCORM documentation was turned towards the content of courses that are conducted through the Web, and aimed to provide the following:

- the ability of LMS systems to initiate the content that is made by different manufacturers and tools to exchange data with the content,
- the ability of LMS systems from different vendors to launch the same content, feasible to exchange data with that content during its execution,
- the ability to more LMS products/environment feasible approaches to the common stock of content a
- the ability to transfer the entire course from one LMS to another system.

SCORM recommendations define meta data for the educational content; model of organization and packaging of educational content – the structure of the course (content packaging); communication mechanisms between learning content and LMS systems, which define data model that manages the LMS, the method of initiating and delivering content.

4. CONCLUSION

The central place in the structure of the educational content that is compliant with SCORM recommendation takes an interchangeable object content (SCO - Sharable Content Object). Its understanding is based on the concept of learning object that is an independent, discrete part of the educational content to practice the one and the only one educational goal. The interchangeable content object is the object of study that consists of one or more basic units of educational content, having the ability to locate the LMS API adapter. Based on SCORM specification, there is a determined hierarchy of educational components. At the lowest level there are: the basic unit of educational content that are presented in the form of text, images, audio or other types of data in digital format. Their combinations can create information objects that represent concepts, facts, principles, processes and procedures.

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MANAGEMENT OF MULTICHANNEL RELATIONSHIP BETWEEN RETAILERS AND CONSUMERS

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Abstract: *Multichannel relationship is built between consumers and retailers that use more than one channel to interact with the target market. Multichannel retailing is currently one of the most interesting areas in marketing channels. Multichannel approach to building customer relationships is of great importance in maintaining regular, loyal customers, as well as in achieving competitiveness and winning new consumers. The development of a multichannel relationship between retailers and consumers is a complex process, and when properly applied can dramatically increase the sale of products and service of retailers at the appropriate market segment. Combining marketing channels through multichannel approach enables better business performance.*

Keywords: *multichannel marketing, marketing channels, electronic commerce, retailer, consumer*

1. INTRODUCTION

The development of multichannel marketing gives consumers access to more marketing channels as a choice to buy products. Using one or more marketing channels, retailers provide consumers with more options and thus become more attractive to consumers and win new consumers. The exponential growth of electronic marketing channel gives retailers new opportunities to reach geographically distant consumers, 24 hours, seven days a week, reviewing the product before going to the retail store, etc.

In building a multichannel relationship between the retailer and the consumers, the following questions need answers:

- Which marketing channel should we use for the customer relationships development?
- How to coordinate and manage the implementation of sales in certain channel (pricing, inventory management, product distribution, etc.)?
- What is the impact of electronic marketing channels on purchasing products in the retail store?
- How to achieve an optimal mix of marketing channels in multichannel relationship with consumers?

Multichannel retailers face many problems in the implementation of selling the product because one marketing channel is a direct competitor to the other marketing channel. Therefore, one channel can exert a direct impact on increasing sales of another, while the relationship between marketing channel depends on the decisions of consumers in which channel will purchase the products.

2. INTERDEPENDENCE OF INDIVIDUAL CHANNELS IN DEVELOPMENT OF RELATIONSHIP BETWEEN RETAILERS AND CONSUMERS

The development of multichannel approach provides good consumer relationships, consumer loyalty, winning new consumers, which will have multiple effects on the income of retailer from sale. Thanks to this approach, the retailer has a view to customers' needs in the multichannel way, improving relationships with customers as a whole. Specifically, in one channel (e.g. e-commerce site) the consumer's need is identified, the consumer becomes familiar with the product, its characteristics, retail stores where the product can be bought, while still not fully prepared to buy in an electronic shop. Then, the decision to buy consumer makes

in the retail store, where he/she meets a physical product. However, following purchase of the same product, the consumer will likely do after receiving the catalog to home address for ordering the product from the same retailer.

The management of multichannel relationships with has to make a decision on the optimal channels, among the growing number of different marketing channels. To increase sales, achieve greater market share, increase sales income for retailers' profit, makes retailers to perform multichannel strategy. The ultimate goal is the synchronization of customers' information and interactions through its channels in order to comprehend better the needs of customers (Arakin, 2008, p. 193). The main characteristics of marketing channels are shown in Figure 1. The value added by sales determines characteristics of individual marketing channels, participated in the retailer's sales force and channel specific transaction costs. In building relationships with consumers, the retailer determines the optimal mix of channels.

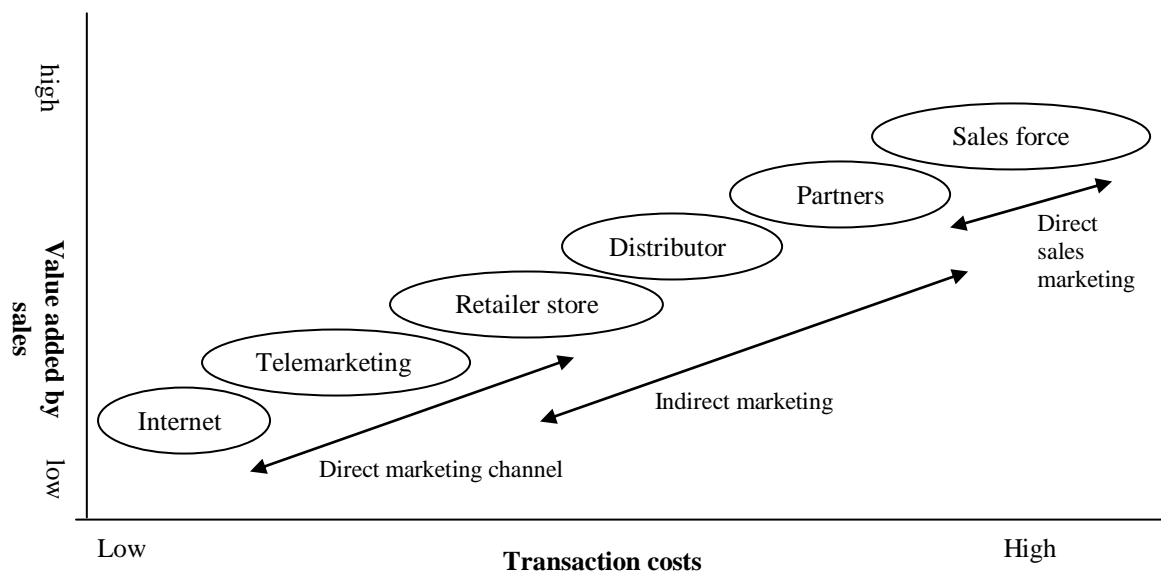


Figure 1: Characteristics of Marketing Channels (Lovreta, Koncar, Petkovic, 2011, p. 186)

If the retailer decides to sell in retail stores with the inclusion of one direct channel, for example, the option of electronic sales, which has low value-added sales, but low transaction costs for the retailer and the consumer, direct marketing channel will initially have an impact on increasing sales in the retail store. Direct marketing channel will be used to introduce products to consumers, compare prices, product choice and marketing channels. In case of the Republic of Serbia, 41.2% of households use the Internet, and more than half consumers, the 58.5%, use the Internet to be informed about the products of retailers and manufacturers (Upotreba informaciono-komunikacione tehnologije u Republici Srbiji 2011., p. 9).

What the impact of one marketing channel will be to increase sales in another channel, that is, how much sales and share of each channel depends on the level of implementation and development of the retailer's relationship with the consumer in a particular channel. The retailer can have multichannel consumer relationships at different levels of development. Interrelationship between the levels of development can be summarized as follows (Vanish, 2011, p.14):

- 1) 0 level - limited presence;
- 2) 1 level - reactive and experimental;
- 3) 2 level - defined and repeatable;
- 4) 3 level - controlled and measured;
- 5) 4 level - optimized and innovative.

Retailers with limited presence of multichannel relationships with customers have limited implementation of electronic commerce, mobile commerce and direct marketing. These new marketing channels are not considered as crucial for retailer's business and have no significant impact, nor are substantially used by consumers to purchase products, but they exist as a potential option to purchase the product. At this level,

multi-channel relationship between retailers and consumers is undeveloped, and the consumer dominantly purchases products at the retailer store.

At the first level, retailers react to the impact of environment, competition and consumers, i.e. external factors that pull use of technology in building relationships with the consumer. Therefore, the use of electronic commerce, mobile commerce and direct marketing is the result of the environmental impact, but without a precise plan of keeping the multichannel relationship between the retailer and the consumer, or the results of implementation of these relationships.

When multichannel relationships with customers become clearly defined and with repeating retailer uses them as essential for establishing an interactive relationship "1:1". Technology is changing the nature of the retailer-consumer interaction (Berman and Evans, 2010, p. 44). The potential of new marketing channel is visible in the further development and implementation of multichannel performance, and the acceptance by consumers.

Control and measurement of multichannel consumer relationship implies the existence of the retailer's integrated approach. The retailer, who has clearly defined goals to be achieved and results of multichannel relationships, devotes attention equally to each marketing channel by which he establishes relationships with the consumer. The application of multichannel marketing profile should contain information, which is provided by online and offline customers' experience (Koncar, 2011, p. 531). At this level, individual marketing channel does not represent a competition to another, but contributes to the achievement of synergy of channel goals.

The last level leads to the spread of individual channels, which can endanger the whole retail system. It is therefore necessary to make decisions about optimization of multi-channel consumer relationships, in order to achieve the efficiency of each channel. The new innovative approach in each of these channels needs to achieve efficiency in contact with the consumer.

In the multichannel management of relationship between the retailer and the consumer, the retailer must keep in mind that some consumers want to purchase electronic, and are willing to wait for products to reach them. On the other hand, a huge number of consumers want to dispose the product immediately when purchase it in retail store. For this segment of consumers, it is not acceptable to wait for product to be shipped, and they are satisfied with the level of interactions in the retail store. What is crucial for retailers is to provide to consumer a variety of convenient ways to buy a product, and, thereby, build good multichannel relationships with consumer.

3. THE IMPACT OF ELECTRONIC COMMERCE IN MANAGEMENT OF MULTICHANNEL RELATIONSHIP BETWEEN RETAILER AND CONSUMER

Electronic commerce represents the use of the Internet and Web to transact business. More formally, digitally enabled commercial transactions between and among organizations and individuals (Laudon and Traver, 2012, p. 49). The development of electronic commerce have the effect of changing the retailer's existing marketing channels, as well as the emergence of new retailers who sell only on the Web. The retailer, who introduces an electronic channel, must take into consideration the consistency of the existing system. Most multichannel retailers benefits theirs performance "clicks and bricks", and thus show the range of products on their websites. The famous multichannel organizations are Wal-Mart, Sears, JCPenney, Staples, OfficeMax, Costco, Macy's, Target and other brand-name merchants. Consumers have access to products from home and the ability to get information and buy products electronically, or do their shopping in a retail store. The multichannel consumer behavior shows that 22% of consumers like browsing products online and buy the same retail facility, a 21% compares prices of different online retailers (Berman and Evans, 2010, p. 175).

Electronic commerce has enabled access to retail customers without time and geographical constraints. In building a multichannel relationship with the consumer, electronic commerce provides information about the needs, identify new needs, collect relevant data on each individual consumer, and all thanks to an interactive relationship, "one on one." Interactivity is a technology that allows for two-way communication between merchant and consumer (Laudon and Traver, 2012, p.54). The dynamics of interactivity will have a profound impact on the concept of the market management, and thereby the relations of retailers and consumers. Interactivity allows the definition of a completely individual and variable assortment, depending on the

preferences of consumers. Consumers are, basically, multichannel beings with many demands, whereby, a successful business concept should fully cover all of the multichannel orientation.

Because of the complexity of multichannel approach, the retailer performance in a "click and brick" must ensure the availability of products in the electronic channel and retail store, and price policy consistency, automatic recording of inventory to meet customer needs in each channel. Two approaches of implementation of multichannel strategy of building relationships between retailers and consumers are "top-down" and "bottom-up" (Vaish, 2011, p.14). The "top-down" concept takes into account the views of all interest groups and dimensions: mobile channels, electronic channels, and various aspects of the electronic channels such as content, experience, business intelligence, etc. In the "bottom-up" approach, we take into account the data, which are available within the organization structure and its possibility of implementing multichannel strategy in dealing with customers.

Multichannel strategy becomes dominant in the world's leading retailers, because of its large extent influence on the improvement of business performance. The experience of developed-market countries shows that retailers who are implementing and utilizes multichannel strategies in marketing channels, have better business performance than those who do business with only one channel.

Today, electronic commerce is becoming a key factor in the expansion of multichannel strategy of retail development in Serbia. The leading indicators of future development of electronic commerce in the Republic of Serbia are the degree of economic development, the Internet infrastructure, as well as the educational level of the population. Products that consumers most often buy electronically in Serbia are: books, newspapers and magazines (23.9%), clothing and sporting goods (19.8%), household products (19%), electrical appliances (10.3%), drugs (8.7%), computer software (8.3%), hardware components (7.1%), housing (5.2%), other travel arrangements (5.2%), games and equipment for the game (4.2%) and other (Upotreba informaciono-komunikacione tehnologije u Republici Srbiji 2010, 2012).

The above data indicate that electronic commerce in the Republic of Serbia becomes a key factor in the development of multichannel retailers and consumers in marketing channels. Interactivity has a profound impact on multichannel marketing on the global market. Personalization and customization of e-services to consumers in the interconnection of multichannel retailers, depends on the possibilities of the Internet and electronic commerce technology. The future expansion of e-services will depend on the capabilities of e-commerce to transform their services in a personalized service to meet the needs of individual consumers. Previous experience of market-developed countries indicates that customers are multichannel marketing users through interactivity that provide an individual offer for each customer. The ultimate goal of developing the profile of a multichannel marketing is the synchronization of information about consumers and their interaction, with the aim of better meeting the demands and needs of consumers.

4. CONCLUSION

Multichannel occurs when retailers in their market performance use more than one type of channel in order to win the target market segments. Multichannel strategy becomes dominant in the business world's leading retailers because it affects business performance improvement compared to single channel marketing. The implementation of multichannel strategies creates a synergy that should create an adequate supply of multichannel consumers. The growing importance of retailing in marketing channels has focused on the application of multichannel strategies. In Serbia, e-commerce is increasingly becoming a factor in the development of multichannel strategies. The importance of electronic commerce in marketing channels will increase in the future in Serbia, and, above all, thanks to the multichannel approach.

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CLOUD COMPUTING IN E-GOVERNMENT MODEL APPLICATION

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Abstract: *A new trend in the development of modern information and communication technology is the cloud computing, a model that is built on the basis of the convergence of several IT concepts: virtualization, distributed software applications, data centers, Web2, grid computing ... The work includes a cloud computing model with all its characteristics and its possible application in e-governance in order to provide efficient, economical, and intelligent services to end users.*

Keywords: *cloud computing, model, e-government, information and telecommunication technologies, architecture*

1. INTRODUCTION

Today, in order to meet the growing demands of our clients, the state administration business is increasingly based on modern information and communication technologies, that is to say Internet technologies. By the application of modern information and communication technology-ICT models, in e-government, it becomes a user-focused administration that enables better, faster and more efficient sophisticated public services to citizens (in rural and urban areas), business systems, public institutions... E-government with its basic models: Government to Government G2G, Government to Enterprise-G2E, n to Business G2B and Government-to-Consumer G2C, becomes a reality in achieving efficient and effective operation of the entire state administration. Public administrations in developed countries have begun to increasingly translate their e-government models into cloud computing models, which are the new innovative information technology that has a trend of exponential growth. Using the cloud computing model increases the productivity of e-government, reduces the costs by reducing information resources needed to run the standard e-government services, increases flexibility, scalability, interoperability, accessibility...

2. E-GOVERNMENT

Throughout the literature, there are many definitions of what constitutes the concept of electronic government. For the needs of this work, we will mention the following three:

"Electronic government refers to government's use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and service to citizens, business partners, employees, other agencies, and government entities". [1]

World Bank definition: "E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.

Definition of the Working Group on E-government in the Developing World: E-government is the use of information and communication technologies (ICTs) to promote more efficient and effective government, facilitate more accessible government services, allow greater public access to information, and make government more accountable to citizens. E-government might involve delivering services via the Internet, telephone, community centers (self-service or facilitated by others), wireless devices or other communications systems.

E-government implementation models

There are four basic e-Government models, based on Internet technologies that need to provide access to services and information 24 hours a day, seven days a week to citizens, business systems and employees in public administration:

- *Government to Government-G2G*, Public Administration Service, based on Internet technology that enables efficient and effective conduct of specific activities (information exchange, reporting, regional planning, transfer of funds, database integration, knowledge base ...) between various government organizations and agencies at all levels.
- *Government to Enterprise-G2E*, a service that enables employees in public administration through the intranet to perform tasks (document management, executive info systems, enterprise resource planning ...) in a functional, efficient, reliable and high quality manner.
- *Government to Business-G2B*, public service administration, which may include two-way interactions and transactions: government-to-business (G2B) and business-to-government (B2G). In these models, the communication or execution of certain operations (procurement, supplies, proposals and bids, sales data, rules and regulations ...) is done using the Internet and extranets.
- *Government to Consumer-G2C*, government provides numerous services to their citizens: tax payments, paying fines & tickets, voter information, birth & death certificates, reservations classes & facilities, complaint tracking, public information...

2.1. E-government architecture

The e-government architecture defines the standards, infrastructure components, applications, technologies, business model and guidelines for electronic commerce among and between organisations that facilitates the interaction of the government and promotes group productivity.

Figure 1 shows the architecture framework of e-government which is divided into four layers: access layer, e-government layer, e-business layer, and infrastructure layer.

- *Access layer*, a layer that allows end users to access various information services and e-government. They consist of online and offline channels or routes of distribution through which products, services and information are used, accessed and communicated by multiple technologies (web sites, mobile phone, digital TV...).
- *E-government layer*, an integrated e-government portal, used for the electronic interaction between: government and citizens, government and business, government and its employees, and government and government.
- *E-business layer*, this layer is focused on using ICT applications and tools to harness a networks of trust, knowledge sharing and information processing that takes place both within and between organizations [10]. Practically, it integrates front-end e-government layer applications, such as online catalogues and transaction interfaces in the government portal with back-end activities such as existing databases and data warehouses.
- *Infrastructure layer*, a layer that should provide a unique, effective and reliable access to desired information and e-government services (e-portal) via the Intranet to all users from its: computer systems, telephones, cell phones, digital TV, public information points ...

The logical connection of each layer will facilitate the exchange of data and services between and within public sector organisations, as well as support the consistency of government data and transactions from and to users.

Most countries in the world, whether they are developed or developing, allocate significant funds for the acquisition of modern IT infrastructure to implement in the e-governance model, in order to improve providing information and services to citizens, business systems and employees ... The construction of modern e-government avoids traditional service delivery and operational processes become more efficient and effective.

In the further text, the United Nations E-Government Development Survey 2012 will be briefly presented and commented, more specifically: regional averages in e-government development, world e-government development leaders 2012 and emerging leaders in e-government development. Table 1 and Figure 2 (graph) show regional averages in e-government development.

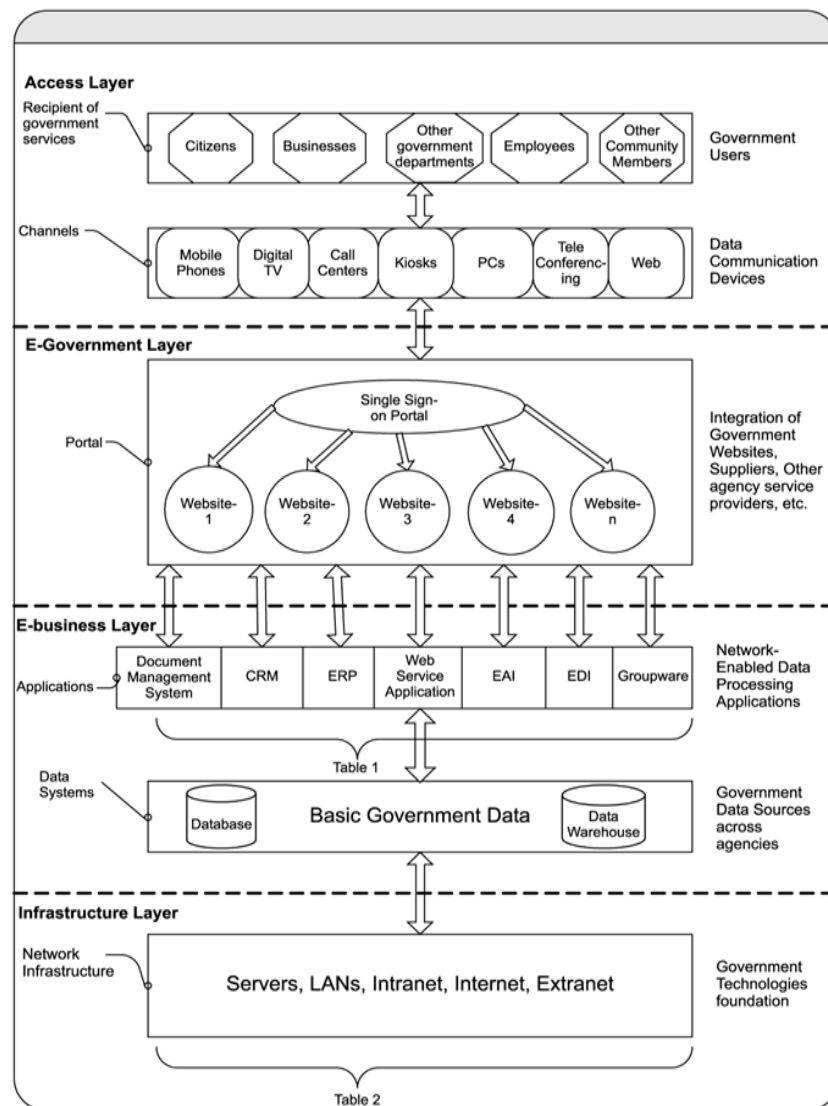


Figure 1: Framework of e-government architecture [4]

Table 2: Regional averages in e-government development

Rank	Continent	E-government development index-EGDI*
1.	Africa	0.2780
2.	Americas	0.5403
3.	Asia	0.4992
4.	Europe	0.7188
5.	Oceania	0.4240
World average		0.4882

* E-Government Development Index is a composite index comprising the Web measure index, the Telecommunication Infrastructure index and the Human Capital index.

In Table 1 and Figure 2 we can see that Europe has the biggest e-government development index 0.7188, America is second 0.5403, third place is taken by Asia with 0.4992, Oceania is in the fourth place with 0.4240 and the last one is Africa with 0.2780. E-government average development index in the world is 0.4882.

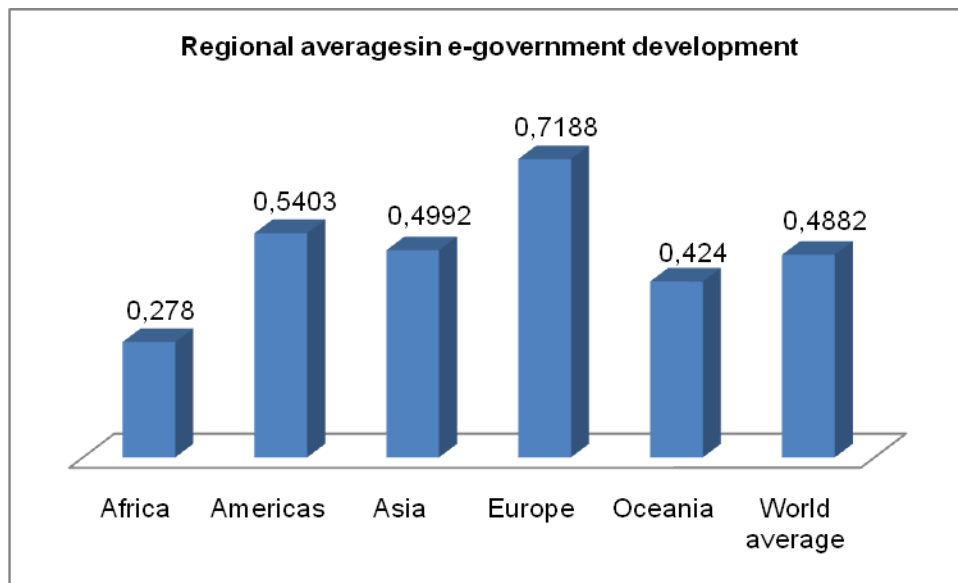


Figure 2: Regional averages in e-government development

The following table and figure (graph) show ten developed countries in the world that represent leaders in e-government development.

Table 2: World e-government development leaders 2012

Rank	Country	E-government development index (EGDI)
1.	Republic of Korea	0.9283
2.	Netherlands	0.9125
3.	United Kingdom	0.8960
4.	Denmark	0.8889
5.	United States	0.8687
6.	France	0.8635
7.	Sweden	0.8599
8.	Norway	0.8593
9.	Finland	0.8505
10.	Singapore	0.8474

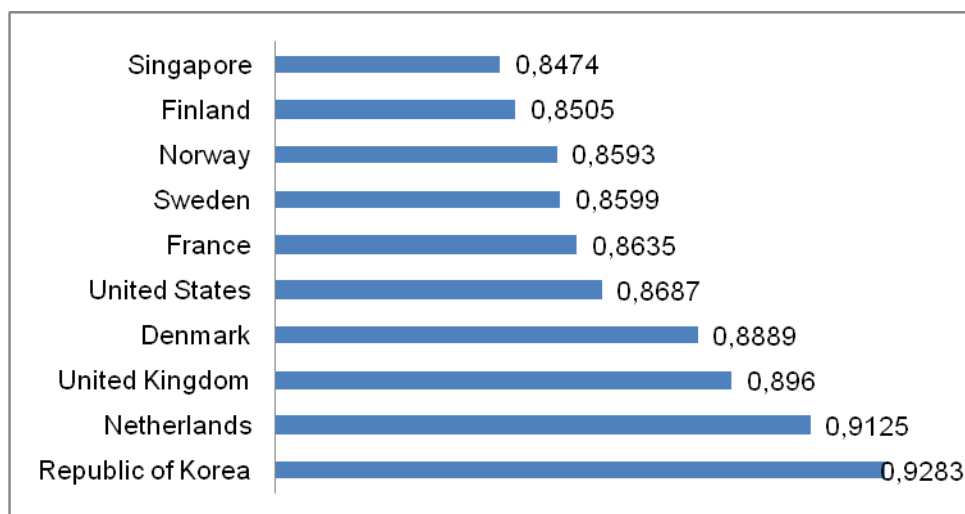


Figure 3: World e-government development leaders 2012.

In Table 2 and Figure 3 we can see that the e-government development leader is the Republic of Korea with 0.9283 e-government development index, Netherlands is second with 0.9125 e-government development index, United Kingdom is in the third place with 0.8960 e-government development index, fourth place is taken by Denmark with 0.8889 e-government development index, United States occupy fifth place with 0.8687 e-government development index followed by: France 0.8635, Sweden 0.8599, Norway 0.8593, Finland 0.8505 and Singapore 0.8474 e-government development index.

Emerging leaders in e-government development are given in Table 3 and Figure 4 (graph).

Table 3: World e-government development leaders 2012

Rank	Country	E-government development index (EGDI)
1.	Austria	0.7840
2.	Iceland	0.7835
3.	Spain	0.7770
4.	Belgium	0.7718
5.	Slovenia	0.7492
6.	Monaco	0.7468
7.	Russian Federation	0.7345
8.	United Arab Emirates	0.7344
9.	Lithuania	0.7333
10.	Croatia	0.7328

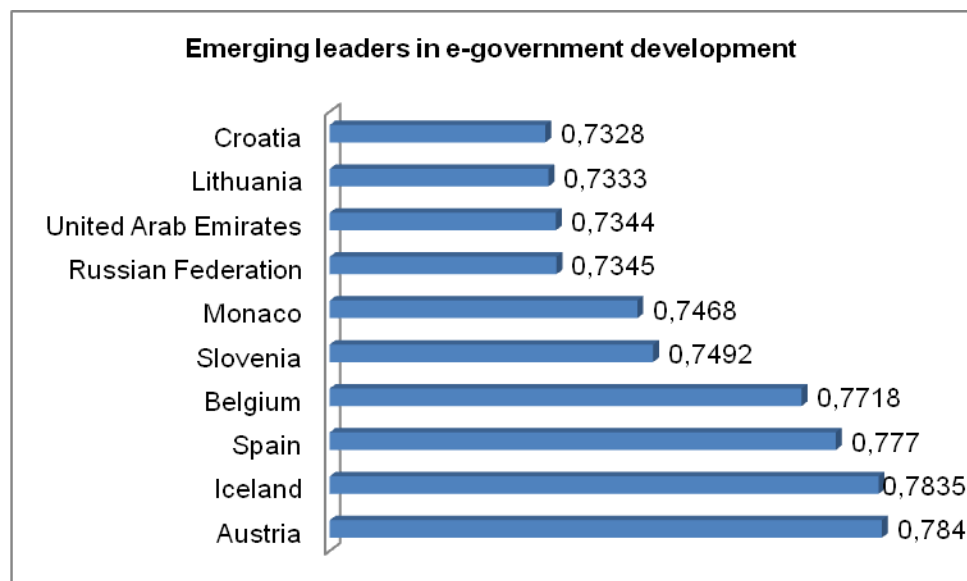


Figure 4: Emerging leaders in e-government development

Among the emerging countries, Austria is the first with 0.7840 e-government development index, followed by: Iceland 0.7835, Spain 0.7770, Belgium 0.7718, Slovenia 0.7492, Monaco 0.7468, Russian Federation 0.7345, United Arab Emirates, 0.7344, Lithuania 0.7333 and Croatia 0.7328. Based on the analysis of the presented results we can conclude that Europe is the world leader in developing e-government according to United Nations E-Government Development Survey 2012.

3. CLOUD COMPUTING

Cloud Computing is created on the basis of the convergence of several concepts of modern information technologies (virtualization, distributed software applications, data centers, Grid computing, standardization, Web2 ...) in order to increase efficiency and reduce overall operating costs. Throughout the literature there are many commonly accepted definitions of what constitutes the concept of cloud computing and for this occasion we cite the definition of the U.S. National Institute of Standards and Technology-NIST "Cloud computing using a computer model that allows the network access if necessary, to shared set of flexible

computing resources (networks, servers, data storage, applications and services) that can be provided quickly and release management with minimum effort and interaction with the provider. It describes the cloud computing model through three service models: Software as a Service-SaaS, Platform as a Service PaaS and Infrastructure-as-Service IaaS, four models of application: private cloud, cloud community, public cloud and hybrid cloud and the five basic features: self-service to request, the broad band network access, resource pooling, rapid elasticity and measured service. [7]

3.1. Architecture, service models and the application of cloud models

The architecture of the cloud

For successful implementation of new business models based on cloud computing are needed and new technological platform for the development and execution of business and software solutions. Large systems in the domain of IT: Google, Microsoft, IBM, Cisco, HP, Dell, Oracle, VMware... developed a scalable and flexible architecture, enabling successful assignment and delivery of information resources and services to consumer demand. Figure 2 shows the models (NIST Cloud Computing Reference Architecture and IBM Cloud Computing Architecture CC-RA), an open, modular and layered architecture of cloud computing with the basic elements of structure: the consumer cloud, a cloud provider, carrier cloud, cloud and cloud auditor broker (NIST) and by cloud services, cloud service providers and the development of cloud services (IBM). [4]

Figure 2 shows the models Cloud Computing Reference Architecture - NIST, an open, modular and layered architecture of cloud computing with the basic elements of structure: the consumer cloud, a cloud provider, carrier cloud, cloud and cloud auditor broker.

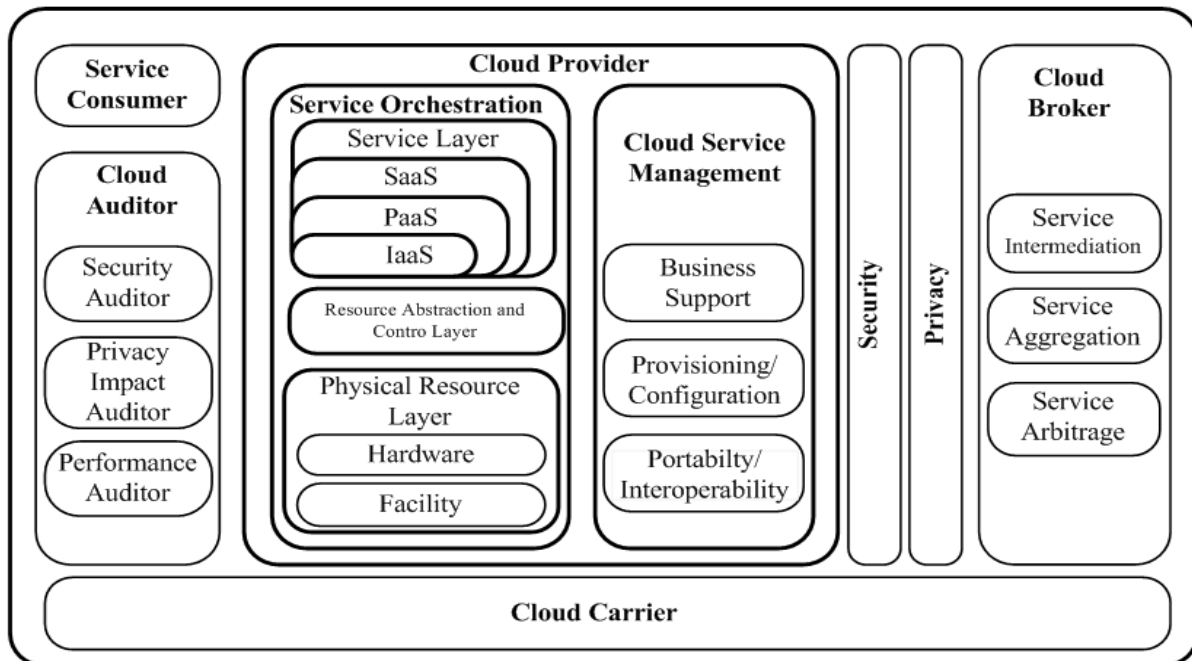


Figure 5: Models of cloud computing architecture

NIST model in the cloud computing architecture is characterized by the following characteristics:

- *Cloud consumer* or user, the system can be a business or individual users who use the services or the services of cloud providers. Business users and related service providers are regulated by SLA (Service Level Agreement).
- *Cloud provider* may be an individual person, business entity or system that is responsible for providing end-consumers.
- *Carrier cloud* or transmission cloud is the agent in charge to ensure successful connection and transfer of cloud between cloud services providers and consumers.
- *Cloud broker*, the person who manages the use of performance and delivery of cloud services, negotiate and establish business relationships between providers and consumers of cloud services. It should be noted that in other representative cloud computing architecture (VMware vCloud Architecture, IBM RA CC, Windows Azure, etc.) there is no cloud broker.

- *Cloud audit*, the party may conduct an independent assessment of: the quality of cloud services, quality of performance and quality of the cloud safety.

Models of cloud services

Service cloud computing services include three basic models:

- Software as a Service-SaaS;
- Platform-as-a-Service-PaaS and
- Infrastructure-as-a-Service-IaaS.
- **Software as a Service-SaaS**, represents software applications in the cloud that were implemented as a hosted service provider to whom users access the Internet with its various computer systems to obtain and use certain software applications. User depending on the cloud provider has available a large number of software applications from various manufacturers for electronic mail, sales, finance, accounting, human resources, document management, social networking, content management, office management systems, customer relationship management - CRM, systems for enterprise resource planning – ERP...
- **Platform as a Service PaaS**, the user provides the ability to use tools and resources on a cloud provider platform and with support by its developers, system administrators and developers elect, appoint, develop, test and manage their own software packages and configuration of the operating environment.
- **Infrastructure as a Service IaaS**, the user (system administrators, developers) to provide access to the necessary basic computer resources: virtual computer systems, data centers, storage, networks, etc. to be used with your choice of operating systems and software applications in the process treatment. Infrastructure as a service to respond to trends of growth in the cloud computing model must be distinguished: scalability, security and reliability.

In cloud computing, there are four models:

- Private cloud;
- Public cloud;
- Hybrid cloud and
- Community cloud.
- **The private cloud**, a model application of computing in the cloud within a business system where IT professionals develop their own integrated and scalable cloud infrastructure (server consolidation, virtualization, data centers, standardization, etc.) that can be placed inside or outside the business system, business system. Access to and use of infrastructure clouds have employed in the business system.
- **The public cloud**, as opposed to a private cloud model, the computing infrastructure of the public cloud model is available and open to the public through the Internet business systems and individual users.
- **The hybrid cloud** model is a synthesis of private, public and common clouds, which remain unique entities interconnected by standardized or proprietary technologies that enable transmission of data or applications.
- **The community cloud**, a model where the cloud infrastructure used to control several operating systems that have common interests in the form of secrecy, security, integration services, etc.

Figure 6. shows the application of the cloud computing model in e-government.

Wyld D. and Maurin R. offer Ten Predictions for the Cloud-Enabled Future of Government:

1. Cloud computing will take off at the local and state levels through mostly rogue, “under the radar” initiatives over the next few years.
2. At the federal level, there will be a coordinated move to cloud computing, but with inevitable tension between agencies.
3. There will be two to three incidents a year worldwide with potentially massive security breaches, involving much media attention and attendant calls for greater regulation and oversight of cloud providers.
4. There will be much cooperation between private sector firms (seeking to be cloud service providers) and government agencies, with far more data and applications than expected today transitioning to the cloud over the next decade.

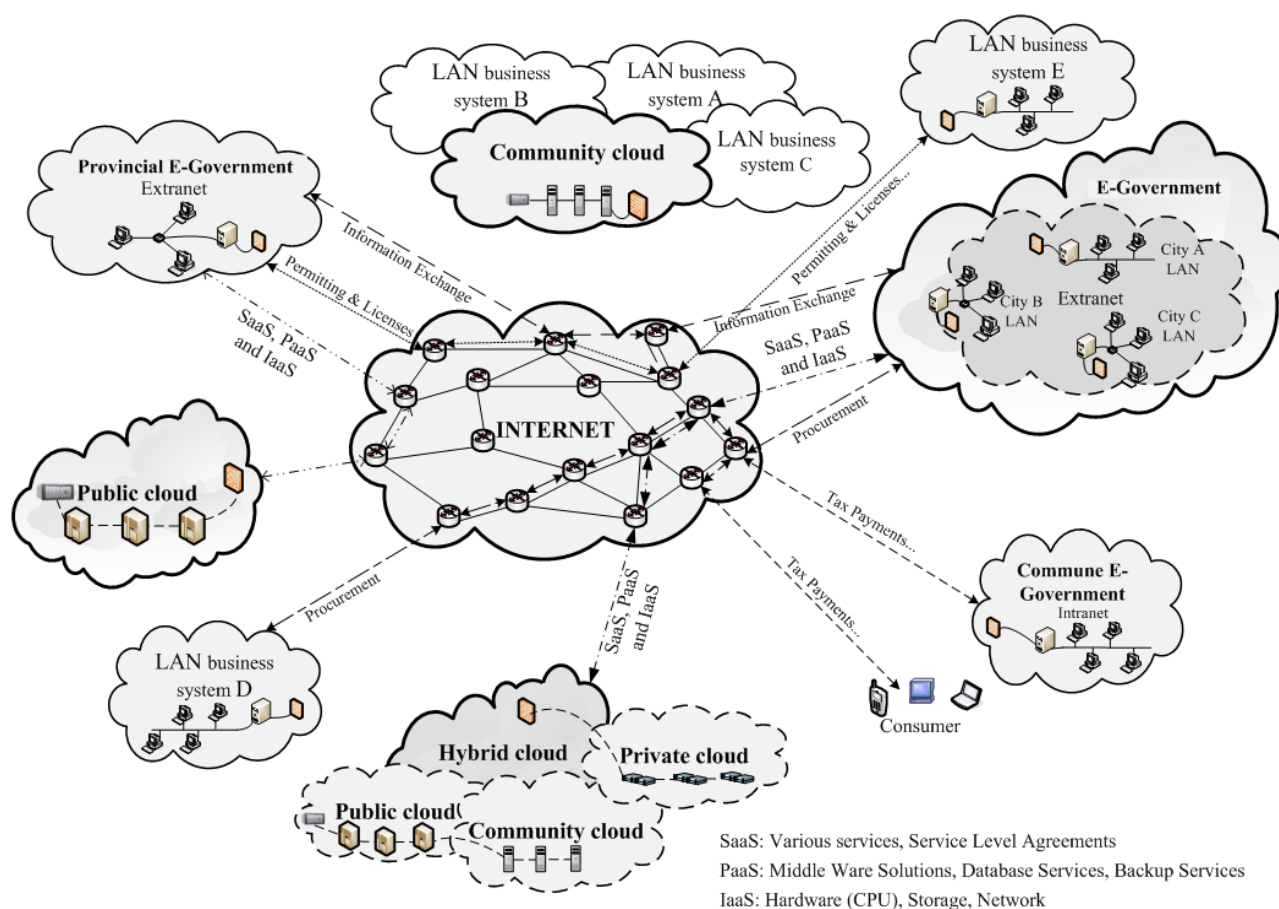


Figure 6: The application of the cloud computing model in e-government

5. Budget pressures will continue to drive more and more government IT to hybrid and even public clouds, as more and more former internal IT functions-and assets (hardware, software, data, and support personnel)—are outsourced, with billions in procurement dollars shifting to the cloud.
6. There will be greater use of cloud computing, in everything from health care and education to the military and national security.
7. Free cloud offerings—even beyond the e-mail, storage, and application functions found today—will be a significant part of IT portfolios in most governmental agencies.
8. The spillover effect of government use of cloud computing will include faster agreements among major cloud providers on standards and cloud interoperability protocols.
9. There will be significant legal action arising out of governmental uses of cloud computing, and legislation addressing both IT and business needs and consumer fears and protections will be a major focus over the next decade.
10. The “democratization of technology” brought about by cloud computing will impact the quality of our individual online lives, the growth of businesses, and the pace of innovation, benefiting us all.

4. CONCLUSION

In recent years the world trend in developed and developing countries is the abandonment of traditional ways of providing information and services by government institutions and the transition to e-government models that are based on modern ICT. The next step that should make e-government more efficient and more effective is the application of the cloud computing model. Cloud computing models represent a new phase in the dynamic development of IT infrastructure and services. They bring a fundamental shift and provide better delivery methods and efficient use of computing resources compared to conventional methods that were applied in the business. Using the cloud computing model in e- government, creates new values through: lower total operating costs, faster time deployment, increased efficiency, greater flexibility, dynamic scalability, higher level of security, rapid development of innovative services...

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THE GROWTH OF SOFTWARE INDUSTRY IN THE WORLD WITH SPECIAL FOCUS ON BOSNIA AND HERZEGOVINA

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Abstract: *This paper presents the essential features of the software industry, its growth, elaborates on the characteristics of a company that manufactures software, gives an overview of possibilities and indicates the perspective of the software industry at the macro and micro level which is the main objective of this paper. This paper also elaborates on the technological, as well as some important economic factors important for the software industry, especially for countries in transition. Finally, it gives an overview of the software industry in Bosnia and Herzegovina and gives some conclusions.*

Keywords: *software industry, the growth, the strategies of software industry's development, the perspective of the software industry*

1. INTRODUCTION

The increasing demand for software for various purposes has caused the appearance, growth and development of software industry. Since its main task the production of software, it inevitably has a major responsibility for its success or failure. Each industry has its own characteristics and dimensions. Same is with the software industry. The dimensions of this industry and its degree of development vary from country to country. Consequently, some states are more advanced in developing software and software engineering than others. Since that, we can make the difference between the classification of some countries in this segment. Software industry is characterized by substantially constant growth and development both on local and global levels.

2. SIZE CHARACTERISTICS OF THE SOFTWARE DEVELOPMENT

The size of firms for software development is characterized by two important features: a) the number of employees, and b) the size of the capital. On this basis, we can conclude that a firm or company which has higher capital and a number of qualified employees has increased opportunities for better and higher quality software development, and therefore the possibility of higher earnings and achieve higher profits. However, sometimes even a firm with a fewer employees can make a big profit.

In the world today there are firms of different sizes, ranging from those whose number of employees can be counted "on the fingers of one hand" to those that employ tens of thousands of workers. Large firms and companies achieve a large gain, which contributes to better and faster growth and development of certain countries.

Software produced by certain company can be used not only at local but also at global level. On this basis, the company opened the doors to a large market and thus big profits.

This leads to greater needs for further development and improvement of the software so that he must be always a step or two ahead of the competition. To achieve this, we need to engage a larger number of experts of different profiles. Positive effects on the economy of certain country are more than obvious, hence the need to stimulate the firms involved in software engineering.

The importance of this can be illustrated by numerous examples and one of them is the Oracle company, established in 1977 in the United States. It now employs 104.569 workers. By comparison, in October 2011 B&H has registered 693.964 employees. Oracle is present in over 145 countries worldwide, its net earnings

in 2007 was \$4.2 billion order in 2011 reached a figure of 8.5 billion dollars.[3] By contrast the House of Peoples of the Federation of B&H (FB&H) has adopted a budget for 2011 in the amount of 1.699 billion.[4]

3. DIFFERENTIATION OF SOME STATES IN THE ADVANCEMENT IN SOFTWARE DEVELOPMENT AND SOFTWARE ENGINEERING

Countries are not in the same degree of commercial, economic, technological, cultural and other advances, therefore, among them some differences occur. The same is in the development of software industry. Some countries are world leaders in production of the major software providers and exporters, while other countries belatedly joined the race.

Some states have dropped out of the race due to certain internal or external factors, as is the case with the former Yugoslavia, which is due to internal conflicts and splits, and as such ceased to exist. Some states do not realize the importance of the software industry, so they are not paying attention or bring legal framework that would encourage the development of software engineering, and therefore the software industry. The constellation of the above, the state of the world would be, in terms of software engineering development, production and export of software, could classify into several groups or categories:

- first category consists of countries: U.S., EU, Canada, Australia, Japan, India, Israel, Ireland,
- second category consists of only two states that are in a transitional phase, namely China and Russia,
- third category consists of countries such as Brazil, Costa Rica, the Philippines, Malaysia, Korea, Pakistan, Mexico, Poland and Romanian who recently have made significant progress in this field,
- fourth category consists of countries such as Cuba, Jordan, UAE, Egypt, Iran, Bangladesh, Indonesia and Vietnam that have only begun to engage in this important race.

Tables would look like this:

Classification of countries in terms of progress in the development of software engineering and software sales	
1. category	U.S., EU, Canada, Australia, Japan, India, Israel, Ireland
2. category	China and Russia
3. category	Brazil, Costa Rica, the Philippines, Malaysia, Korea, Pakistan, Mexico, Poland and Romania
4. category	Cuba, Jordan, UAE, Egypt, Iran, Bangladesh, Indonesia and Vietnam

Table 1: Classification of countries to progress in the development of software industry and software engineering

The question is which of these categories include B&H? Unfortunately, neither one of these. If you just compare B&H with some of the countries from the fourth category such as Egypt, it is clear that B&H does not fall into any of these categories.

Ministry of Communications and Information Technology of the Arab Republic of Egypt was established in December 1999 and, in its plans for the next five years, had a goal to reach the Egyptian software exports worth 500 million dollars. That failed, but by 2006 profit worth 200 million dollars.[1] B&H does not have any similar plan or development strategy on this issue which can be clearly seen by visiting the official government websites. What remains B&H is to use the experience of advanced countries in this field in order to move with progress and technological revolution that may have positive economic consequences for its entire development.

4. GROWTH OF SOFTWARE INDUSTRY

The software industry is a branch of computer industry. In the U.S., it occupies third place, immediately after the automobile and electronic industries. Otherwise, the U.S. leading this industry in relation to other countries. In 2008, the U.S. took a significant share of the packaged software market. Their share was \$136.6 billion, or 45.9% of the world market. Therefore the U.S. is the largest single market of packaged

software in the world. Nevertheless more than half the world market packaged software is located outside the United States.

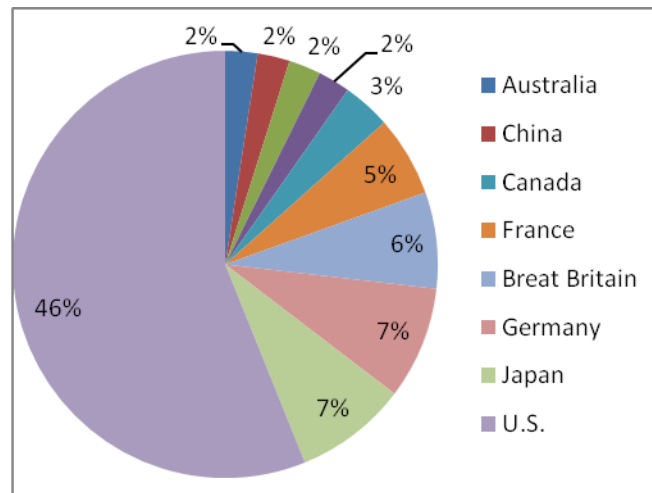


Figure 1: Profits shares of some countries in the world market of packaged software in 2008

In 2008, the PC software market has taken 30% market share, or \$ 88 billion of the total packaged software market worth 297 billion dollars.

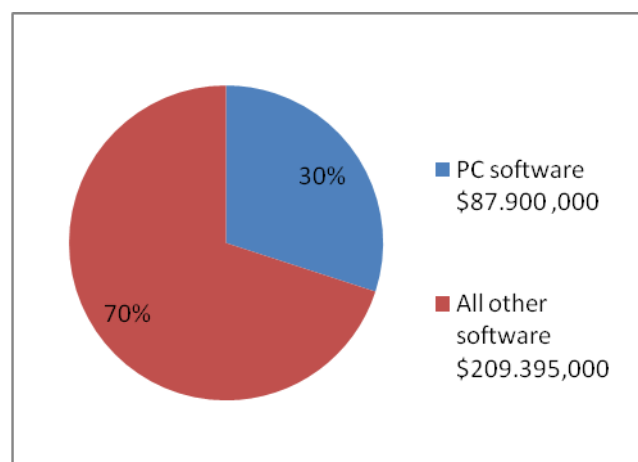


Figure 2: The total market value of packaged software in 2008, in millions of dollars

It is interesting that the extraordinary progress in computer sales was recorded in Brazil, Russia, India and China (abbr. BRIC countries - Brazil, Russia, India and China). In the period between 2009 to 2012 they recorded growth of 43%, which amounts to more than 66 billion dollars. In the same period in U.S., Central, Eastern and Western Europe and Japan together recorded a growth of 2%. At the same time sales of packaged software in the BRIC countries experienced growth of 44% which is close to \$22 billion. Also, at the same time the United States, Central, Eastern and Western Europe and Japan together have experienced an increase of only 15%.

5. SOFTWARE INDUSTRY IN B&H

The software industry in B&H has not developed and doesn't have a significant economic impact on the development of national economy. At the last time, Bosnia and Herzegovina has made some progress in developing the local software industry. B&H has recognized a number of jobs related to IT and software industry, one of which is a software engineer. However, it is indicative that B&H has no national strategy for developing the software industry. Nevertheless, in B&H there are companies that are engaged in developing application and system software, designing, implementing and maintaining information systems, such as: IT Systems - Sarajevo, UNITRADE SOFT, Ocean, Djikic Ltd. (...).

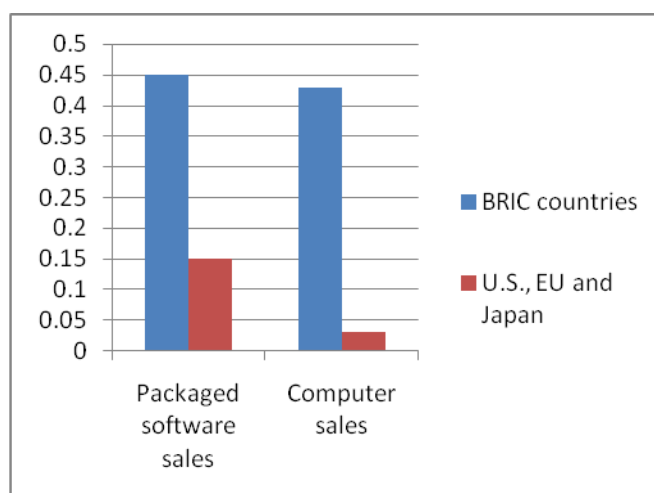


Figure 3: Sales growth of computers and packaged software in the world

According to some reports in the B&H in the end of 2002, there were about 200 companies from the IT sector, and their numbers through 2005 years has grown at 2587.

Furthermore, in these reports, states that 70% of companies in this sector with mostly or completely domestic capital, and only 30% of companies have different missions and representatives of foreign firms. It is stated that more than 20% of companies in the IT sector in BiH achieve an annual turnover in excess of 5 million.

Also the report states that at the end of 2005 in B&H more companies from the IT sector engaged in software sales (35%) than selling computers (30%), and that, according to a survey conducted by UNDP, as much as 62% of these companies have in their offer domestic software production, and on average have the commercial offer more than five different software solutions. However, this report includes not only software company engaged in developing application and system software, but it includes all the IT companies engaged in the sale of computers, or repair (...).

Unfortunately there are not many official statistics on the domestic software industry, as well as data on the number of employees in these firms, the profit generated, etc. Notwithstanding the absence of this information can come to the conclusion that the profit realized by the company at the state level is not significant, based on the following:

- due to the small number of software companies,
- they are mostly small-scale firms that employ fewer workers (Djikić company employs 13 permanent employees and has a network of collaborators).

However, there are some external analyzes, research and forecasts for Bosnian market of information technology and software industry. Thus, according to a UNDP report, the total market value of information technology in B&H in 2007 amounted to 187.38 million, of which 10.3% share of the software or about 19.3 million dollars.

With the numerous problems encountered, domestic software industry suffers huge damage that piracy causes it, which, although prohibited by law, continue to spread, so that these firms, in addition to the small Bosnian-Herzegovinian market, have even lower profits because of pirated sales of their works.

In addition, the domestic software industry is faced with the problem of competitiveness. The big international software companies offering their products localized, which makes local software producers that, as stated in the UNDP report, enter the phase of software development leaving the phase of analysis and design phase, and after the development phase of software, testing is not performed. This mode is referred to the company managers justify their desire to offer you a cheaper product as possible. Most software companies in B&H, especially smaller ones, offers to the market inexpensive software that does not meet all user requirements, which results in frequent interventions in the software, even in the stage of implementation. This mode makes the ICT industry in the increasingly uncompetitive both within B&H and in markets outside B&H.

In 2010, the IT market in Bosnia and Herzegovina reached a value of 166.99 million U.S. dollars, which represents some progress compared to 2007. Whatever, IT market in B&H grew by 5% compared to 2009. Delivery of IT services and software are recorded growth of 5.6%, while the overall hardware fell by 2.1%.

6. KEY ASSUMPTIONS FOR DEVELOPMENT DOMESTIC SOFTWARE INDUSTRY

For the development of any industry in any country requires particular preconditions to be fulfilled. Otherwise, all efforts on the development of these industries is futile. B&H is trying to develop many kind of industries. As in Bosnia began to develop the software industry needs to lead the care of her and her development. Accordingly, it is necessary to implement the main preconditions for the development of domestic industry which could be summarized as follows:

- 1) establish a separate ministry for information technology and telecommunications,
- 2) developing a strategy for the development of domestic software industry,
- 3) adoption of legal regulations that will regulate this area,
- 4) provide support to local government software industry both financial and otherwise,
- 5) ensure that copyright is not only legal on paper, but also through the practical implementation of that law,
- 6) educate experts in different areas of information technology,
- 7) establishment of technology parks,
- 8) organization of scientific seminars on software engineering and software industry under the auspices of the state,
- 9) provide a positive climate for the development of domestic software industry and attract foreign investors,
- 10) favoring the domestic IT industry in the public procurement process.

This would be some of the preconditions for the development of software engineering and domestic software industry. In addition to these there are other assumptions and preconditions to be fulfilled, however, the above-mentioned preconditions are the basis and only when they, or most of them are met, a software engineering in B&H, as well as local software industry will be able to run faster, better and better develop and find their place in the local and global markets.

7. CONCLUSION

If one compares the data of the profits of software in the world market for some years in the period 1997-2008, he can see its steady growth.

Table 2: Total profits of packet software in the world market

Year	Total profits of packet software in the world market
1997	122 billion U.S. dollars
1998	135 billion U.S. dollars
2002	220 billion U.S. dollars
2008	297 billion U.S. dollars

In just eleven years, the world's software industry profits more than doubled, even when adjusted to a billion dollars, then these data clearly show that the software industry in the world has very good perspective. Even in a period of world crisis (recession), some countries experience growth and increased profits from year to year.

Development of software companies and software industries may find fertile ground in any place in the world if they fulfill at least the most important preconditions for the development of software industry and reduce risks in its investments.

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ARCHITECTURE OF TSM SOLUTIONS IN SYSTEMS BASED ON NFC TECHNOLOGY

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Abstract: *This paper gives insight into the architecture of NFC service life cycle management solutions - one of the key components of the NFC ecosystems. NFC enabled phones equipped with secure elements, combined with NFC enabled infrastructure – readers and POS terminals are surely prerequisites, but are insufficient for the use of NFC technology in its full potential. There has to be a secure way to download, install, personalise, upgrade and delete an application on a secure element, without the need to go to the service provider's or mobile operators' stores. Solutions for the application life cycle management, the so called "TSM solutions", provide means for managing the NFC service life cycle "over the air" (OTA) by using the mobile operators' wireless infrastructure. This work presents the basic concepts that "TSM solutions" are built upon and emphasizes its role and importance in NFC ecosystem. The paper is intended for "TSM solution" providers, mobile operators, financial institutions, service providers, as well as other actors participating in NFC ecosystem.*

Keywords: *Near Field Communication (NFC), TSM solutions, OTA application life cycle management*

1. INTRODUCTION

Near Field Communication (NFC) is wireless technology, allowing very short-distanced data transfer (up to 4cm), with speed rate of 424Kb/sec. Operating on 13.56 MHz, NFC is based on the same principle as RFID technology - electromagnetic induction. It was initially developed by Sony and Philips, afterwards it has been standardized by ISO (ISO/IEC 18092, ISO/IEC 21481) and ECMA (ECMA 340, ECMA 352). NFC standard incorporates variety of existing standards such as ISO 14443 (Type A and B) and Felica, which makes NFC enabled devices compatible with existing wireless infrastructure.

Integration of Near Field Communication technology in mobile phone, turns mobile phone into multifunctional device – in new sense of those words. NFC extends mobile phone functionality from basically communicational device towards device that can replace one's wallet (cash and credit/debit cards), home and office keys, identification documents (id cards) and all kinds of tickets (tickets for public transport, tickets for theatre or football game) (Figure 1). What NFC actually brings to mobile phone is the ability of device to interact with its surroundings. Interaction takes place in "near field" – short distance up to 4 cm. By simply "tapping" NFC enabled device to NFC tag or NFC enabled reader, user can read smart posters, make proximity payments, provide identity (access building or log in to PC), or use ticketing service.

NFC device can work in three operational modes: card emulator, reader/writer and peer-to-peer mode. In card emulator mode device acts as contactless smart card, replacing existing plastic smart cards. In reader/writer mode NFC device can read or write to smart tags (i.e. smart posters), while peer-to-peer mode is used for two NFC devices wishing to exchange content (Ok, Aydin, Coskun and Ozdenizci, 2011).

In order to use security sensitive NFC services, such as mobile payment, or identification, besides NFC chip, mobile device needs to have kind of trusted execution environment (TEE) – a place where sensitive data and applications can be stored and ran in secure fashion. It is a piece of hardware, called "secure element" (SE), and it can be provided in three form factors (Figure 2):

- **UICC card**

Advanced type of SIM card. Besides communication applications (USIM, CSIM) it can contain applications intended for general purposes (payment, public transportation, etc).



Figure 2: **Applications of NFC technology** (Oberthur, 2010)

- **Secure microSD card**
MicroSD card with TEE.
- **Embedded secure element**
Embedded secure element (eSE) is a secure chip “embedded” to phone’s motherboard, being integral part of mobile phone electronics.

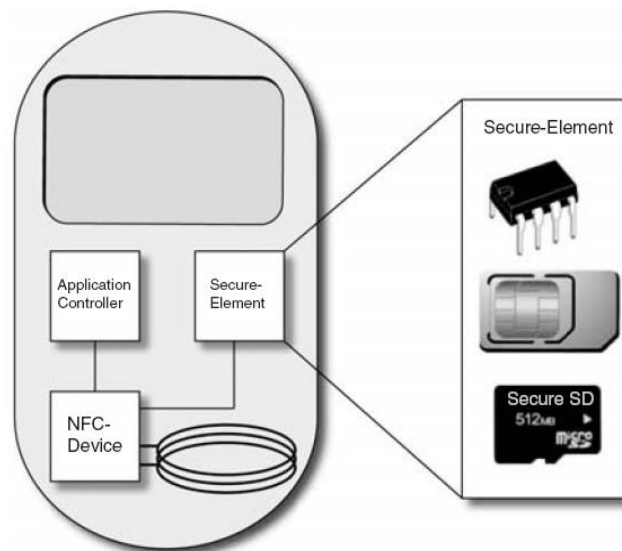


Figure 3: **NFC enabled device with secure element** (Finkenzeller, 2010)

Regardless of SE type used for NFC services, it is very important to allow different service providers to host their applications on the same SE. Otherwise, end-user could end up with several secure elements, which would create complexity, resulting in bad user experience and slowing down adoption of NFC services.

In order to use sophisticated NFC services one has to have NFC enabled mobile phone, with SE hosting security sensitive applications. There is also a need for NFC enabled infrastructure such as NFC tags and readers. However, NFC enabled infrastructure, combined with NFC phones with secure elements, is not enough for successful implementation and use of NFC services. There are some open questions such as:

1. How to manage life cycle of applications on secure element (how to load, install, personalize, lock, unlock, upgrade or delete application on secure element or application on handset²)?
2. Who has rights to manage application life cycle?
3. Should there be some kind of agreement between service providers (SPs), phone manufacturers and mobile network operators (MNOs)?
4. Does user need to go to service provider's store each time he wants to use new NFC service?
5. What happens when user loses or damages his mobile phone or secure element?
6. What if user changes secure element?

To find proper answers to these questions, we need to understand environment for using NFC services, called NFC ecosystem, its actors and their complexed relationships.

2. NFC ECOSYSTEM – ACTORS, REQUIREMENTS AND ROLE OF TSM

NFC ecosystem is environment intended for using NFC services. It consists of:

- **Actors**
Actors are real world entities such as banks, public transport operators, MNOs, mobile phone manufacturers, SE manufacturers and end-users. Each actor can have one or more roles attached. Role can be viewed as a set of responsibilities.
- **Infrastructure**
Infrastructure consists of hardware (NFC tags and readers, NFC enabled mobile phones, secure elements, wireless infrastructure such as base stations, servers, etc.), software (that runs on mentioned hardware), communication channels, protocols and standards for data exchange between devices (GSM/UMTS, SMS, Internet, ISO/IEC 18092, TCP/IP, etc.).
- **Business agreements**
Business agreements define business relationship between actors, such as sharing expenses and profit or creating appropriate business models.
- **Technical agreements**
Technical agreements are based on business agreements and refer to technical aspects of functional implementations (i.e. technical agreement defines way of personalization of application on SE, or message exchange format between different actors in ecosystem).

As shown in Figure 3, main actors of NFC ecosystem are service providers (SPs), mobile network operators (MNOs), SE manufacturers, mobile phone manufacturers and end-users³. Service providers are companies who want to offer more effective services to their customers by using NFC technology. Examples of SPs are financial institutions (banks), public transport operators, theatres, museums, merchants, government bodies, etc. MNOs are telecommunication companies providing mobile network functionality, used for communication via cell phone. Phone manufacturers are companies that produce mobile phones such as Nokia, Research in Motion (RIM), Samsung, Motorola and Sony Ericson. Companies like NXP, G&D, Gemalto and Oberthur are examples of SE manufacturers – actors that produce different kinds of SE. The last, but not the least, are end users, that “consume” NFC services.

² NFC service is usually composed of one or more applications running on secure element, and one or more applications running in the memory of mobile device. Applications running in mobile device memory are usually intended to be user interface for accessing appropriate service application on SE.

³ Figure 3 shows only main actors in NFC ecosystem. Real ecosystem has many more actors.

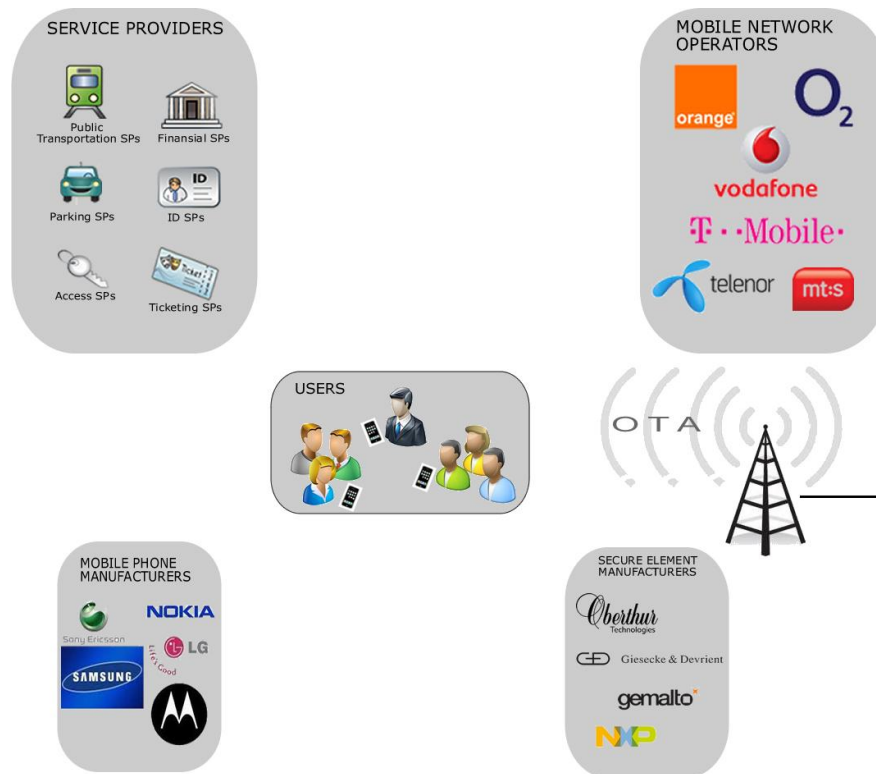


Figure 4: NFC Ecosystem

In NFC ecosystem each actor has its area of responsibility. MNO controls wireless infrastructure - so called "Over The Air" (OTA) infrastructure, bank holds financial instruments such as user's bank account, SE manufacturer is in charge of SE, while mobile device manufacturer holds control over mobile device functionalities. In order for NFC service be functional, each actor must give "green light", in its area of jurisdiction. Let's take NFC mobile payment service for an example. If end user wants to enable mobile payments using his handset, he refers to his bank, requesting activation of mobile payment service. In order to allow payment service, bank needs to check out end-user's mobile phone and secure element from technical point of view. To do that kind of check, bank needs identifiers of mobile phone (IMEI⁴) and secure element, which can be retrieved from end-user's MNO, based on his phone number. So, bank must have a way to ask for IMEI and SE identifier from MNO. MNO, from the other side, must have a way to reply to the end-user's bank request, sending IMEI and SE identifier. When received, identifiers of mobile phone and SE need to be forwarded to device manufacturer and SE manufacturer, respectively. This means that bank needs to be able to communicate with device manufacturer as well as SE manufacturer. Based on SE identifier, SE manufacturer sends data regarding technical capabilities of secure element to the bank. Using the same logic, device manufacturer will send data about technical capabilities of mobile device. If end-user's SE and mobile device meet the requirements for activating NFC payment service, bank refers to MNO again, asking for download of payment application to user's SE. MNO takes application code and, using its OTA infrastructure, downloads application code "over-the-air" to the SE in user's mobile phone. In the last step MNO notifies all actors about successful operation on SE. This simplified example shows essential need for communication between actors in NFC ecosystem.

Prior enabling communication, actors need to establish business agreements and technical agreements. Business agreement means setting commercial model – defining revenue sharing, pricing for technical service management functions (responding to request, sending data), pricing of "renting" space on SE, etc. Technical agreement refers to communication details (initiating connection, message exchange format, etc), supported modes for SE content management, supported SE types, etc. If each actor would have to make agreement with each other actor, it would lead to chaotic business environment, with low level of scalability and rather proprietary than standardized communication interfaces. In order to decrease complexity, and support standardization (interoperability) and scalability, MNOs association - GSMA proposed creation of Trusted Service Manager (TSM) role, which is supposed to be a link between all other actors, especially SPs

⁴ International Mobile Equipment Identity (IMEI) is mobile phone identifier. It is used from GSM network to identify valid devices.

and MNOs, that are competitors in NFC ecosystem⁵ (Global Platform, 2009). Instead of direct interaction, actors of ecosystem interact using trusted intermediary – TSM (Figure 4).

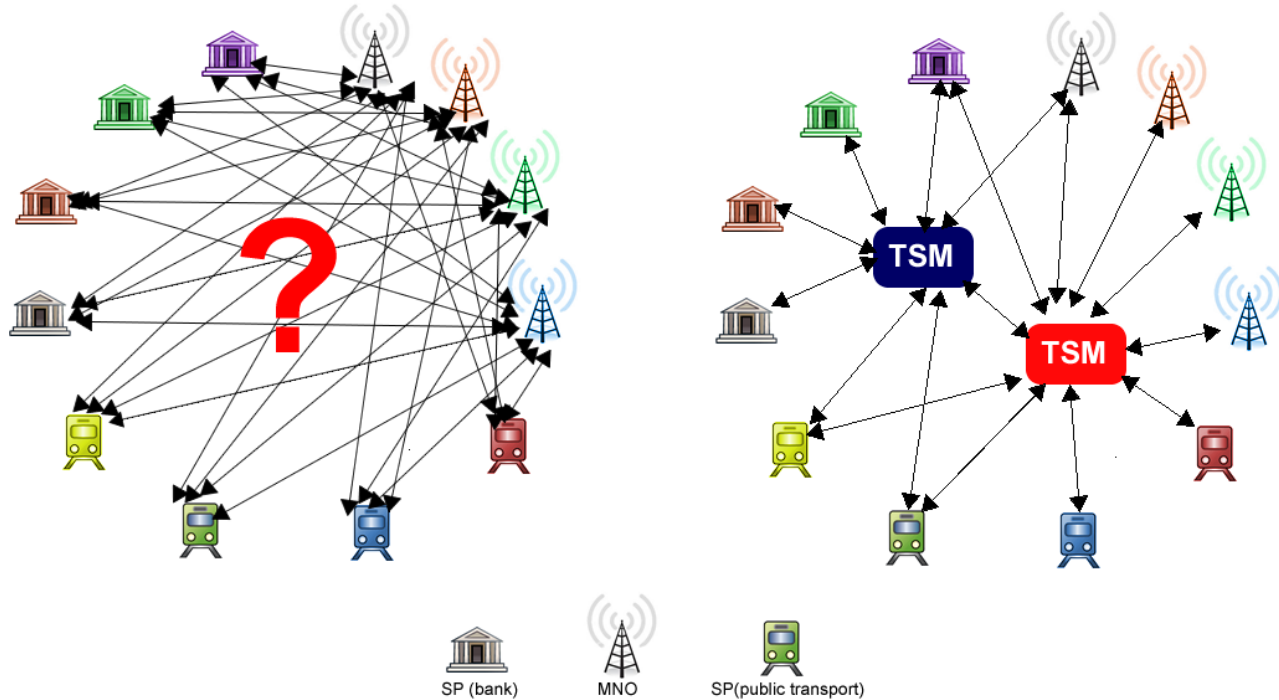


Figure 5: Role of TSM in NFC ecosystem

From technical aspect, TSM provides Trusted Third Party which guarantees security and confidentiality between SPs and MNOs, and offers 24x7 high availability services for all actors of ecosystem (Veran, 2008). From business point of view, TSM is one-stop shop for service providers to offer NFC services to their customers, no matter what MNO they belong to (Veder, 2008).

3. TSM SOLUTIONS – SYSTEMS FOR OTA NFC SERVICE LIFE CYCLE MANAGEMENT

Traditional payment and information networks rely upon service provider's card terminal being on-line (i.e. ATM), while customer token (i.e. credit card) is not on line. In traditional payment networks all personalisation is done before issuing smart card to the end user. After personalisation smart card is issued "as it is", with unlikely possibility of adding new applications, or upgrading existing ones. All this traditional ways of managing secure element are just not good enough for NFC services, because NFC ecosystem needs to be dynamic environment, allowing applications to quickly transit from one to another life cycle state.

One of the essential features, that brings value to the users of NFC services, is the concept of "On-Line User". It means that user and its token (secure element) are 24x7 accessible, which makes possible for service provider to communicate with SE almost constantly. This is very convenient for the highly dynamic environment such as NFC ecosystem, because user doesn't have to go to SP's stores and wait there in long queues in order to get new or upgrade old NFC service – all those activities are performed using wireless (OTA) infrastructure, often even without end-user's knowledge of ongoing changes on his device and/or SE.

System (solution) for OTA life cycle management of applications on SE is enabler of concept of "On-Line User". These solutions are often called "TSM solutions", because of specific role of TSM in ecosystem. Despite this commonly accepted colloquially nickname of system, it would be wrong to comprehend TSM role as implementer of all functionalities of system – on the contrary – TSM mainly acts as trusted message dispatcher, while other actors implement system functionalities.

Use cases, that system for OTA management of NFC service life cycle must implement, can be divided in two main groups (Global Platform, 2011):

⁵ Because of being competitors, MNOs and SPs often have difficulties in finding mutually acceptable business model, which happened to be one of the biggest obstacles for NFC mass rollout.

- **Use cases related to NFC service**

Technical use cases that cover OTA management of NFC service life cycle (deployment, locking, unlocking, update, upgrade and deletion).

- **Use cases related to end-user**

During the service life, end user can encounter events or situations that have impact on service. Such events are: SE/mobile device changed, SE/mobile device lost or stolen and maybe recovered later, etc.

Use cases related to NFC service are:

1. NFC service deployment
2. NFC service activation
3. NFC service lock
4. NFC service unlock
5. NFC service upgrade
6. NFC service data update
7. NFC service undeployment

Use cases related to end-user are:

1. SE changed
2. Mobile phone number changed
3. Mobile device changed
4. Lost or stolen mobile device
5. Recovered mobile device after a loss
6. Get a new mobile after a loss
7. Mobile subscription termination
8. MNO swap
9. Temporary suspension of NFC services

Global Platform (2011) and Association Française pour le “Sans Contact” Mobile – AFSCM (2009) give detail description of use cases mentioned above.

As shown, management of service life cycle in NFC ecosystem is based on stakeholders interaction (communication) – actors need to communicate with each other and exchange messages in reliable and interoperable way. Considering the fact that these actors come from different business environments, with heterogeneous systems, as appropriate environment for implementation of NFC service management systems, Global Platform (2011) recommends Service Oriented Architecture (SOA)⁶, using Web services as SOA implementation technology. Main two reasons are interoperability and loose coupling⁷. This means that communication of actors in NFC ecosystem should be implemented using Web services.

Web service is software system designed to support machine-to-machine interaction over the network (Wikipedia). Interaction is based on message exchange using Simple Object Access protocol (SOAP) - XML based protocol for exchange of structured informations. On one side of web service is entity that provides service – “service provider”, while on the other side is entity that “consumes” service – “service consumer”. In order to clarify using web services for communication implementation in NFC ecosystems, we can refer to the above mentioned example of user wanting to enable NFC mobile payment on his phone (Figure 5). After receiving request for enabling NFC payment service, bank needs to “talk” to TSM using web service. Bank, as a web service consumers, requests user’s mobile equipment check (phone and SE) from TSM, as a web service provider. In next step, TSM acts as web service consumer, by calling another web service provided by MNO (MNO is service provider in this step), in order to obtain IMEI and SE identifier. Same logic applies

⁶ Service Oriented Architecture (SOA) is a set of principles and methodologies for designing and developing software in the form of interoperable services. These services are well-defined business functionalities that are built as software components (discrete pieces of code and/or data structures) that can be reused for different purposes (Wikipedia).

⁷ Loose coupling between two software components occurs when one (depending) component depends only on the interface of the other component. Depending component has no knowledge of the concrete implementation of interface functions, so implementation of functionalities can change, without effecting dependant class, as long as interface specification is respected.

for web services used for communication on relation TSM – SE manufacturer and TSM – mobile device manufacturer.

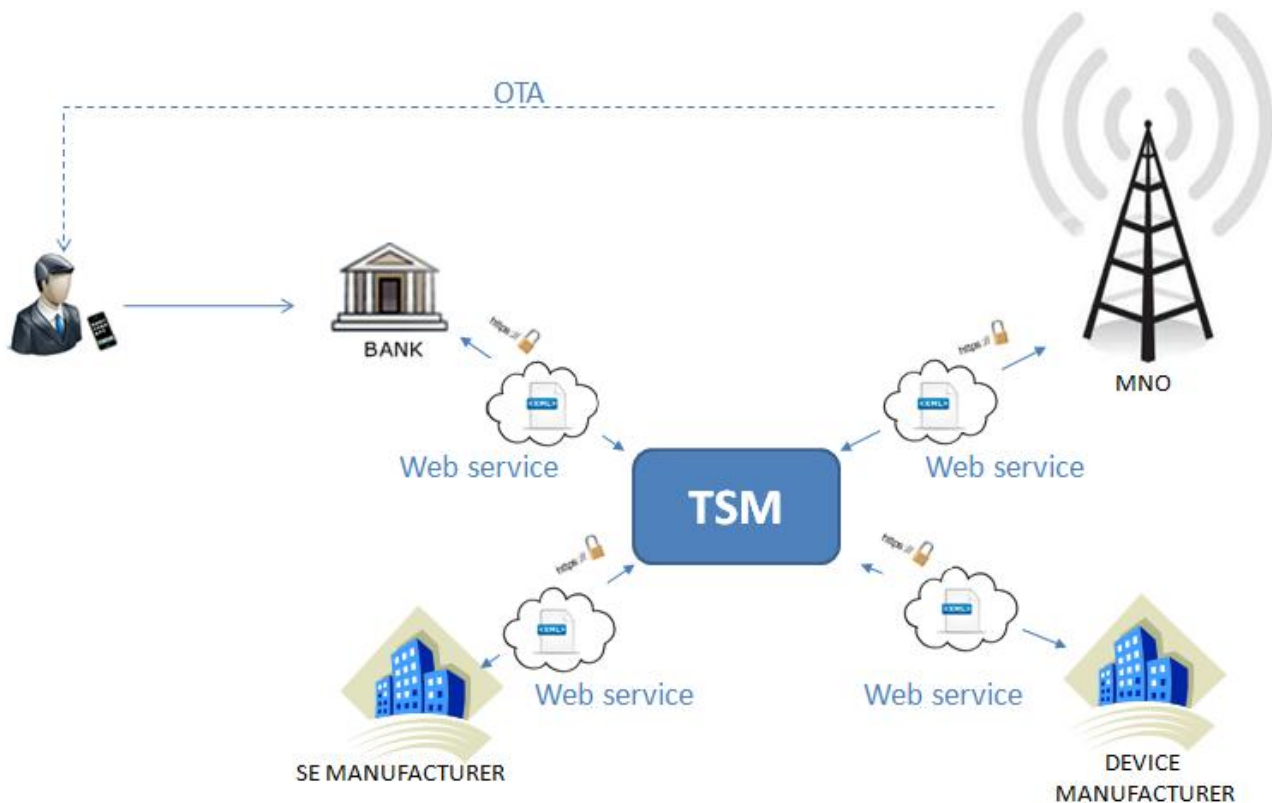


Figure 6: **Communication of actors using web services**

4. TSM SOLUTIONS' SECURITY

Instead of using physical cards, TSM solutions are used to manage smart card applications, hosted on the SE of NFC device, over the wireless network. Therefore, TSM solutions have to meet high security standards, like those of ordinary smart card issuers, producing, personalizing and distributing smartcards (Madlmayer, Langer, Kantner, Scharinger and Schaumüller-Bichl, 2009). In order to provide end-to-end security in NFC ecosystem, one has to deal with several different aspects of security such as: security of SE, security of SE application and UI mobile application, security of TSM, security of the OTA provisioning, security of NFC device, security of NFC interface, etc. In this work, focus is on the TSM security.

Considering that TSM solutions are systems based on actors' interactions using web services, security of TSM solutions comes down to web services' security. Threats such as message alteration, breach of confidentiality, "man in the middle attack" and denial of service need to be addressed, when SOAP (XML) message exchange is involved.

In order to cope with these challenges, appropriate security techniques must be applied. Security techniques can be implemented on transport layer, SOAP message layer or both – transport and SOAP message layer. The choice often depends on application requirements (Web Services Interoperability Organisation-WSI, 2005).

For security implementation on transport layer, combination of SSL/TLS protocol and HTTP protocol is used, which provides integrity and confidentiality of whole SOAP message, transported using HTTPS. In this case, the entire HTTP message – header as well as body containing SOAP message – receive integrity and confidentiality protection. However, confidentiality and integrity are in the effect only during HTTP session – there is no protection of message once received (and possibly queued by the web service consumer or requestor). Because protection is applied to the entire message (partial protection can be applied), transport level security is unsuitable for SOAP topologies involving SOAP intermediaries.

Security techniques implemented on SOAP message layer provide integrity and confidentiality to a portion or combination of SOAP message content using XML Digital Signature and XML Encryption techniques outlined in SOAP message security specification (OASIS, 2006). In this case, confidentiality and integrity are in effect during as well as after message transmission (beyond HTTPS session), being suitable for providing end to end confidentiality despite SOAP intermediaries.

5. EXISTING SOLUTIONS

There is evident trend of increasing demands for TSM solutions. Companies, positioned as security and smart card solutions providers, such as Gemalto, Giesecke & Devrient, Oberthur, Bell Id and First Data, are also TSM solution providers. MNOs and SPs are forming alliances with TSM provider companies, in order to get their solutions for NFC service life cycle management. Bellow are presented examples of such partnerships.

In September 2009, First Data formed strategic partnership with company SK C&C – mobile technology and ePayment leader – aiming to develop TSM solution by mid of 2011. Proof that this partnership had been successful was participation of First Data, as a TSM solution provider, in project with Google named “Google wallet”.

In the December 2011, Gemalto was chosen by the american MNOs consortium “ISIS” (joint venture of three biggest wireless service providers in USA – Verizon, AT&T and T-Mobile), in order to provide TSM solutions that will be appropriate for the needs of USA market.

One of the biggest telecommunication companies in the world Telefónica, on 2nd December 2011 announced choosing Giesecke & Devrient’s solutions called “TSM Enabler” as a platform for providing TSM services for its partners in NFC ecosystem.

6. CONCLUSION

In order to create NFC ecosystem that will enable use of NFC services in their full potential, it is crucial to provide solutions for remote (OTA) management of NFC service life cycle. These solutions, also called “TSM solutions”, are based on communication of actors. These actors are coming from different industries and are based on heterogeneous platforms, so the most appropriate environment for implementing interactions is Service Oriented Architecture, using Web services as SOA implementation technology.

Although we are witnessing raised interest for obtaining TSM solutions from MNOs and SPs, it seems that all existing solutions are limited to just a few ecosystem participants. There is no real openness for new actors. This lack of scalability origins from absence of stakeholders willingness to change and adopt to new business environment, rather than technical attributes of TSM solutions. It is very important that communication interfaces within existing TSM solutions are being based on standards, so other potential participants could easily join, which, having in mind significant profit NFC services are bringing along, is a chance worth effort.

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MODERN TENDENCIES IN THE DEVELOPMENT OF TOURISM- TIMESHARING - WITH REFERENCE TO LEGAL ASPECT

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Abstract: *In the process of globalization, the growing integration of the economy and society in the world results from a very fast expansion of tourism. Timesharing is a serious rival to some of the traditional forms of tourism businesses. In this paper the authors start from the basic characteristics of timesharing, its types, economic benefits and the legal framework of this phenomenon. In our opinion, timesharing represents a new concept in tourism, and a new way of providing tourist services, but at the same time it represents an effective way of attracting the capital and an interesting way of investing into future holidays. Due to the complexity of timesharing in tourism of the modern age, in this paper we approach the problems from the economic as well as the legal aspect.*

Key words: *timesharing, tourism, types, benefits, contract*

1. INTRODUCTION

By studying the innovations in the tourism sector throughout the life cycle of tourism services we can come to many conclusions. Their use in the coming decades should allow for the expansion of quality and quantity of using tourism services. Despite the widespread belief that innovations in services often do not occur or that they do not exist at all, innovations in tourism are numerous and frequent, but more complex than innovations in some other sectors or industries. The competition, globally, more and more influences tourist destinations forcing them to innovate. Services in developed economies produce two thirds of new values and participate in employment and this share is increasing, while the share of production tends to decline. Regardless of the economic effects of services, the study of innovation did not deal with this field - service innovations to a great extent. In fact, in this area there are several key questions which have been raised: whether and how innovative the services are, what kind of connection exists between service innovation and product innovation and what the relation between innovation and economic performance services is. However, to this date it is considered that the innovations are associated with the changes in technology (Stosic, 2007).

2. DEFINING TOURISM

There are several definitions of tourism. Unkovic and Zecevic (2007) state that "tourism is the sum of phenomena and relationships arising from the travel and stay of non-residents, insofar as they do not lead to permanent residence and are not connected with any earning activity" (p.11). This is considered to be the most acceptable definition of tourism, and it was adopted by the International Association of Scientific Experts in Tourism, and it is the work of Swiss authors Hunziker and Krapf.

Regarding this definition, we may conclude that there are factors that influence the development of tourism. According to some authors, the basic factors of tourism are following (Dobre, 2005): The Movement factors, the factors of the Offer, the Mediatory factors.

We may conclude that tourism as an economic activity differs from other activities according to its characteristics and specificities. Therefore, it is necessary to point out the specificities that characterize tourism: heterogeneity - complexity of the structure, seasonal business on the tourist market, the specificities of the components, work non-productivity (Dobre, 2005).

The managers of the tourist enterprises have to bear in mind these characteristics when making decisions about planning, organizing and controlling, so that they could contribute to the development of tourism. In the last few years, new ways of spending free time appeared on the tourist market. Among them, timesharing is of the utmost importance.

3. THE TERM AND FORMATION OF TIMESHARING

Timesharing is a relatively new term, which takes a special place in the global tourism. The Timesharing industry is reported to be one of the fastest growing sectors of the tourism industry and its significance within the tourism sector brings great benefits to the host communities, the hoteliers and the timeshare owners. There are different explanations and definitions for the term "timesharing". The term "timesharing" is a concept that follows the changes on the market, which represent the grounds for the growth and development of timesharing, and which is the exact reason why the timesharing concept can be differently defined. Bakic, Tomic, Muhi and Kovacevic (2010) define timesharing as a "ownership of certain shares of accommodation facilities, where a form of share considers purchasing time (one or more weeks) in pre-determined number of years (exp. 25, 30, 50, 80, 100 and more) in specific units of accommodation facilities" (p.18). Timesharing industry was originally created in 1960. when Alexander Nette began offering shares in a hotel he managed in Ticino, where ownership gave the buyer the right to use the holiday properties owned by the company on a regular basis. His concept led to the development of the Hapimag company, which is still the main promoter of the European timesharing industry. The concept is based on the fact that an individual cannot afford skiing or staying in the luxurious suites in the Alps, but if a group of friends unite, gather their money, and agree to share an apartment, in that case they can afford the purchase. During one year the right to use the shared flat, i.e. apartment for the first week has one of the friends, the second week the other until all of them use their right to the shared property. However, according to Edmonds (1991), Timesharing, as we know it today began in 1967 from an enterprising hotelier in the French ski resort known as the "Superdevoluy". This new business venture was advertised by a popular slogan: "Why rent the room? Buy the hotel, it's cheaper!" At the beginning of the 70s, several cases where apartment hotel building investors could not close the financial construction of building the apartment hotel were recorded. It is then that the investors started using timesharing system and instead of selling apartments, they started selling time spent in using them (Tutic, 1994). The phenomena of massive tourism resulted from the impossibility to satisfy the needs, thus the problem tried to be solved by building and purchasing holiday homes, which had its negative sides such as big expenses, as well as the possibility of a theft or burglary when nobody was at home. All of these influenced the blossom of timesharing at the beginning of the 80s. On behalf of timesharing we can point out some of the positive aspects: feasibility - vacation owner will always have a free place for vacation. We can also point out the possibility to change the vacation place every year; purchased timesharing units the buyer can rent, sell, or leave as an inheritance; via timesharing, the trader collects other people's capital to finance his own activities and expend his own capacities; saving money - by purchasing timesharing you do not have to worry about the prices during the season i.e. you have the accommodation provided at any time of the year at the same price. The consumer satisfies his needs by receiving the same or higher service quality, and he gets all that by spending less money. Inflation does not affect timesharing users because they gained their rights to use the propriety over a longer period of time.

The basic characteristic of timesharing is to ensure that the consumers possess capacities which in normal conditions, based on their incomes, they would not be able to afford. It mainly concerns luxurious products, i.e. luxurious hotels, villas, houses, yachts, airplanes. Due to the popularity of this concept, specialized companies have developed. The main function of these companies is to provide the consumers with the necessary capacity and provide the conditions for using these capacities in special destinations, i.e. they enable the owners to exchange time lease and give them the possibility of staying in different destinations all around the world.

Hotel chains also have a significant role in the area of timesharing industry. Hotel chains use up-to-date technology to manage the resort facilities that are included by the new systems of ownership. The leading hotel chains are Marriot Co, Hyatt, Sheraton and Hilton Ritz.

These economic effects have affected certain governments (Greece, Tunis, Morocco, Israel, Egypt) to support the development of this system. Some of the reasons for the support were: regional development, the development of tourism, employment, etc.

4. TYPES OF TIMESHARING

Universally accepted form of timesharing does not exist. Looking at the standard models and schemes of timesharing relations will help us understand the extent of offered possibilities. The standard forms of timesharing can be divided into two basic groups. The first group consists of forms with which you gain the right of ownership or co-ownership (owner (co-owner) or proprietary timesharing). The buyers gain the co-ownership of a specific accommodation unit within the scope of specifically determined complex, with determined order of using the accommodation during the year and obligation of signing in the property registry. There are several ownership variations, among these the most frequent ones are timespan ownership, interval ownership and fee simple.

Timespan ownership is a form of timesharing ownership where the unit of co-ownership is placed. Each co-owner is the owner of ideal part of accommodation unit and has its exclusive right of ownership in a specific period of every year, which is determined by the plan of using the tourist facility. Interval ownership implies rotating the ownership among the owners, and the right of ownership is determined by that rotation, at the end, the users become co-owners of the facility. In the case of fee simple, every owner has the absolute right of ownership in the agreed period of every year (Kessler as cited in Micovic, 2011). The basic characteristic of the other group of timesharing is to establish the right of using the tourist facilities. Establishing timesharing relations by means of clubs is the most significant aspect of nonproprietary (user's) timesharing. The club membership timesharing is the form of timesharing present in many countries (England and Germany). In these cases, users do not gain the right of ownership - co-ownership of a certain tourist facility, but they gain "the ownership of time stocks." By purchasing a time stock a person becomes a member of the timeshare club complex, which was founded by other owners. The stock certificate of ownership is given to every buyer of time stock, who has enclosed the contract (Zindovic, 2011). The next modality of the user's timesharing is timesharing via participation in the economic society. The economic (stockholder) society is created from this form of timesharing, the society where the buyer becomes a shareholder or stockholder and thus gains the right to enjoy in a specific unit and to use the common parts of a facility with the rest of the stockholders during the specific period of a year. This is all regulated by the contract of society founding and statute (examples: Switzerland and Italy) (Zindovic, 2011). One of the first companies founded according to this concept is the Swiss company called HAPIMAG. Since 1963, Hapimag has been offering flexible rights of residence at a range of travel destinations. Today, Hapimag has over 5300 apartments in 57 resorts and residences in 16 countries. All Hapimag properties are financed from shareholders' equity. This successful business model has enabled Hapimag to withstand every economic crisis of the last 50 years. Since 1963, Hapimag has been offering flexible rights of residence at a range of travel destinations. There is one simple idea underlying Hapimag's business model: joint investments and individual use. Members invest together in resorts and residences, which are currently 57 in number and which they can use individually according to their own requirements. Their need for rights of residence determines the size of their investment (Hapimag, 2012).

5. THE ROLE OF EXCHANGE

Exchange has become an essential part of the timeshare product. The Exchange companies are like brokers between consumers. They give timeshare owners the ability to swap their timeshare for another - at a different time, location or both - with the confidence that they will receive another high-quality holiday. Typically, a timeshare purchaser in an affiliated resort joins the exchange company automatically at the time of purchase. Their exchange company then acts like a timeshare bank. If the consumer chooses not to use the week they have bought, they deposit it with the exchange company and can subsequently withdraw equivalent weeks - at other times and/or at other resorts - which have been deposited by other members. The leading company in the exchange of the tourist resorts is RCI (Resort Condominiums International). For more than 37 years, RCI has been at the forefront of the timeshare exchange industry, transforming the holiday experience for resort developers and owners alike. As the global leader in holiday exchange, RCI is known industry-wide for being a trusted associate as well as a full-service, single source service provider for our clients' needs. We strive to make dream holiday reality for our 3.8 million members and to work with developers to help enhance their sales and profits by expanding the utilization and enjoyment of their leisure real estate products. We help our resort affiliates move their business forward, and together, we continue to advance the leisure real estate industry as a whole (RCI, 2012). RCI require members to deposit a week in their bank before offering an exchange and generally only offer a week/resort of similar or lesser trading power than that banked. They charge an annual membership fees (with discounts for longer periods) plus an exchange fee. RCI has been increasingly criticized for their failure to provide a good choice of exchanges or

even, in some cases, any choice whatsoever. To become a member of RCI you must own a week in one of its affiliated resorts. RCI also has two "Points" systems notionally independent of their "weeks" system as well as numerous sister companies offering rental of holiday accommodation. RCI, the world's largest timeshare exchange company and a part of Wyndham Worldwide, has signed its first affiliation agreements in Serbia, adding two new resorts to its portfolio of over 4,000 affiliated resorts worldwide: Club "Satelit" and "Kraljevi Konaci" resort. RCI members can now choose from two attractive resorts in this diverse and vibrant country (The Timeshare Blog, 2008).

6. THE MAIN PLAYERS IN THE TIMESHARING DISTRIBUTION

Pantazis (2003) states that "the Timesharing distribution system consists of various players. Their individual role is crucial for the success of the industry. According to WTO (1996) and OTE (Organization for Timeshare in Europe) the following explains who are the main participants in the industry's distribution chain when it comes to planning, development, commercial and resort management phases of a Timeshare development. On one hand, there is the Developer. The Developer is a real estate or construction company that owns some kind of physical property, which is to be sold on a Timeshare basis. Some of the developers plan the project, choose the location and build the complex. Other developers purchase existing hotel or an apartment block, or change the already build resort for the Timeshare use" (p.19).

The two most famous companies that are responsible for the promotion and selling, i.e. commercial aspects of Timeshare intervals are Sales and Marketing company.

The Holiday Exchange Companies are the ones that offer their clients, the Timeshare owners, the opportunity to exchange their interval for another, in an affiliated resort.

The so-called Management company is in charge of the maintenance and management operations of the resort. The developer may employ and train the required staff on his own or go to a specialized management company.

The association established by the resort developer is called Owner's Association. This association is more concerned with resident's issues and it operates like a residents association for a block of apartments. The association was formed by the owners of the Timeshare intervals in the same resort, and its main purpose was to protect owner's interests. They deal with issues such as the level of annual service charges and the provision of sinking funds for major future repairs and refurbishment.

The companies that are specialized for organization and division of the Timeshare developer entities are called The Resale companies. They are aimed at selling to the open market weeks and properties, which had been previously purchased by the individuals who subsequently wish to sell (Panatazis, 2003).

7. THE PRICE

The price of timesharing accommodation unit can be very different. Mostly, the price is affected by the location and time criteria and other factors such as the type of product (whether the accommodation is in bungalows, villas, apartments), also other contents which are offered (receptive factors, such as food, sport, recreation, entertainment, amusement conditions, etc.) the quality of the product (how are accommodation units equipped, interior and exterior design), then image, fashion and prestige (Bukvic, 2004). Bakic et al (2010) argue that "timeshare unit selling price includes the following structure: cost of accommodation units (30-50%), marketing (35-40%) and other expenses included in profit and the like (30-35%) (p. 19). Calculations show that it is cheaper to spend a vacation via timesharing system, than to have your own house or a holiday home since the fixed expenses are extremely high. Timesharing is attractive not only for the users, but for the companies as well. These companies deal with timesharing and gain the profit throughout the whole year by using a precise system of management.

8. THE MARKETING OF TIMESHARING

Whatever the timeshare product or enhancement introduced into the resort timeshare sale, the marketing of such products in the resort timeshare world has increasingly become an art and science unto itself.

Bakic et al. (2010) argue that Promotional activity is a very important instrument in business policy for selling timeshare capacity. Most productive ways to promote timesharing are:

- Through specialized journals for timesharing ("Holiday Timesharing", "International Timeshare News") to inform readers and inform stakeholders about the latest news and benefits in the industry. Through "Word of mouth" concept. The recommendation was an incentive to buy in more than 50% cases.
- Internet as a means of promotion. This type of promotion has proved to be the fastest and most productive. The advantage of the website is reflected in the fact that it can present to buyers as many information, in easy way. Potential buyers can visually experience what is the offer like, how much it costs, location and other features (p.19). In addition, direct mail is used to be one of the principal means of generating potential prospects for Timeshare, particularly for off-site offices. The nature and the quality of the direct mail vary. For some companies, well-presented mail and high quality brochures, are sent to potential buyers while others simply inform them that a free gift has been won and it has to be collected personally by visiting the office on a certain date. Direct marketing, which includes direct mail and telephone marketing is a very popular tool. The consumers in general have little knowledge or understanding about timesharing which in accordance with no natural desire to buy the product, leads the marketers to offer them incentives to induce their visit to the point of sales.
- Off Property Contacts (OPCs): OPCs are the individuals who fill timeshare presentations with potential buyers by pitching them on the beauty of timeshare ownership and, often, offering a thank you gift for attendance. OPCs may be direct employees of a timeshare company or may be part-time contractors. These workers operate from high-traffic tourist areas, such as hotels, shopping malls, beaches and stand-alone local sites. OPCs do not sell timeshare units. Sales agents conduct presentations and perform all sales.
- Fly-Buys or Mini Vacation: This method has become one of the most popular ways of marketing Timeshare and still continues to grow in importance. The potential prospects are given the opportunity of taking a short break or a low cost holiday at a Timeshare resort, subject to attending a sales presentation. This offer is made through direct mail, tele marketing or with OPCs.

9. THE EXPERIENCES OF TIMESHARING IN OTHER COUNTRIES

In Europe about 1.4 million families own timeshares, and about 620 companies, which have their own business in that sector, have estimated annual profit of 2 billion euro (Marviss services, 2011). Within many years of tourism tradition in our country, but not only with that tradition, "health spa resort" after a long period of "dry" years, is again on the upward path towards the development. If we take into consideration that Serbia has a large number of spa resorts, we can conclude that there exists the capacity for the development of timesharing. What is necessary for the development of timesharing is the existence of attractive spa, health resorts, archeological sites, etc.

So far, the experiences have shown that the timeshare centers must satisfy certain conditions in order to be positioned and sold at the tourist market. The conditions are following:

- Location must be in an attractive area (both natural and social attractions are desirable);
- Availability and diversity of different catering facilities (restaurants, taverns, pizzerias, fast food restaurants, etc.), as well as supplying facilities for tourists (supermarkets, groceries, etc.);
- Developed traffic infrastructure in the area (most of all the road network), as well as the access roads;
- Availability of various partial tourist products from the area of sport, entertainment, recreation, amusement, culture, etc.;
- Exclusive offers (most often it is asked for "peaceful" locations near famous tourist centers, as well as "isolated" locations so as to avoid the overlapping of the segments – tenants and "ordinary" tourists);
- Relatively higher quality of interior design (very often with luxurious furniture);
- It is desirable for the number of hotel accommodation units to be incorporated in the system (for a relatively shorter staying – one or two days);
- The worked out system of maintenance (cleanliness, phone plug-in, TV and etc.);
- The worked out system of management (tenancy, exchange, resale, promotional activities (Bukvic,2004);

Destinations that do not satisfy the above-mentioned conditions have small chances of success on the market. Precisely, there is a specific number of destinations that did not succeed because of neglecting some of the above-mentioned factors, they could not go further than the introduction phase. These factors

are in the center of interest for those who are developing the system, as well as for those who are appearing as users (tenants).

The most recent timeshare statistics as compiled and provided by the American Resort Development Association (ARDA) indicate that there are 1,548 vacation ownership properties in the USA. Seven percent of all households own more than 7.2 million intervals with the average cost of a timeshare interval being \$20,468. The majority of timeshares owned are points based systems. Resort occupancy stands at 79.7% and nine out of every ten timeshare owners are current on their timeshare loans and maintenance fees (Timeshare Trends Blog, 2011). These firms have created projects specifically geared toward the timesharing market. According to John Nicolls, former senior vice president with Hyatt, today's timesharing unit is a complete apartment rather than simply a hotel room. "The most important aspect of a timesharing project is that it should be designed and built for that purpose," said Nicolls. In developing its timeshare properties, Hyatt has found it desirable to locate them adjacent to a successful resort. "Usually, the best strategy is to get the hotel up and running and a few years later start the timesharing project. It is important that they be located near a successful resort hotel, because that generates the traffic and the leads you need to sell the timeshares," said Nicolls.

Specific period of time had passed until the timesharing industry found its base in Asia. According to the research, currently there are four countries in the region that have more than ten timesharing resorts (Malaysia, Indonesia, Thailand and Australia). As Smith and Vecchi (2010) state that in Asia is still present only small number of the purpose-built resorts with respect to The United States which have a large number of the purpose-build resorts.

Currently in Malaysia, there are about 30 timesharing resorts, in Indonesia about 20, and in Thailand about 15. However, this is only temporary. Each of the countries mentioned above has its own plan which is based on the further stimulation of timesharing. For instance, in Malaysia exist defined plans according to which they will build 11 timesharing resorts. In Indonesia, in Bali, they have already started building the purpose-build resorts. It is necessary to point out that the existing resorts apart from high quality content, which refers to possibility of using golf course or going to the beach, have a high standard of personal services.

Timesharing in Asia is arising. Several factors are influencing Asia to become the area that will experience the expansion which was previously seen only in The United States. The growth of the middle class and prosperity, the arising need for the vacation, elimination of the currency control, decreasing control of the government when business activities are concerned, removing the obstacles for the inflow of foreign investments are just some of the factors which induce the development of the timesharing in Asia. With respect to Asia whose markets are unsaturated with small investing expenses, the markets in the USA are saturated with high expenses and low margins. European markets regardless of a good geographic and demographic base, with respect to Asian market, are regarded as less suitable for investments due to the excessive regulations.

Asian industry has to decide whether it will define timesharing product as an investment or as a consumer's product. Furthermore, there should be a specific jurisdiction, on a state level. Therefore, it is necessary for the government to take the initiative to ensure that the timesharing will become a healthy part of vacation in Asia's industry. The users, ownerships, local communities and any other institution or a person dealing with timesharing can benefit from it.

10. THE SHORTCOMINGS OF TIMESHARING

One of the product's disadvantages often mentioned by its critics and not seldom adopted by prospective buyers is the high acquisition price combined with the long-term (up to 60 years) period of fulfillment of the owner's right.

As mentioned above timesharing has many positive impacts on the tourism industry, but it may also have some negative impacts. One of the main problems occur when the marketing of Timeshare is taking place on site, at the resort area. This involves different forms of persuasion by OPCs and sales people, which often use sale activities that are regarded as aggressive. These aggressive sales practices have resulted in strong opposition from consumer organizations and have caused criticism from the media. Another negative impact of the timesharing and the whole tourism industry is the damage of the local societies and environments particularly in overcrowded and undeveloped destinations (Pantazis, 2003).

Regardless of the criticism addressed to timesharing, it represents a large contribution to the national economies.

11. LEGAL FRAMEWORK

The development of services and the expansion of tourism represent the basic characteristics of the new age. Tourism refers to every aspect of our society. It affects the development of the economy, the way the citizens live and their standard of living, it leads to the opening of the new working places and general prosperity. Due to its nature and characteristics, tourism includes a wide variety of phenomena that occur before, and that go deep into economic, ecological, social and legal aspects of life.

In the process of providing tourism services a large number of participants appear, among them are tourist agencies, traveling agencies, recreational organizations et al., all of which give their contribution to providing tourism services in their own ways.

There are two tourism services that we can differentiate: travel packages (or contracts about travel organization) and timesharing. In business practice timesharing was formed as an unnamed contract, a part of the autonomous contract law. In these regions the timesharing contract was implemented into legal system by adopting the law which gives the right to time share a tourist facility. According to the Article 1. Subpart 2. the law defined the right to time share a tourist facility as a right to use a certain tourist facility, according to its purpose for a certain number of years, in a certain period during a year, under the conditions specified in the contract of sale. What is characteristic about this law is that the object of this law was under public property. The period of using a certain facility could not be less than 5 years, nor longer than 30. The time spent using a certain facility was determined to a period of 7 days.

Brief application of this law led to the great interest of renting apartments in Kopaonik. Our legislator defines timesharing as a contract of using a time shared immovable property, timesharing is a contract according to which the vendor is bound to give one or more immobile properties once or more times to the consumer to use it, and the consumer is bound to pay the compensation for it and the contract is closed for the period less than a year or with a possibility of tacit prolongation of the contract. The solution from our already existing law as a subject of timesharing it induces real estate (immovable). However, Directive 2008/122/ec of the European parliament and of the council of 14 January 2009 on the protection of consumers in respect of certain aspects of timeshare, long-term holiday product, resale and exchange contracts as subject of timesharing it induces "overnight accommodation". This kind of formulation refers to immovable property as well as movable ones. However, our legislator used the formulation "immovable property where you can spend the night". The aim of the directive is that the EU member states harmonize their regulations in order to facilitate the functioning of the internal market and allow the consumers to conclude the contract on the entire territory of the EU. In addition to this, the aim of the directive is to protect the buyers and to highlight the main issues that need to be taken into account when signing the contract (Vilus, 2007).

The law nature of timesharing

The greatest similarity timesharing has with the rental agreement, taking into account that in both of them the right to use the property, which is limited, is constituted; that the landlord takes over the responsibility to maintain the property during the period of using it and that after the expiry period the consumer has the obligation to give the property back to the landlord.

Furthermore, the host is obligated not only to hand over and make it possible for the people to enjoy in the tourist apartment, but also to enable the use of all the appliances and facilities intended for the general and common use by the guests in the apartment area. Moreover, the host is obligated to keep all the guest's possessions, which were brought or handed over, safe. When compared with tenants, the guest is not obligated to pay for small expenses and repairs which were made by the regular use of the apartment and its appliances. In the case of the rental agreement, according to the law, the lease is paid semi-annually if the property is under the lease for one or more years, but if it is under the lease for a shorter period of time it is paid at the end of that period. Compensation according to timesharing is paid at the expiry date when the consumer may unilaterally terminate the contract (Micovic, 2011).

Caric (1996) points out that "timesharing is different from the lease contract, mainly due to the fact that via timesharing one cannot transfer or gain the full and unlimited right to use other people's property, but it is time parceled right which is being agreed upon and which assumes common use of the property by several people" (p.70). The difference between timesharing and the contract of sale is in the fact that the consumer,

according to the contract for time shared immovable property only gains the right to use the property, but do not gain the absolute right of ownership over the property (Draskic as cited in Micovic, 2011). Lately, in our country as well as in the others, there is the growing need to differentiate timesharing from the concession contract. Their common feature is that they can provide time and content limited right to use the property. Caric (1996) points out that "their differences are crucial because the concession contract refers to the use of renewed economic wealth and goods in the general use, while timesharing may refer to every economic property, although timesharing contract is more often closed in tourism" (p.70). The main characteristic of timesharing which makes it specific and separates it into a special institution of the contract law is the time limit. Therefore, we justify the stand that we are dealing with a specific, *sui generis* contract. Zindovic (2011) emphasizes that "due to the economic significance and the relations which can be formed from this contract, we consider that this contract cannot be classified into traditional contracts of civil and economic law, but it represents the contract *sui generis* of the service right" (p.312).

Timesharing in our law has a law obligation effect. By concluding timesharing, an obligation relation is formed between the vendors (the ones who give the immovable property) and the consumer as the carrier of the right to use the immovable property in a specific time period, according to which the two parties gain rights and obligations. On one side, the vendor has the obligation to hand over the immovable property and keep the consumer's things safe. While, on the other side, the consumer is obligated to pay compensation to the vendor for using the immovable property and other services, to take a good care of it and to return the property to the vendor after the expiry date. The obligations of the vendor do not only refer to the obligations set by the contract, but as well as the preliminary contract.

According to the Article 111. Consumer protection law from 2010, the vendor is obligated to precisely inform, in the appropriate time span, the consumer about the data listed in the standard informative forms for timesharing, whose content is legislated by the Government, on the proposition of the Minister and the Minister authorized for tourism businesses. In the case of conclusion the contract, these data become its integral part and they cannot be changed, unless both parties specifically agree in a different way, and if the changes are made in case of a force majeure.

Therefore, the vendor is obligated to provide the notice from the Article 111. Subpart 1. of the relevant law to the consumer without the compensation, the notice should be given in written form or on the permanent medium which is easily available to the consumer, in a clear and understandable way. In the same way, before the contract conclusion the vendor is obligated to inform, in the appropriate time span, the consumer about any change of the data, which will be specially stated in the contract if it should be concluded.

The legislator emphasizes three information which the vendor is obligated to notify the consumer, in appropriate time span, before the conclusion of the contract.

- The consumer's right to unilaterally terminate the contract.
- The deadline during which the vendor can unilaterally terminate the contract.
- The prohibition of paying in advance before the expiry date during which the vendor can unilaterally terminate the contract.

Considering the fact that the contract is closed according to the already prepared forms, it is clear that it is the formulary (adhesion contract). In the Annex of previous Directive 94/47/EC the minimum content of data was legislated which the contract must include. Many neighboring countries have explicitly stated in their legal texts exactly what a contract must include. That practice has not continued with the new Consumer protection law from 2010, but it is left for the legislation to arrange obligatory timesharing contents.

It should be emphasized that the contract of enabling the exchange of the time shared immovable property is regulated by the law. This contract is said to be the one by which the vendor is bound to include the consumer in the exchange system of time shared immovable property, and the consumers can reciprocally concede for a specific period the rights from the contract of time shared immovable property, but the consumer is bound to pay the compensation for that.

The consumer can unilaterally terminate the contract, i.e. preliminary contract of time shared immovable property, contract of permanent facilities for rest, contract which offers help during the resale, and the contract which enables the exchange of the time shared immovable property without the obligation to state the reason for the termination, during the 14 days from the day of receiving the concluded contract.

Popovic (2010) emphasizes that “ despite the fact that timesharing contract has a short history, in the couple of previous years it was very significant in the practice, especially in the Western Europe countries, therefore it will on the basis of this legal business in tourism developed countries achieve a significant financial impact” (p.115).

12. CONCLUSION

Despite the scepticism in the past about the innovations in tourism, the innovations in tourism are becoming more evident. In the future, the tourists will dictate the terms, technology will stay the key factor, and the forms of providing tourism services (first of all we think of timesharing) will not disappear from the market, but it will appear in innovative forms. We consider that emphasizing the basic characteristics of timesharing experiences in other countries and legal legislatures is useful for considering the possibility of developing that system in Serbia. We should not forget why timesharing was in the first place established in our country. Our timesharing system was formed as an ‘emergency exit’, when the possibility of engaging foreign capital via so called mutual investments with foreign business partners fell into a dead end. It was created in the hope that our timesharing system will represent a significant system of tourism investments in our country. However, even today we can see the possibility of adopting timesharing in our country, provided that we use the timesharing experiences around the world, come up with a very good organization, and take into account all the natural beauty and the position of Serbia.

Besides the possibility of raising funds, the positive role of timesharing is that tourism capacities will be used for many years, which is an important prerequisite for successful business. Furthermore, in the traditional business lack of financial resources for the advertising system is constantly appearing, but in timesharing system this is not the case, except at the very beginning. Timesharing gives an interesting possibility to the consumers that the apartment can be rented or sold to anyone else during the week when consumers are using it, and it can be replaced through an organization for a similar apartment in Vietnam, the Dominican Republic or Jamaica. As far as the legal nature of the contract of timesharing is concerned, the contract is the creation of autonomous contractual economy law and is similar to the sales contract rental agreement, contract of leasing and concession contract. In the Law on consumer protection there are several articles devoted to tourism.

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SHAPING UP A BUSINESS MODEL IN AUTOMOTIVE INDUSTRY: THINKING OUTSIDE THE VEHICLE

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Abstract: *The purpose of this paper is to propose a framework to depict the issues, opportunities and challenges the automotive ecosystem is facing while driving toward sustainable mobility. Research was based on a thorough analysis of contemporary articles, journals and books in this field as well as on several interviews with representatives from top automotive suppliers and OEMs in Italy and Germany. With the concept of e-mobility which is increasingly becoming more prominent within automotive industry, new business opportunities are arising. For those players who wait too long in joining the e-mobility race, a potential share could be significantly smaller. The central point is that in the years to come, the automotive industry value chain will be reshaped towards a car usership model. Perceiving a car as a mobility product where the car itself represents just a piece of the holistic mobility package is the anticipated direction. A portfolio of business models has been analysed starting from the car as a product striving to a future holistic mobility approach. The arrival of electric cars is no longer a question, we could just argue its adoption rate and the course of technology and business development. As any disruptive innovation, the new value chain will bring many white-space opportunities, as well as challenges. Only those players who proactively think in this direction will be the ones taking advantage and leading the way in the new generation of sustainable mobility.*

Keywords: *automotive, sustainable mobility, business models, car usership, value chain, e-car*

1. INTRODUCTION

The purpose of this paper is to propose a framework to depict the issues, opportunities and challenges automotive ecosystem is facing while driving toward sustainable mobility. Through comprehensive research and interviews with automotive executives and leaders at automotive OEMs and suppliers, we are trying to:

- Identify current automotive industry business models and anticipate changes over the years to come
- Connect megatrends that are having a strong impact on the automotive industry; trying to appoint innovation as an answer to most of them
- Determine relevance of sustainable mobility for automotive industry
- Explore and position new entrants as well as existing players in the business model and value creation
- Identify where will the new opportunities emerge; how the business model will realign by proposing a classified framework
- Identify patterns of success and failures in today's automotive industry
- Perceive holistic mobility approach and mobility package as a solution

The perspectives in this report are intended to benefit and encourage mutual cooperation among all players within extended circle of future automotive business model. We are convinced that once the new ecosystem is established, automotive industry will be capable to meet the triple-bottom line challenge: people-planet-profit.

2. MAJOR TRENDS

Sustainable mobility comes with three major trends that will greatly affect the automotive sector in the following years: environmental issues, rising urbanization and overall changes in the customer behaviour.

Environmental concerns are at the top of the list of challenges facing the automobile industry today, overcoming even the cost reduction which has been the primary goal so far. "While cost reduction remains very important, the automotive industry's emphasis is on the environment and the demands that it puts on innovation," said Chris Murphy (DuPont Automotive, 2008). People are becoming more and more environmentally aware. They are increasingly expecting sustainability and eco-friendliness in the automotive industry and placing these concepts as the main points for differentiation and improvement of brand image.

There is an on-going trend of moving people to live in cities. By 2050, 70% of the world's population is expected to live in urbanized areas. With the growing trend of urbanization, the number of mega cities will rise to up to 30 in 2025, where almost 8 out of 10 mega cities will be in the emerging markets (*Fédération Internationale de l'Automobile - FIA, 2011*). Having in mind that emissions and environmental standards are continuously being tightened and are affecting regulations in mega cities, the sustainable mobility will have a great impact on demand, margin structures and business models in the automotive sector. In defiance of the fact that cars are currently being designed to meet the current urban habits and customer needs, not everybody wants to have his own car anymore. The world is moving from car ownership to car usership. With this in mind, there is a greater focus on the intelligence mobility services (car-sharing, car-pooling etc.) and new business models that come with it. This is why today's automotive market will soon develop in the mobility market, forcing the existing market players to adopt and give an opportunity for the new ones to evolve.

As a result of globalization and ever increasing connectivity among people, we have sailed into the world of the empowered customer. Power has shifted to the customers and thus compressing margins and creating new paradigms. These new generations of Internet-empowered car buyers are more demanding and they have placed the negotiation power in their corners. Customers have unlimited access to the information and can instantly share it with the rest of the world. Through social networks and mobile commerce the relationship between buyers as sellers has changed dramatically, where customer expectations regarding the service quality, price and delivery are striving to the highest level. OEMs that recognize this empowerment and the importance of additional mobile services are more likely to gain and maintain the competitive advantage in the future.

3. FROM CAR OWNERSHIP TO CAR USERSHIP

Automotive industry value chain has to be reshaped to address emerging mobility needs as well as changing customer behaviour and habits. Customer is smarter, enlightened with all sorts of information which are instantly available on demand.

Internet is becoming a part of daily life where staying connected is recognized and accepted concept which helps people all around the world regardless the application area. Connectivity is becoming an intrinsic part of a vehicle and more importantly outside of a vehicle. It is certain that automotive business model needs to undertake major changes due to a size of the technology shift and already mentioned pressure towards sustainability products.

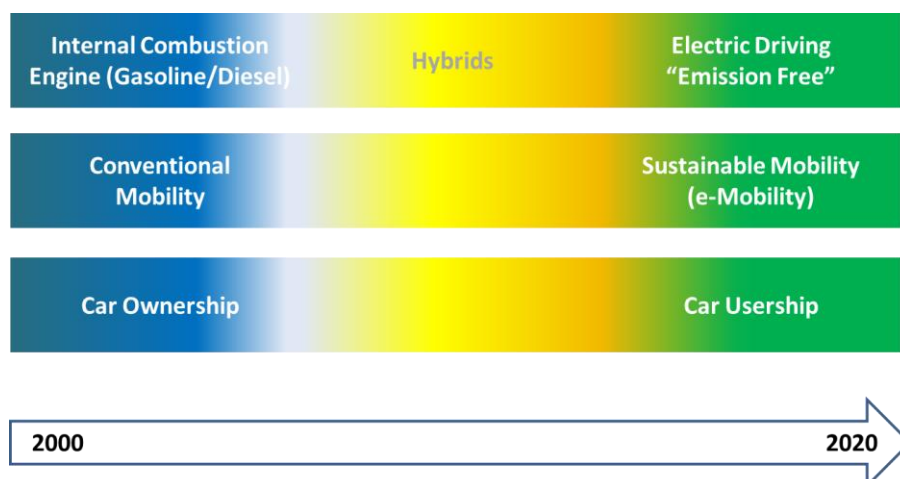


Figure 1: Changing concepts of mobility and car ownership

In the same way, automakers have to bear in mind decreasing importance of a car as a status symbol. In the years to come concept of mobility will overtake the factual car ownership with a smarter and more convenient transportation models to reach from point A to point B, what is a direct attack for automaker's revenue streams. From the finance perspective, in the era of IT intelligence and ubiquitous connectivity, traditional car concept is a highly depreciation asset which has to undertake changes.

On the other hand a substantial part of the customer base is emotionally tied to the car they own or they'd like to buy, what makes this issue significantly more complicated. Moreover, we could say that the conditions are pretty much the same with other industries where smart application and services are overtaking the traditional markets but within an automotive ecosystem a unique approach has to be invented simply because motor cars cannot be replaced by electric cars. The entire business model will expand and offer opportunities beyond the traditional value chain.

It is very likely to see new entrants like infrastructure providers, utility companies, suppliers, TIME (telecommunications, information technology, media and entertainment) or new service providers fighting for the customer's mobility budget.

Having that in mind it is reasonable to believe that radical innovation like moving to e-car concept involves shift on more than one dimension. There are three main dimensions triggering the change:

- Product innovation – sustainable growth of the industry converging to e-car and e-mobility concepts
- Customer innovation – changing needs and habits
- Business model innovation – changing the way value is created and shared

An innovation that occurs along one dimension is expected to be incremental, while connecting the dots along two or all three dimensions will result in a new business opportunities and it is much more likely to be disruptive. Taking into account the size of the technology shift required and customers' uncertainty concerning high costs, low mileage and undefined usability, it is up to the industry to attract customers into electric cars – push strategy.

Every innovation is facing customer resistance in the early phase; electric cars are not excluded from this practice. Technology risk from the customer viewpoint represents the main threat for the successful adoption of electric cars. Therefore, making the shift together with an innovative business models will make the transition from the concept of ownership to usership far easier for OEMs. Furthermore, perceiving a car as a mobility product where car itself represents just a piece of the holistic mobility package is the right standpoint. Total cost of ownership/usership is another critical turning point on the way to e-car. TCO/TCU has to be the reason to outweigh the traditional car concept and create momentum. Customer is going to evaluate benefits from the features like pay-as-you-drive, car2go, car-sharing, car-pooling and others yet to be invented and support the concept as a respectable pay-off. Once the early adopters approve the usership business model arriving at around 16% of the market, early majority will jump in and there will be no going back (KPMG, 2012).

4. FUTURE BUSINESS MODELS

As stated above, owning a car will have a diminishing role in the mind of the future customers. With the increase of ecological awareness more rational approach to mobility is going to be developed, regarding the sustainability and an overall improvement of the lifestyle. This will lead to growing customer expectations in the field of traffic and mobility concepts. Taking into consideration the conflicting priorities in this field, it could happen that only few of the OEMs will manage to sustain profitable in the long run by focusing only on product related features and profit streams. That is why the automotive industry players have to challenge and shake up their current business models in order to satisfy ever demanding mobility requirements and secure sustainable margins and profit streams for the future development. By 2020, an automotive will transform to mobility market and realign the existing business models.

During our research, we have identified portfolio for possible business model that will emerge in the near future. As you can see in the figure below business models are deployed between two concepts - car and mobility. First axis the "mobility concept" describes two extremes of mobility offerings to the customers. It ranges from basic mobility to the holistic mobility which is reflected in expanded mobility, increased convenience and improved lifestyle services. The second axis denotes the car concept in the future business

model landscape. From one side there is a physical ownership of the car and mobility is inevitably connected to the car itself, while the other side is completely opposite. Instead of owning a car there is a concept of car usership. Together with this concept a lot of new areas for mobility business models arise.

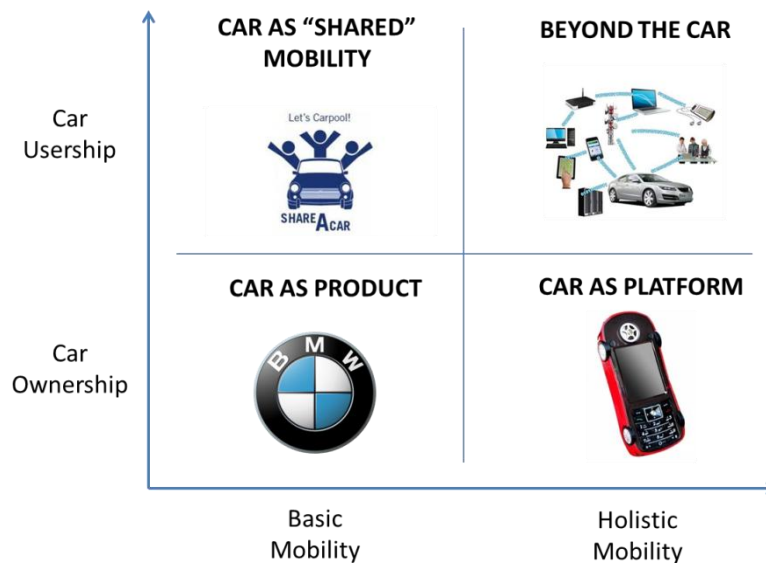


Figure 2: Portfolio of possible business models

These four possible business models represent the end-points in the future mobility market. Although it's possible that some of the market players take these extreme values as their future business strategy, it is more likely that the mixture of these models is going to be the right solution for majority of the players.

Car as product is a business model that largely corresponds to today's car manufacturer. Main competence lies in the state of art technology for producing variety of products, ranging from engine to chassis and lightweight construction parts. What distinguishes this model from the others is a manufacturing excellence that enables the production of high quality and cost effective products. In order to maintain its competitiveness this players have to continuously develop innovative, sustainable and green technologies. The main market segment to focus on is a technology savvy customer who seeks for comfort, independence on one side and eco-friendliness on the other, and they are willing to pay a premium price to acquire the product. Since the main profit stream in this model is coming from sales of the product itself, it is expected that premium vendors will evolve and concentrate on specific market niche. In addition few players who succeed in maintaining necessary margin and economies of scale will take the leadership in the future automotive landscape.

Car as platform is a model that can be seen in today's telecommunication industry. Although there is an inevitable link with the core product, the main emphasis is being moved to service portfolio offered to the customers. What we can witness today in telecommunication industry is that companies are giving cell phone products for free in order to see the additional packet of their services. The similar concept can be expected in automotive industry. Car is going to represent just a platform for enabling a vast number of services around it offered to a customer along the whole product lifecycle. The main difference with the previously mentioned concept lies in technology development. While players focused on car as a product invest in technology innovation and use state of art technology, car service providers use the existing technology and have a low impact on product-based innovation. All the processes beyond their core competencies are outsourced.

This concept is primarily targeting the customer who is still seeking the concrete product to satisfy his/her mobility requirements, but as the same time search for additional services around the core product. Revenue streams in this case are coming from a multiple business opportunities emerged during the whole product ownership cycle. Partnerships, value creation and money distribution among the major players in the industry are characteristics of this model.

Car as "shared" mobility moves the focus from the product itself to the sustainable transport and mobility solutions. In this business model car is seen as just one of the means to satisfy the future mobility demands. Customers will have the possibility to create a multi-modal ways of mobility by using public transportations

and other non-individual transportation means. Car innovation set place in the area of cost-efficiency and practicality. The concept of “shared” mobility will take place. The player will focus on providing mobility solutions without producing a car itself. The main drivers of this model come from reduced cost and increased flexibility for all the customers that just need to move from place A to B. We are moving here from car ownership to the pay per use approach. This will give opportunity to the development of so called collaborative commuting – “We is the new I” (*Smart Mobility magazine*, 2011). Car sharing concept will become the number one mobility solution. It is similar to car rental but mainly for a short distances and regular mobility requirements. Some of the typical representatives of these models are Zip-Car and Car2Go from Daimler Company.

Beyond the car model completely separates the concept of mobility from the car itself. Necessary infrastructure, car, train schedule, parking, an airline, hotel, meetings, online commerce, video conference, connectivity, CO2 reduction, smart phones, tablets are all ingredients in the future mobility requirements that need to be met. It is up to the companies and business model actors to manage them in the effective way in order to create a nice blend of services which will satisfy the customer needs at the highest level.

The main competence of these players lies in the expertise of managing compound relationships with customers and expanding the cooperation and partner networks beyond the automotive industry in order to provide a unique portfolio of additional services. Goal is to provide all the mobility necessities in a customer everyday life. Companies should focus on the segments who doesn't have the need to own the car, on the contrary they see a car as a burden and potential cost generator. The status symbol is being required through a variety of additional mobility services providing along the way. It's not the car that is going to be sold anymore, but the solution to mobility issues required by the customers – more time, lower cost, ecological awareness, better quality of life etc. Automotive manufacturers will move from the car to the lifestyle providers.

5. REALIGNED VALUE CHAIN

Without a question lifecycles between the traditional automotive and e-car industry differ in its fundamentals. In the new automotive age technology suppliers play highly important role and they should closely collaborate with the OEM. The automotive value chain will be considerably different in months and years to come with the high level of uncertainty what is going to lead and control the major technologies and changes in the electric value chain. It may be OEMs, the utility companies, infrastructure providers or maybe some other intermediates. Hard times have come for the automotive stakeholders because reshaping of the value chain is indispensable action towards not grow but existence in the business.

According to KPMG survey 54 percent of respondents believe electric component suppliers will gain a more significant role by 2025, however the survey underestimates the importance of emerging concepts and business models (*KPMG International*, 2012). Still, electric vehicles are gaining the momentum, especially in the last 12 months when they've gone from the strategic long term objectives directly on the streets. Unconventional partnerships are made in order to support new business model to achieve complementary services. Electric vehicle value chain became reality.

Many uncertainties and risks are still influencing the industry mainly because of high electric car prices, complex transition process, missing infrastructure, atypical cooperation needed between OEMs and power producers and still extremely high battery prices. On the other hand, technology for electric cars is available today but the unique silver bullet solution is missing to put all the pieces together. Overall up-front costs are remaining very high for the end customers of e-cars. Essentially, the Total Cost of Ownership paybacks have not been well-articulated so far. For both consumer and fleet managers the initial costs of electric vehicles compared to that of internal combustion engine (ICE) are still incomparably high. Governments are responsible to facilitate and trigger the first move with incentives towards large scale e-car production. In order to influence successful electric vehicle rollouts more cross-sectional cooperation is needed, predominantly between OEMs and power suppliers.

Furthermore, some automakers and vehicle-sharing businesses perceive the mobility concept as part of the electric vehicle offering and value distribution. Business model innovation might be even more important than the technology itself. What the world is searching for is actually a self-sustainable value chain for electric vehicles. In the initial phase, one of the solutions could be a new business processes with the focus on electric car integration to traditional energy billing system including all mobile electricity expenditures one

could make; leasing electric cars, park and charging stations, other mobility web 2.0 brokers and intermediates and finally battery leasing and switching concepts.

Changed provision market is expected to occur as the number of e-cars is increasing. Similarly, the utility companies will create a new revenue stream regarding delivering and charging the electricity. If we try to conceptualize, electric vehicles are adding a great deal to the overall fluctuation in value distribution. An electric vehicle in the grid system will increase considerably electricity revenues over the life of the vehicle. Correspondingly, from the battery supplier point of view, shift to lithium-battery is adding in approximately 10.000 € to the cost of the e-car. Current batteries packs enable up to 100 km before they need to be recharged. Companies that can design and produce these batteries with the same performance at half the current cost will garner a competitive edge. Companies across the value chain are competing to hit this new revenue stream while governments are more and more perceiving battery technology as strategically vital. Revenue stream will be shifting to companies that can provide charging, maintenance and other services yet to come. New service revenue streams will essentially come from services such as infrastructure, communications, retail, media and advertising.

To survive and prosper, all stakeholders should take the necessary steps needed to stay in the game of electric vehicle value chain. The transformed value chain will take the following distribution of value starting from the development and promoting of e-mobility services, building and operating e-mobility, selling and delivering and finally the chain will be closed with service and billing management.

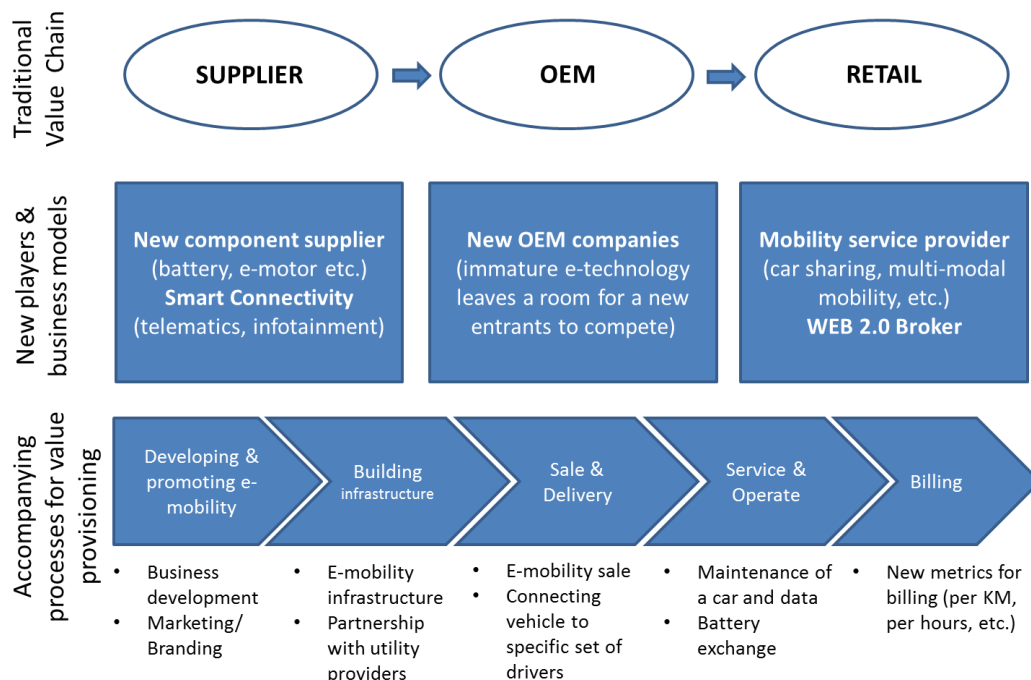


Figure 3: Realignment of the automotive value chain

As any disruptive innovation, the new value chain will bring many white-space opportunities as well as challenges. Only the stakeholders that proactively think in this direction will be the ones taking advantage and leading the way in the next generation.

6. CONCLUSION

Sustainability will have the major impact on demand, margin structure and value chains in the automotive industry. As a result a change in the industry structure can be expected, meaning that existing and new entrants will have to adapt to the new framework and emerging business models in order to achieve sustainable success. The arrival of the electric cars is no longer a question, we could just argue about the adoption rate and course of the development.

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THE ANALYTIC HIERARCHY PROCESS (AHP) APPLICATION IN EQUIPMENT SELECTION

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Abstract: *In those papers, we propose a method for decomposing a decision problem into its constituent parts and building hierarchies of criteria using the AHP concept. The mentioned concept is also used to improve and facilitate group decision-making. Our method is performed through four steps: structuring a decision problem and the selection of criteria, priority setting of the criteria by pairwise comparison (weighing), pairwise comparison of options on each criterion (scoring), obtaining an overall relative score for each option. We intended to show one of the various ways to identify difficult decisions to decision makers. Strengths and weaknesses are also included in order to provide an overall picture.*

Keywords: *AHP, methodology, decision, method, criteria*

1. INTRODUCTION

The **Analytic Hierarchy Process (AHP)** is a structured technique for organizing and analyzing complex decisions. Based on mathematics and psychology, it was developed by Thomas L. Saaty in the 1970s and has been extensively studied and refined since then.

It has particular application in group decision making, and is used around the world in a wide variety of decision situations, in fields such as government, business, industry, healthcare, and education.

Rather than prescribing a "correct" decision, the AHP helps decision makers find one that best suits their goal and their understanding of the problem. It provides a comprehensive and rational framework for structuring a decision problem, for representing and quantifying its elements, for relating those elements to overall goals, and for evaluating alternative solutions.

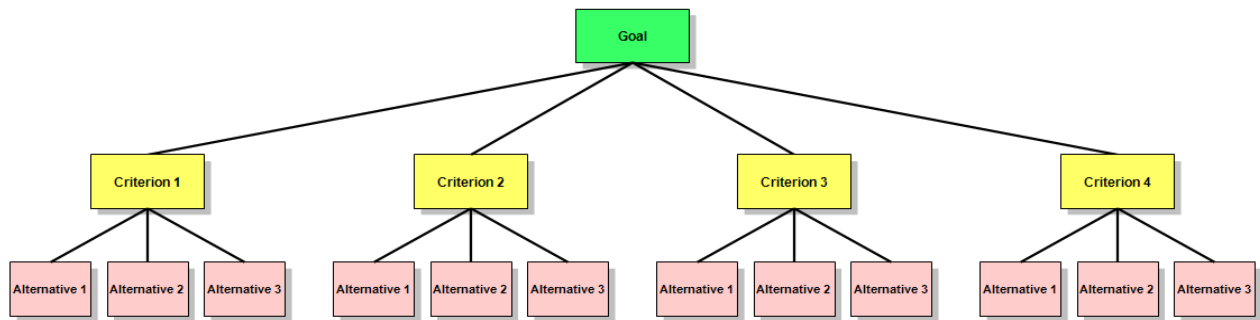
Users of the AHP first decompose their decision problem into a hierarchy of more easily comprehended sub-problems, each of which can be analyzed independently. The elements of the hierarchy can relate to any aspect of the decision problem—tangible or intangible, carefully measured or roughly estimated, well- or poorly-understood—anything at all that applies to the decision at hand.

Once the hierarchy is built, the decision makers systematically evaluate its various elements by comparing them to one another two at a time, with respect to their impact on an element above them in the hierarchy. In making the comparisons, the decision makers can use concrete data about the elements, but they typically use their judgments about the elements' relative meaning and importance. It is the essence of the AHP that human judgments, and not just the underlying information, can be used in performing the evaluations.^[2]

The AHP converts these evaluations to numerical values that can be processed and compared over the entire range of the problem. A numerical weight or priority is derived for each element of the hierarchy, allowing diverse and often incommensurable elements to be compared to one another in a rational and consistent way. This capability distinguishes the AHP from other decision making techniques.

In the final step of the process, numerical priorities are calculated for each of the decision alternatives. These numbers represent the alternatives' relative ability to achieve the decision goal, so they allow a straightforward consideration of the various courses of action.

Several firms supply computer software to assist in using the process.



Picture 1

2. METHODOLOGY

The AHP, as a compensatory method, assumes complete aggregation among criteria and develops a linear additive model. The weights and scores are achieved basically by pairwise comparisons between all options with each other (ODPM, 2004).

Note that AHP, as all MAVT methods, can only be applied when the mutual preferential independence axiom applies.

3. PROCESS

The basic procedure to carry out the AHP consists of the following steps:

1. Structuring a decision problem and selection of criteria

The first step is to decompose a decision problem into its constituent parts. In its simplest form, this structure comprises a goal or focus at the topmost level, criteria (and subcriteria) at the intermediate levels, while the lowest level contains the options.

Arranging all the components in a hierarchy provides an overall view of the complex relationships and helps the decision maker to assess whether the elements in each level are of the same magnitude so that they can be compared accurately. An element in a given level does not have to function as a criterion for all the elements in the level below. Each level may represent a different cut at the problem so the hierarchy does not need to be complete (Saaty, 1990).

When constructing hierarchies it is essential to consider the environment surrounding the problem and to identify the issues or attributes that contribute to the solution as well as to identify all participants associated with the problem.

2. Priority setting of the criteria by pairwise comparison (weighing)

For each pair of criteria, the decision maker is required to respond to a question such as "How important is criterion A relative to criterion B?" Rating the relative "priority" of the criteria is done by assigning a weight between 1 (equal importance) and 9 (extreme importance) to the more important criterion, whereas the reciprocal of this value is assigned to the other criterion in the pair. The weighings are then normalized and averaged in order to obtain an average weight for each criterion.

3. Pairwise comparison of options on each criterion (scoring)

Analytic hierarchy process (AHP)

For each pairing within each criterion the better option is awarded a score, again, on a scale between 1 (equally good) and 9 (absolutely better), whilst the other option in the pairing is assigned a rating equal to the reciprocal of this value. Each score records how well option "x" meets criterion "Y". Afterwards, the ratings are normalized and averaged.

Comparisons of elements in pairs require that they are homogeneous or close with respect to the common attribute; otherwise significant errors may be introduced into the process of measurement (Saaty, 1990).

4. Obtaining an overall relative score for each option

In a final step the option scores are combined with the criterion weights to produce an overall score for each option. The extent to which the options satisfy the criteria is weighed according to the relative importance of the criteria. This is done by simple weighted summation (see the previous chapter).

Finally, after judgements have been made on the impact of all the elements and priorities have been computed for the hierarchy as a whole, sometimes and with care, the less important elements can be dropped from further consideration because of their relatively small impact on the overall objective. The priorities can then be recomputed throughout, either with or without changing the judgements (Saaty, 1990). Remark: Especially in the case of complex sustainability issues the compensability among criteria can be problematic. The idea of 'musts' and 'wants' initially developed by Kepner and Tregoe (1965) and referred to by De Brucker et al. (1995) is a possibility to 'weaken' the compensatory nature of AHP (or other MCA methods), if necessary. An option that does not satisfy one or more 'musts' is considered infeasible and is eliminated from further consideration. The remaining options are then evaluated based on how well they meet the 'wants' (objectives to be maximised).

4. REVIEW

4.1 Evaluation of results

Policy processes:

AHP can effectively support decision making with regard to complex sustainability issues and can help to recognize and define a problem in detail. It is widely used to decompose a decision problem into its constituent parts, which are then structured hierarchically. Multiple and even conflicting goals can be taken into consideration. Furthermore, the paired comparison approach forces decision makers to consider each individual trade-off in the decision problem, which can be a lengthy task. As a result, AHP delivers a ranking of options which facilitates the selection of a policy option. AHP is less suitable for the implementation and the evaluation of implemented policy options.

Sustainability aspects:

AHP is capable to compare long-term impacts, independently of the gauge year. Further sustainability aspects such as (de-)coupling, adaptability, (ir-)reversibility can be incorporated as criteria to compare alternative policies. Also the impacts on distributional effects over different groups/sectors/regions can be included in AHP as separate categories. AHP can compare impacts independently of the global dimension and can be applied to spatial data. Environmental, economic and social impacts can be simultaneously covered by AHP.

Operational aspects:

Manpower and time needs as well as the costs for applying the tool are difficult to estimate and depend highly on the subject. The same goes for data needs and data availability. In general, much data is needed to estimate the impacts, whereas the required amount of expert judgement to explain the results is medium. Qualitative and quantitative data can be incorporated.

The methodology for AHP is clear, straightforward and well documented. Since the approach requires complex calculations, corresponding software supports the users.

Under some circumstances, ranking irregularities can occur when AHP or some of its variants are used. But sensitivity analysis allows the decision maker to assess how alternative ratings would change if criteria weights were changed. AHP can support the modelling of risk in a variety of ways. Particularly, the modelling of relative rather than absolute probabilities and the use of risk adjusted values can provide new opportunities for decision support. No specific time scale is associated with AHP and there are no limitations regarding the geographical coverage.

4.2 Experiences

AHP has been very successful in gaining the acceptance of practitioners, possibly owing to the helpfulness of the hierarchical problem presentation and the appeal of pairwise comparisons in preference elicitation (Salo and Hämäläinen, 1997). The range of reported practical applications is extensive (Vargas, 1990) and includes

Resource Allocation, Strategic Planning and Project/Risk Management. Ramanathan et al. (2001) proposes namely the AHP to address the need for considering multiple criteria and multiple stakeholders in Environmental Impact Assessment (EIA).

Gomez-Limon & Atance (2004) used the AHP technique in order to reveal the preferences that citizens assign to the different possible objectives of the European Common Agricultural Policy (CAP). This methodological approach has been implemented among citizens of Castilla y León (Spain).

AHP as one of the presented MCA methods was not applied during the case study of Sustainability-A-Test. With regard to the topic of the case study, the Biofuels Directive and the Energy Crop Premium, AHP could have been used to decompose and present the policy problem in a multicriteria fashion, and later on to support the stages of policy options description and evaluation.

4.3 Combinations

Although AHP is a decision-making methodology in itself, its ability to elicit accurate ratio scale measurements and combine them across multiple criteria has led to AHP applications in conjunction with many other decision support tool and methodologies. AHP has been used in combination with, linear programming, integer programming, goal programming, data envelope analysis, balanced score cards, genetic algorithms, and neural networks (reported in Millet and Wedley, 2003).

A'WOT (Kurttila et al., 2000) is an example of a combination specially developed for the purposes of practical strategic planning. The approach in which the SWOT (Strengths, Weaknesses, Opportunities and Threats; Wheelen and Hunger, 1995; Hill and Westbrook, 1997) forms the general framework, and the AHP is applied within this framework in order to bring quantitative analysis capacity into the planning process, has been given the name A'WOT. It has also been tested in strategic natural resource planning in state forestry in Finland (Pesonen et al., 2001). As only preliminary tests have been made so far, the method is bound to evolve further, and new versions will be developed (Kangas et al., 2001).

AHP can also be used to compare the impacts of alternative policies generated by other tools like physical assessment tools, modelling tools and environmental appraisal tools. It can be applied in conjunction with stakeholder analysis and, finally, AHP is capable to support the evaluation of alternative policies/plans/projects in SIA and SEA.

4.4 Strengths and weaknesses

The strengths and weaknesses of the AHP have been subject of substantial debate among specialists in MCA.

4.4.1 Strengths:

The advantages of AHP over other multi criteria methods are its flexibility, intuitive appeal to the decision makers and its ability to check inconsistencies (Ramanathan 2001). Generally, users find the pairwise comparison form of data input straightforward and convenient.

- Additionally, the AHP method has the distinct advantage that it decomposes a decision problem into its constituent parts and builds hierarchies of criteria. Here, the importance of each element (criterion) becomes clear (Macharis et al. 2004).
- AHP helps to capture both subjective and objective evaluation measures. While providing a useful mechanism for checking the consistency of the evaluation measures and alternatives, AHP reduces bias in decision making.
- The AHP method supports group decision-making through consensus by calculating the geometric mean of the individual pairwise comparisons (Zahir 1999).
- AHP is uniquely positioned to help model situations of uncertainty and risk since it is capable of deriving scales where measures ordinarily do not exist (Millet & Wedley 2002).

4.4.2 Weaknesses:

Despite the popularity of the AHP, many authors have expressed concern over certain issues in the AHP methodology.

Many researchers have long observed some cases in which ranking irregularities can occur when the AHP or some of its variants are used. This rank reversal is likely to occur e.g. when a copy or a near copy of an existing option is added to the set of alternatives that are being evaluated. Triantaphyllou (2001) proved that rank reversal is not possible when a multiplicative variant of the AHP is used.

According to Belton (1986) and Belton and Gear (1997) a key issue for the AHP ranking reversals is the interpretation of the criteria weights. However, the AHP and some of its variants are considered by many as the most reliable MCDM method.

The AHP–method can be considered as a complete aggregation method of the additive type. The problem with such aggregation is that compensation between good scores on some criteria and bad scores on other criteria can occur. Detailed, and often important, information can be lost by such aggregation.

With AHP the decision problem is decomposed into a number of subsystems, within which and between which a substantial number of pairwise comparisons need to be completed. This approach has the disadvantage that the number of pairwise comparisons to be made, may become very large ($n(n-1)/2$), and thus become a lengthy task (Macharis et al. 2004).

Another important disadvantage of the AHP method is the artificial limitation of the use of the 9–point scale. Sometimes, the decision– maker might find difficult to distinguish among them and tell for example whether one alternative is 6 or 7 times more important than another. Also, the AHP method cannot cope with the fact that alternative A is 25 times more important than alternative C (see also Murphy, 1993; Belton and Gear, 1983; Belton, 1986). Due to the discussion on the scale’s restrictions, Hajkovicz et al. (2000) modified the procedure in their study by using a 2–point–scale, due to time constraints placed on decision makers. So the decision makers only indicated whether a criterion was more or less important or equally important to its partner.

5. A WORKED EXAMPLE

The AHP deals with problems of the following type.

A firm wishes to buy one new piece of equipment of a certain type and has four aspects in mind which will govern its purchasing choice: expense, E; operability, O; reliability, R; and adaptability for other uses, or flexibility, F. Competing manufacturers of that equipment have offered three options, X, Y and Z. The firm’s engineers have looked at these options and decided that X is cheap and easy to operate but is not very reliable and could not easily be adapted to other uses. Y is somewhat more expensive, is reasonably easy to operate, is very reliable but not very adaptable. Finally, Z is very expensive, not easy to operate, is a little less reliable than Y but is claimed by the manufacturer to have a wide range of alternative uses. (This is obviously a hypothetical example and, to understand Saaty properly, you should think of another case from your own experience.)

Each of X, Y and Z will satisfy the firm’s requirements to differing extents so which, overall, best meets this firm’s needs?

The firm has four factors in mind: expense, operability, reliability and flexibility; E, O, R and F respectively. The factors chosen should be independent, as required by Saaty’s mathematics. At first sight, E and R are not independent but, in fact, what is really shown is that the firm would prefer not to spend too much money but is willing to do so if the results justify it. We first provide an initial matrix for the firm’s pairwise comparisons in which the principal diagonal contains entries of 1, as each factor is as important as itself.

	E	O	R	F
E	1			
O		1		
R			1	
F				1

There is no standard way to make the pairwise comparison but let us suppose that the firm decides that O, operability, is slightly more important than cost. In the next matrix that is rated as 3 in the cell O,E and 1/3 in

E,O. They also decide that cost is far more important than reliability, giving 5 in E,R and 1/5 in R,E, as shown below.

	E	O	R	F
E	1	1/3	5	
O	3	1		
R	1/5		1	
F				1

The firm similarly judges that operability, O, is much more important than flexibility, F (rating = 5), and the same judgement is made as to the relative importance of F vis-à-vis R. This forms the completed matrix, which we will term the Overall Preference Matrix (OPM), is:

	E	O	R	F
E	1	1/3	5	1
O	3	1	5	1
R	1/5	1/5	1	1/5
F	1	1	5	1

The eigenvector (a column vector but written as a row to save space), which we will call the Relative Value Vector (RVV), is calculated by standard methods (see Annex A) as (0.232, 0.402, 0.061, 0.305). These four numbers correspond, in turn, to the relative values of E, O, R and F. The 0.402 means that the firm values operability most of all; 0.305 shows that they like the idea of flexibility; the remaining two numbers show that they not desperately worried about cost and are not interested in reliability. The CR is 0.055, well below the critical limit of 0.1, so they are consistent in their choices. It may seem odd not to be interested in reliability but the RVV captures all the implicit factors in the decision context. Perhaps, in this case, the machine will only be used occasionally so there will be plenty of time for repairs if they are needed. We now turn to the three potential machines, X, Y and Z. We now need four sets of pairwise comparisons but this time in terms of how well X, Y and Z perform in terms of the four criteria, E, O, R and F. The first table is with respect to E, expense, and ranks the three machines as :

	X	Y	Z
X	1	5	9
Y	1/5	1	3
Z	1/9	1/3	1

This means that X is considerably better than Y in terms of cost and even more so for Z. Actual cost figures could be used but that would distort this matrix relative to others in which qualitative factors are assessed. The eigenvector for this matrix is (0.751, 0.178, 0.071), very much as expected, and the CR is 0.072, so the judgements are acceptably consistent. The next three matrices are respectively judgments of the relative merits of X, Y and Z with respect to operability, reliability and flexibility (just to remind you, X is cheap and easy to operate but is not very reliable and could not easily be adapted to other uses. Y is somewhat more expensive, is reasonably easy to operate, is very reliable but not very adaptable. Finally, Z is very expensive, not easy to operate, is a little less reliable than Y but is claimed to have a wide range of alternative uses):

Operability:

	X	Y	Z
X	1	1	9
Y	1	1	3
Z	1/9	1/3	1

Eigenvector (0.480, 0.406, 0.114), CR=0.026

Reliability:

	X	Y	Z
X	1	1/3	1/9
Y	3	1	1/3
Z	9	3	1

Eigenvector (0.077, 0.231, 0.692), CR=0 (perfect consistency)

Flexibility:

	X	Y	Z
X	1	1/9	1/5
Y	9	1	2
Z	5	1/2	1

Eigenvector (0.066, 0.615, 0.319), CR= 0.

The reason that Y scores better than Z on this criterion is that the firm does not really believe the manufacturer's claims for Z. The AHP deals with opinion and hunch as easily as with fact. The final stage is to construct a matrix of the eigenvectors for X, Y and Z:

	E	O	R	F
X	0.751	0.480	0.077	0.066
Y	0.178	0.406	0.231	0.615
Z	0.071	0.114	0.692	0.319

This matrix, which we call the Option Performance Matrix (OPM), summarises the respective capability of the three machines in terms of what the firm wants. Reading down each column, it somewhat states the obvious: X is far better than Y and Z in terms of cost; it is a little better than Y in terms of operability, however, X is of limited value in terms of reliability and flexibility. These are not, however, absolutes; they relate only

to the set of criteria chosen by this hypothetical firm. For another firm to whom reliability was more important and who wanted to avoid expense, the three machines might score quite differently. Those results are only part of the story and the final step is to take into account the firm's judgements as to the relative importance of E, O, R and F. For a firm whose only requirement was for flexibility, Y would be ideal. Someone who valued only reliability would need machine Z. This firm is, however, more sophisticated, as, I suspect, are most firms, and has already expressed its assessment of the relative weights attached to E, O, R and F in the Relative Value Vector (0.232, 0.402, 0.061, 0.305). Finally, then, we need to weight the value of achieving something, R, say, by the respective abilities of X, Y and Z to achieve R, that is to combine the Relative Value Vector (RVV) with

the Option Performance Matrix (OPM). Technically, the calculation is to post-multiply the OPM by the RVV to obtain the vector for the respective abilities of these machines to meet the firm's needs. It comes out to (0.392, 0.406, 0.204) and might be called the Value For Money vector (VFM). In matrix algebra, $OPM \cdot RVV = VFM$ or, in words, performance*requirement= value for money. In those terms, this suggested method might have wide applicability. The three numbers in the VFM are the final result of the calculation, but what do they mean?

First, in simple terms, they mean that X, which scores 0.392, seems to come out slightly worse in terms of its ability to meet the firm's needs than does Y at 0.406. Z is well behind at 0.204 and would do rather badly at satisfying the firm's requirements in this illustrative case. Secondly, the three decimal places are, in practical terms, illusory, and X and Y are equal at 0.4. A coin could be tossed but, in the real world, it might be sensible to go for X as the option putting least pressure on cash flow. Thirdly, and perhaps most importantly, the vector of the relative merits of X, Y and Z follows ineluctably from judgements made by the

firm as to its requirements and by their engineers as to the capabilities of differing machines. There is a strong audit trail from output back to inputs. Of course, anyone who understands the AHP mathematics might be able to fiddle the judgements so as to guarantee a preferred outcome, but that is unavoidable except by vigilance.

6. CONCLUSION

Through this paper we presented a methodological approach which implies structuring criteria of multiple options into a system hierarchy, including relative values of all criteria, comparing alternatives for each particular criterion and defining average importance of alternatives. The goal of using this method is to single out and offer one out of several decisions. It should be done by setting apart unnecessary decisions and choosing the ones that has the biggest impact on the main goal. AHP method offers meaningful and rational framework for structuring problems, presentation and quantification of elements that make a problem. Techniques of putting together these elements and techniques of evaluating alternative solutions enable directing towards a final solution.

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CASE STUDY

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MARKETING COMMUNICATION STRATEGY OF REUSABLE BRANDED BOTTLE EQUA ON THE EX-YUGOSLAVIA MARKET

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Abstract: Awareness about ecology, waste reduction, harmful chemical compounds in plastic and overestimated price of bottled water, have all created potential buyers for reusable products. The aim of manufacturers was to quickly meet buyers' need with the production of reusable, trendy, and economical bottle for water.

This case study presents a practical example of Slovenian company ZkotZ d.o.o. and its leading brand for reusable plastic bottles for water, EQUA. Authors of this case study present implementation of marketing communication strategy on the ex-Yugoslavia markets.

This case study is designed to present different methods marketing communication strategy for a new concept of reusable and ecological product. The differentiation of targeted markets is minimal due to the fact that all of them belong to an ex-Yugoslavia region and therefore share similar preferences and awareness about ecology. The case study particularly emphasizes representing a new product and its communication forms, used to raise awareness about health and ecology that could be transferred to similar markets.

Keywords: marketing strategy, communication, brand, EQUA, bottle, ecology, lifestyle

1. INTRODUCTION

January 16th 2012, Ljubljana, Slovenia, miss Tina Šegota, marketing manager for EQUA brand, brand owned by ZkotZ d.o.o. Company, was working hard during the weekend to put together annual marketing plan for 2012. While Miss Šegota was on her way to work, she could not help herself not thinking about the fact that she noticed - company had excellent sale results in the last quarter of 2011. Brand EQUA recorded rapid growth, by introducing innovative communication strategy to Slovenian Market, and by entering new markets such as Croatian market. The only thought that was rushing through mind while she was preparing for Monday morning board meeting, was what a great potential EQUA brand has on ex-Yugoslavian market. Miss Šegota was so excited that she needed to share this great potential for company's growth with her colleagues.

"We should focus more on ex-Yugoslavia market if we want to achieve our goals. Also we should adapt EQUA's marketing communication strategy for specific market if we want to attract new customers" - was the most common feedback that Miss Šegota received from her colleagues. She also presented this proposal for position on ex-Yugoslavia market to Mr. Anže Miklavc, CEO of ZkotZ d.o.o. Company in board meeting.

After the meeting Mr. Miklavc was sitting in his chair, drinking his favourite coffee, and thinking about Miss Šegota's just proposed. He picked up the phone and revised his final decision – "I think that your proposal has great potential. Also, I agree that we need to plan our marketing plan for ex-Yugoslavia market. But we also need to think how to reposition EQUA brand on Slovenian market and retain our consumers."

2. COMPANY BACKGROUND

The ZkotZ d.o.o. company was established in year 2009 as a part of Ljubljana University Incubator, and today counts 7 employees. The company is fully owned by Anže Miklavc who is also the founder of the company. Presently, the company owns brands EQUA, Ushakes and Outbox. EQUA is an international brand with the headquarters situated in the capital of Slovenia, Ljubljana.

At the moment EQUA brand has the strongest presence on only two markets, Slovenian and Croatian market, but is also present on several other markets including Austria, Finland, Germany and The Netherlands. Having in mind business results that EQUA brand achieved in last year and market potential for this kind of product, the CEO of ZkotZ d.o.o. is thinking about expanding their business to some new markets in year 2012.

Organizational structure of the ZkotZ d.o.o. company

Company counts 7 employees, and each of them has its own position and field of business to cover. Employees' positions and field of business that they cover are as following:

- ❖ *CEO* – in charge of company's core business activities, the highest level of responsibility, final decision maker;
- ❖ *Project manager* – in charge of new projects (expanding the product portfolio), event management (the first Pillow fight in Slovenia), media relations;
- ❖ *Marketing manager* – in charge of all marketing activities on ex-Yugoslavia markets, relationship management with B2B key accounts on ex-Yugoslavia markets, communication with sales channels and distributors;
- ❖ *Creative director* – responsible for all visual communications and ideas related to products and brand's visual communication;
- ❖ *Manager for Dutch market* – in charge of all business activities on Dutch market, including marketing activities and support to distributors;
- ❖ *Manager for Austrian and German market* - in charge of all business activities on Austrian and German market, including marketing activities and support to distributors;
- ❖ *Manager for brand Ushakes* – in charge of all business activities on Slovenian market, including marketing activities and support to distributors.

3. PRODUCT PORTFOLIO

Company ZkotZ d.o.o. owns three brands: EQUA, Ushakes, and Outbox. The most successful brand is EQUA, which has the greatest share in company's annual profit, around 80 %. Even though brand Ushakes was created before brand EQUA, company decided to introduce EQUA brand based on the results of market research on the Slovenian market.

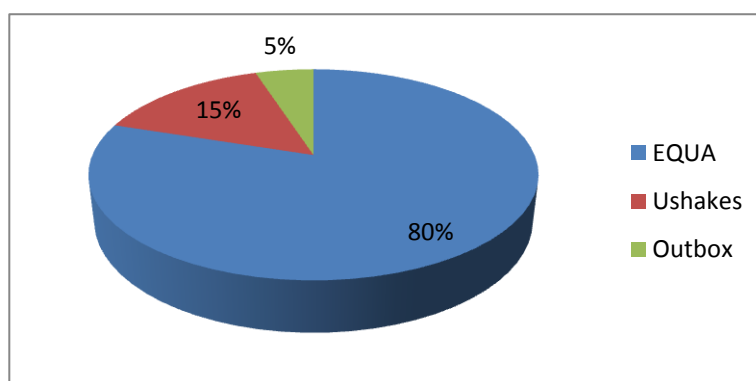


Chart 1: Share in company's annual profit by brands for 2011

EQUA is the biggest and the strongest brand of the company. It was created in April 2010. At the moment brand EQUA is the main focus of the company. It represents environmentally friendly reusable bottle for water. It is an excellent alternative for any kind of plastic bottles, in same time it encourages consumers

not to use regular plastic bottles, which usually end up as waste. It does not take up valuable landfill space like wasted plastic bottles and the best thing about EQUA is being friendly to users' health and to the environment. What makes EQUA bottle more suitable to use is the material EQUA is made of which does not contain harmful chemical compound bisphenol A (later referred to as BPA), which could be found in regular plastic.

EQUA's philosophy is very clear: "We care about the world and our main focus is to operate our business in a sustainable way." Its philosophy is also communicated in brand's slogan "For your health and nature's wealth".

Ushakes is a healthy meal substitute which contains more than 20 vital vitamins, minerals and other crucial nutrients and comes in two basic variations: sports edition flavoured with vanilla and banana, and diet edition

flavoured with vanilla and strawberry. With daily consumption of all the nutrition crucial for users' normal body and mind function, everyday stress immediately transforms into challenge. Not only users feel and look great, their performance and productivity are also brought to the highest level.

Outbox is brand that focuses on video production – preparation of audio and video ads and material.

About brand EQUA and its products

The brand name consists of two words *eco* and *aqua* which together form EQUA. The name stands for ecological, reusable and trend products. At the moment main product presented by the brand is reusable plastic bottle for water names after the brand. The EQUA bottle can be used for different purposes and at various situations: at home, in the office, during sport activities or even while having a walk through the city. On top the bottle is very practical, light and easy to use on a daily basis. Slogan of the brand "For your health and nature's wealth" directly represents the EQUA bottle which is healthy and eco-friendly.

The EQUA bottle is one of the best alternatives for regular plastic bottles. The latter are made of materials which can react with the content of the bottle if used regularly. Therefore the content in a regular plastic bottle could become dangerous for consuming and it could seriously jeopardize consumers' health. What makes the EQUA bottle more suitable to use is the material the product is made from and which does not contain harmful chemical compound BPA. Each bottle carries the "BPA free" certificate that guarantees that consummation of content from the EQUA bottle is 100 % healthy and harmless for both human and environment. The EQUA bottle is meant for long-term and is recyclable.

Additional ecological aspect of brand EQUA is cooperation with local ecological organizations. By purchasing EQUA bottle, consumers' are donating 10 % of net profit to ecological organizations.

Product characteristics: All EQUA bottles are made of high quality material tritan copolyester, which contains a mold release derived from vegetable based sources. The material is branded Eastman Tritan which is one of the best manufacturers of harmless plastic material. Its most outstanding features are excellent toughness, hydrolytic stability, and heat (100 °C) and chemical resistance. Bottles from EQUA collection can be filled with liquids, which do not exceed 110 °C temperature. The bottles can be washed in dishwasher.

Normally, unnecessary emissions are used for production, transport and storing of a regular plastic bottle. They are also harmful for the environment and have consequences to our health. There are not any extra emissions used for production of tap water, which is simply the most ecological and the cheapest to drink. Official certificate indicates that the bottle is made out of "food contact materials", which are intended to be in contact with food or drink.

At the moment there are 13 different bottle designs (See Picture 1). Product size: 400 ml and 600 ml.



Picture 1: *The collection of EQUA bottles*

4. BUSINESS SEGMENTATION

EQUA bottles are being sold through different distribution companies across the region. For example, through distribution companies specialized for supermarkets, fitness centres, gift shops, office stores, pharmacies, etc. At the moment brand EQUA is present on Slovenian and Croatian market. There is no difference in both markets therefore both are divided into B2B and B2C segments (See Picture 2).

B2B segment

B2B-1 (sellers)	B2B-2 (users)
Retail stores	Big and small companies
Designer product stores	Banks, post offices and telecommunication companies
Gift shop	Tourist offices, tourist information centers, travel agencies
Pharmacies and drugstores	Pharmaceutical companies
Fitness, aerobics and yoga centers	Water filter companies
Eco and bio stores	Municipalities, universities, elementary and secondary schools, student clubs
Bookstores	The organizers of various events: conferences, sports events, children's workshops, ecological events
Toy stores	
Office material stores	
Gas stations	

B2C segment

In the B2C segment sales are conducted via web store.
Consumer groups, for which the product is most appropriate:

- Eco-conscious individuals.
- Athletes (professionals, amateurs and recreational).
- Parents with young children, pregnant women and mothers with babies.
- People who work in offices.
- Students.

Picture 2: *Market segmentation for brand EQUA*

5. MARKETING COMMUNICATION ON EX-YUGOSLAVIA MARKETS

Brand EQUA combines ecology and lifestyle. When communicating with its target markets there is a strong need to combine ecology, lifestyle and fun.

Communicating ecology

When emphasising ecology, there are several benefits that have to be communicated. First and foremost important is the benefit of “BPA free” certificate, which is present on every EQUA bottle and is the biggest benefit for EQUA’s customer (See Picture 3). The certificate stands for its fine quality material, which enables customers to fearlessly drink non-contaminated drinks.



Picture 3: *EQUA’s “BPA free” certificate*

The second ecological benefit is the bottle being the best alternative for regular plastic bottles. Main topic is that the bottle if used daily, could replace 169 regular plastic bottles used by the customer when buying soft drinks or bottled water.

Those two benefits are mostly combined in EQUA’s communication. Both are usually communicated in PR messages addressed to ecological and health magazines, whose readers are eco-conscious individuals and parents with young children, pregnant women and mothers with babies.

Ecological attitude of the brand is shown through “10 %” concept, in which 10 per cent of net profit of each sold bottle is donated to local ecological organization. In year 2010 EQUA decided to cooperate with Slovene ecological organization *Ecologists without borders*, which organizes the largest environmental project World Cleanup in Slovenia. The cooperation continued through the years and in 2012 EQUA

decided to make customized bottle for World Cleanup in Slovenia (See Picture 4) to help the organization raise finances for the project.

Due to the fact that in 2012 brand EQUA entered Croatian market, it carried forward the same model of "10 %" concept. Therefore EQUA decided to cooperate with Croatian ecological organization Žmergo, which organizes the largest environmental project World Cleanup in Croatia. This is the first World Cleanup project in Croatian and EQUA made customized bottle for World Cleanup Croatia (See Picture 4) to help the organization raise finances for the project.



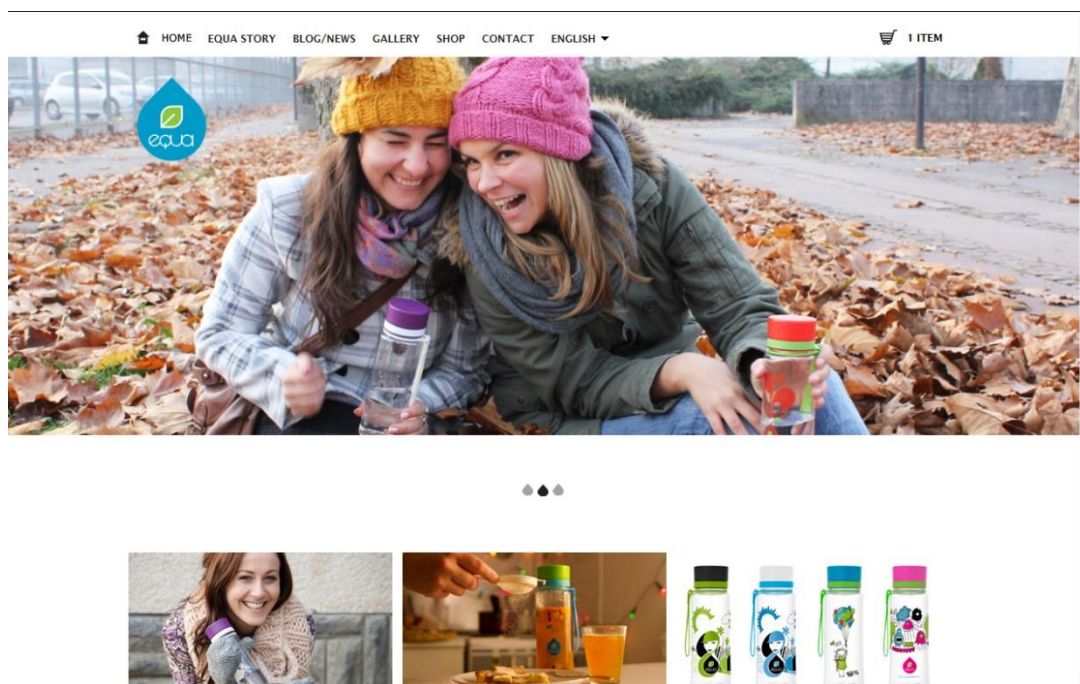
Picture 4: Customized bottles for World Cleanup 2012 events in Slovenia and Croatia

Communicating lifestyle

EQUA's lifestyle is all about trends, fun and fashion. Its designs are created to enable each individual to find the bottle which will meet its preferences and enable self-expression. Therefore EQUA's collection is being upgraded at least once a year to constantly follow design trends and customers' preferences.

Recently EQUA started to communicate the lifestyle by using the phrase *myequa*. This stands for using EQUA products daily and at various situations and to enable to user to express trendy and ecological attitude.

The implementation of the phrase began with the upgrade of EQUA's web page in February 2012. The web page uses internet name www.myequa.com (See Picture 5). The web page has five different languages: Slovene, Croatian, English, German and Dutch. It is designed to communicate happiness, the use of EQUA bottles in various situations and to give its users as many information they need.



Picture 5: Brand's web page www.myequa.com

The funny side of EQUA brand is communicated in events. In October 2011 EQUA and Radio Antena co-organized the first Pillow fight in Slovenia. The event took place at Students' Arena, a three day event in Ljubljana, where young people have the opportunity to listen to different lectures, take place in workshops and get useful information about student's life. Pillow fight was communicated via Facebook, in PR messages, in Radio Antena, and outdoor ads and fliers placed around Ljubljana's faculties (See Picture 6). Special pillows were made for the event and were given to participants. The event in Slovenia got lots of media coverage including TV, radio, magazines and web pages.

EQUA is going to organize Pillow fight every year and its goal is to make this event traditional. In 2012 Pillow fight Slovenia is going to take place at Students' Arena event as in year 2011 and Pillow fight Croatia is going to be organized in Zagreb for the first time. Both events will take place in October. The aim is to connect EQUA brand with youth and fun.



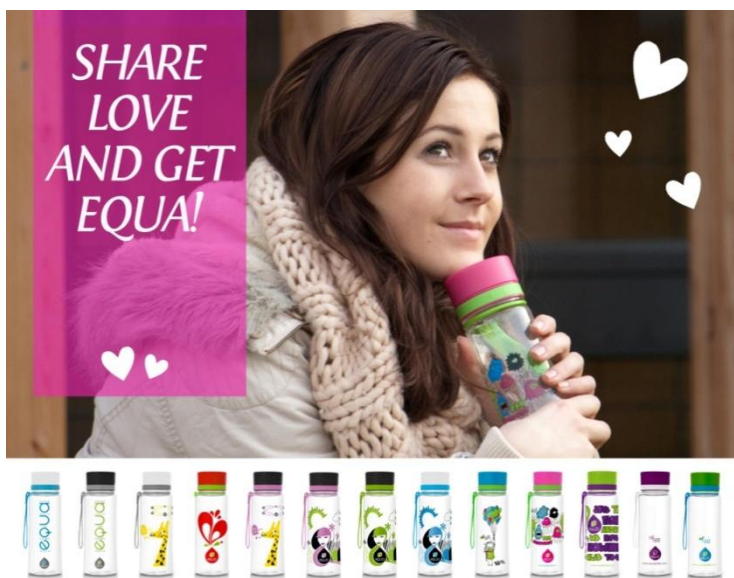
Picture 6: Pillow fight 2011 advertisement

One of the main communication channels for EQUA is Facebook. EQUA has 4 different Facebook profiles, but only three are active. These three profiles aim to communicate with different public in their own language and are named after different markets. Among active ones there are *EQUA – pijem zdravo, darujem za naravo* for Slovenian customers (active for two years), *EQUA – for your health and nature's wealth*, which communicates in English and German language and is meant for Austrian, German and countries excluded from ex-Yugoslavia region (active for two years), and there is *EQUA Hrvatska* for Croatian customers (active since the end of December 2011). Non active is *EQUA Serbia*, but it is soon to be activated.

On Facebook EQUA strives to be fast in answering fans requests and questions. This channel is used to provide news about the arrival of new designs and products and to give different tips about EQUA lifestyle.

To reach its fans EQUA also uses several social media channels as Twitter, Flickr, LinkedIn, Vimeo, Youtube, but Facebook is its priority. Flickr is the second most used social media channel where EQUA posts its visual content communicating happiness and variety.

In February 2012 EQUA decided to increase the number of fans on EQUA Hrvatska's profile by organizing prize game "Share Love and Get EQUA" (See Picture 7). The "Share Love" game lasted for 14 days and followers were invited to share daily posted pictures on their walls and therefore compete for daily prize. EQUA Hrvatska's fan base increased by 1.104 unique new likes and at the moment counts 2.029 unique likes. Because of the success of "Share Love" game on Croatian Facebook page it was later on conducted also on Slovene Facebook page.



Picture 7: "Share Love and Get EQUA" Facebook prize game layout

6. CONCLUSION

Company ZkotZ d.o.o. launched brand EQUA in the time of economical crisis in Slovenia. But despite the political and economical troubleshoot; brand EQUA received great appreciation among its users. EQUA is an example how a good product, its well thought marketing communication strategy and fast response to customers' needs could prosper in billowing economy.

The same as many Slovene companies, EQUA decided to enter ex-Yugoslavia markets due to the similarities and conjoined history. Marketing communication practices, which were firstly implemented in Slovenia and showed good results, were duplicated to Croatian market. Those have a good potential to be duplicated also to other ex-Yugoslavia markets EQUA is going to enter. Nonetheless, successful marketing communication practices from ex-Yugoslavia markets are also going to be implemented to Slovenian market, and the results will be compared to discover the small differences of the markets.

Due to the fact that EQUA is a young brand which enables two types of communication – ecology and lifestyle mixed with trends and fun – EQUA strives to constantly participate in raising environmental awareness and to communicate healthy lifestyle.

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INFORMATION TECHNOLOGIES IN CONTEMPORARY SCHOOL MANAGEMENT SYSTEM, CASE STUDY

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Abstract: Improvements within the management system of schools as part of an ongoing process of improving the education system, have reached a certain level. This paper aims to observe modes, levels and specific problems in application of information technologies in informing, information sharing and collaboration as important aspects in ensuring quality in control of the processes that occur at school. Some deficiencies in application of information technology within these processes have been identified, and alternatives to solving them have been offered. The solution discussion was performed according to the parameters that were extracted as important in the problem analysis. A school that is recognized in Zlatibor region and elsewhere in Serbia for its advanced development tendencies was selected for the case study. The proposed solutions are practically applicable in any work collective.

Key words: management, education, information technologies, groupware software, teamwork

1. INTRODUCTION

As Stjepan Staničić pointed out in his Current trends in school management, management in education can be defined as coordination of human, physical and financial resources in the education sector to achieve the goals set by the state, local and school educational policy, legislation system and concepts and projections of the education development (Staničić, 2008).

Modern approach to the development of schools, especially in terms of quality assurance of the processes that take place within the institution, requires also the development of appropriate software solutions for effective monitoring and control of the process. The school managements in Germany, Denmark, Ireland and the Benelux countries apply special software for the process management, which allows simultaneous monitoring and coordination of different processes, ensuring optimization of the schools' functioning. (Rottluff, 2008)

Previous efforts for a more intensive application of information technology in the educational system of Serbia involved the application of various software solutions and internet in teaching, electronic Grade Book, accounting programs, e-mail application, the application of EIS and others. New products constantly come onto the market and in combination with existing products realize a new functionality (Saračević & Mašović, 2011). This paper will show the current status and ways of monitoring several distinct processes within the school and offer several solutions for improvement.

2. GENERAL OVERVIEW OF THE COMPANY

It was on February 27, 1960 when Technical School Užice was opened. Its establishing emerged from the need for education of personnel for the economy and public services in mechanical, electrical, metallurgical and construction sectors. In 2010, it celebrated its fifty year anniversary. The period from the year 2002 on has been marked by participation of the school in various projects, intensive arranging and equipping of the school, the introduction of new educational profiles, but also by continuous training of teachers in modern teaching methodologies.

Several years back, there have been from 1050 to 1150 students in the school; this academic year the enrolled students attend classes in 40 regular classes, whereas there are 32 in the four-year education (11 pilot classes) and eight classes in the three-year education, including two experimental ones. In 2003, the school entered the first phase of the Reform of vocational education in which, through CARDS I, the European Union through the European Agency for Reconstruction and Development financed the reconstruction of the school building, procurement of modern teaching devices and equipment for experimental educational profile – a machining operator, but also the training for modern methods of work

within the school. Internal and external carriers of change, in addition to the director, passed a series of seminars that helped the employees start using new ways of working in educational practice. In August 2006, the school entered the second phase of the Program of reform of vocational education as one of four schools in Serbia, where the European Agency for Reconstruction funded the introduction of new educational profile in the sector of information - communication technologies, a telecommunication electrician. The program was successfully completed in May 2008. Apart from the obtained equipment, the teachers have undergone a series of training that enabled them to apply modern forms of work in their teaching, aiming at gaining functional knowledge by the students and facilitating their involvement in work after they complete secondary education. A Seven-member school delegation paid a study visit to the Vocational school, "Otto Brenner" in Hanover in October 2007.

Technical School Užice was the Saint Sava award winner for the year 2006. Serbian Chamber of Commerce and Regional Chamber of Commerce Užice awarded Technical school the plaque for its contribution to the economic development of the region and the Chamber system in 2007 and the plaque "Captain Misa Anastasijevic" for the results achieved in the promotion of entrepreneurial culture and creativity in 2009.

At the moment, the school is implementing the project "Regional centers of competence ReCeKo - Serbia" in which the school has been involved since September 2009 as one of 12 schools in Serbia. The project aims to develop vocational schools into the regional centers of competence for vocational education. The project is being implemented in cooperation with the Ministry of Education and with the financial support of German organization for technical cooperation - GTZ. The school delegation visited "MM school for multimedia and information technology" in Hanover, Germany, which should become a partner school in the project realization. Since March 2010, the school has been involved in the project "Modernization of Vocational Education" implemented by the Ministry of Education with technical and financial support from the European Union (IPA 2007), as a continuation of the Program of reform of vocational education, whose three phases were implemented over the past six years. The school is undertaking activities to include itself into the program International recognition for young people - MEPI.

During the past decade, the school timely recognized modern tendencies in the development of vocational education and engaged itself in many projects - so today Technical school is recognized in the wider region for its work and success.

3. SPECIFIC FIELD OF OPERATION

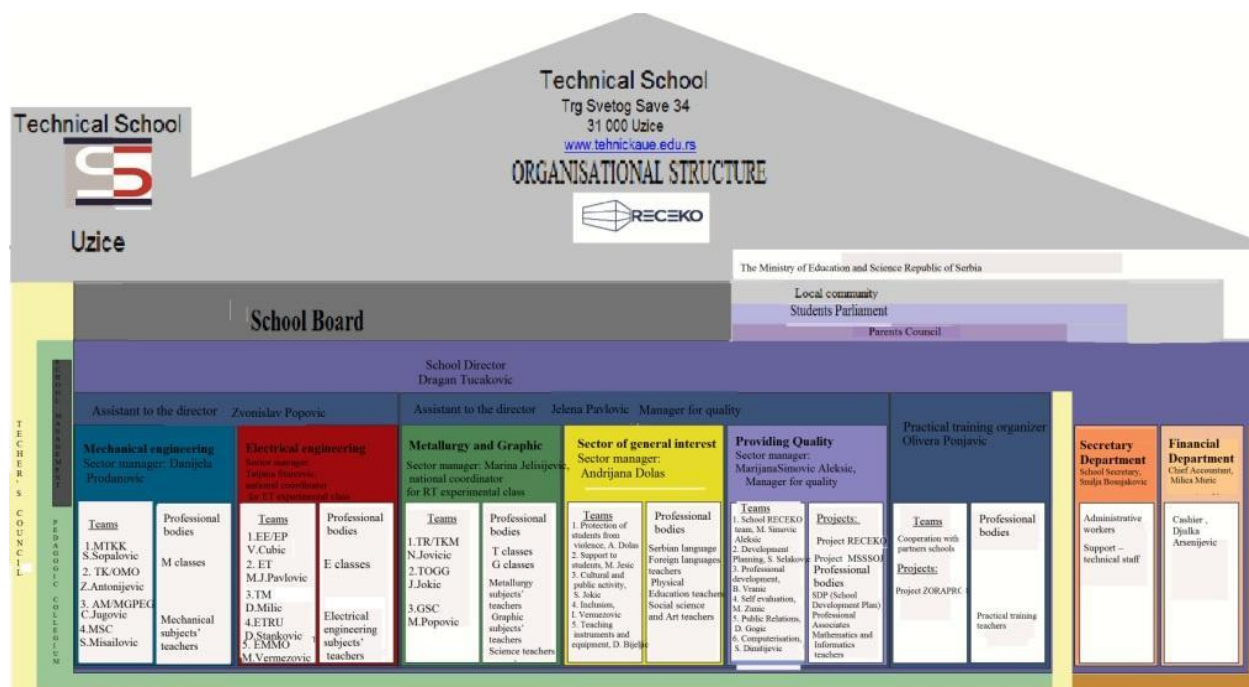
The fields of education and service delivery in education today differ much compared to the ones that existed several years ago. According to the current Strategy for the Development of Vocational Education in Republic of Serbia, adopted by the Government, institutions for vocational education and training develop and implement programs and modules of various types in accordance with appropriate standards, i.e. programs of initial vocational education, trainings and programs for professional development and knowledge updating, which are customized and intended for different target groups (youth, adults, employed, unemployed, people with special needs). The ultimate goal remained the same - successful student and successful teacher; however, the methods used to obtain these, roughly called, "final products" are significantly different than they used to be. The school management has to select the most productive methods to achieve the ultimate goal.

4. SPECIFIC DECISIONS AND PROBLEMS

Quality improvement and modernization of educational work in secondary vocational education involves the introduction of new program contents and organizational innovations (Komlenović, 2004). Being aware of the specificity of educational activities, but also the historical and cultural heritage, it should be noted that the introduction of innovations, which go beyond the usual understanding of school, is a potential source of problems. In this context, the imposition of new standards in communication between the subjects of the educational process will be one of the challenges for the transformation of schools in Serbia. Therefore, the development of activities to implement the measures in terms of improving educational services, in addition to finding optimal organizational and methodological solutions, must be accompanied with aspects of motivating all subjects as well.

4.1 THE CHANGE OF THE ORGANIZATIONAL STRUCTURE

In accordance with ReCeKo project which anticipates introduction of innovations in the areas of organization, management and financing of vocational schools, the following organizational structure of the school was established in 2011:



Picture1: Organizational structure of the Technical school Uzice

Managers were appointed, teams were formed, the new structure became established and key performance indicators were put in place in accordance with the ReCeKo project:

- Self-responsible school that in measurable way, constantly improves the quality of its work and contributes to regional economic development.
- More intensive and better direction of learning opportunities of vocational schools in Serbia to local and regional needs
- Standardization and quality in accordance with the EFQM model

As it was said in case study Building high performance teams, done by the firm Human Synergistics With the overall aim of developing a culture of collective achievement, the focus is 'empowerment', 'personal responsibility' and 'team decision making', which is completely applicable here. Overarching this is a clearly defined set of 'core values', designed to guide everyone's behavior. These are: integrity, participation, teamwork, continuous innovation and personal development.(Human Synergistics, 2010)

The new organizational structure of management in its first year of implementation has led to a more efficient division of labour in comparison to the previous organization, as well as to a layered division of responsibility, which was the objective. However, some problems in the lower layers of the organization were reported.

The critical issue here was the need to take on more staff to meet increasing volumes, but at the same time reduce expenditure. The two were clearly not entirely compatible unless something is changed in the way the operations were managed. Put bluntly, there needed to be a profound increase in productivity.

4.2 PROBLEM ANALYSIS

Before approaching the observation of problems involved with the process of organizational adaptation of the education system at the level of basic organizational unit such as a school, it is necessary to review the resources which Technical school in Uzice brings into this process. Bearing in mind that communication -

information aspects of education have a significant place in the considered changes, a particular attention has been paid to the information - technology and multimedia resources.

The school has following resources:

▪ **Human resources:**

Table 1: Human resources

Professional profile	Number of executors		Education degree							
			VII2	VII1	VII	VI	V	IV	III	I
Teaching staff	Teacher	94,7	1	1	82,3	9,4	1			
Internal and external change carriers	Internal	0,2			0,2					
	External	0,2			0,2					
Managing staff	Director	1			1					
	Assistants to the director	1,5			1,5					
	Practical training organizer	1			1					
	Sector managers	1,5			1,5					
Professional associates	Psychologist	1			1					
	Pedagogue	1			1					
	Librarian	2			2					
National coordinators for experimental classes	Electro-Telecom technician	0,3			0,3					
	Recycling Technician	0,2			0,2					
Administrative staff	Secretary	1			1					
	Administrative workers	1,5						1,5		
Financial staff	Chief Accountant	1						1		
	Cashier	1						1		
Support technical staff –	Caretakers	2					1	1		
	Hygienists	14								14
Total executors		125,1	1	1	93,2	9,49,4	2	24,5	4,5	14

14

▪ **Material-technical resources:**

Table 2: Material-technical resources

Resource	Total no	Area (m ²)
Classrooms	11	487
Specialized classrooms	19	1150
Laboratories	8	372
Workshops	5	440
Gym block with two rooms	1	653
Library with reading room	1	70
Conference hall	1	35
RE-CE-KO office	1	35

▪ **Information - technology (IT) and multimedia equipment**

Table 3: Information-technology (IT) and multimedia equipment

Type of equipment	Where is it used?	Number of items
Personal Computer	in teaching	105
Personal Computer	out of teaching	18
Video beamer	in and out of teaching	4
Graph scopes	in teaching	6

For monitoring and controlling of the processes that are happening in the school Director, sector managers and team leaders use the same tools as the employees use to exchange information and for being informed generally:

- meetings and telephone as key players
- electronic mail as a further step
- shared folders within the network (it is used by a small percentage of employees)
- web site: www.tehnickaue.edu.rs

The employees are accustomed to all these ways of communication. In most cases, all participants must be at the same place and at the same time.

The analysis of the school specificities in terms of :

- existing resources
- the organization of the lessons (work in two shifts)
- schedule mismatch of the teachers – teams' members
- communication styles
- specific obstacles faced by employees in their work

the following problems are distinguished:

1. teachers don't have their own space to work
2. insufficient number of computers for teachers' needs
3. educators perform major part of their work on professional preparation and responsibilities as members of the teams out of the institution
4. team meetings are held mainly in the evening, after the afternoon shift, when the efficiency of employees is significantly reduced
5. the employees stress unsatisfactory level of mutual communication and cooperation
6. the employees stress unsatisfactory level of communication and cooperation with other structures in the school
7. the employees stress unsatisfactory level of communication and cooperation with clients and parents
8. lack of interactivity of the school's web site
9. inertia of the education system in the procurement of new computer equipment

The question is whether it is possible:

- That each employee achieves the established 'core values'
- To achieve effectiveness of teams
- That the team leader has a good insight into the work of his/her team
- That the sector manager has a good insight into the work of teams.
- That the school Director has a good insight into the work of sector

without use of the advanced information and communication technologies? Because only high-quality, accessible and maintained information may be key to business success .

E-mail, though very effective, has a number of limitations; shared folders also have a number of flaws. Unfortunately, the experience gathered in recent years clearly shows that for modern and efficient school operations former selection of the information and communication technologies is less and less sufficient.

It is time to move a step forward.

5. ALTERNATIVES

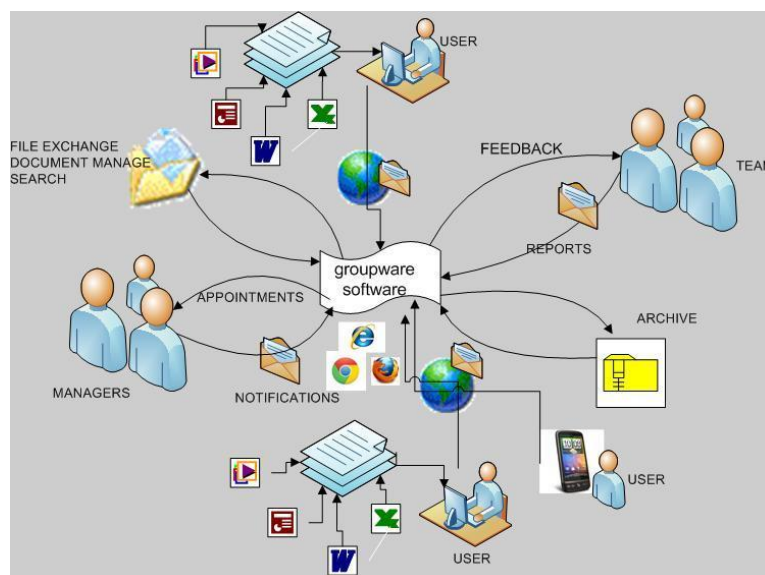
What is needed for more efficient operation?

- Document Management
- Information management
- Projects Management

It can be performed by certain software, let's call it "collaboration software", the software that raises the level of communication within the organization, regardless of whether it is the: client-server architecture, solutions based on Web technologies, solutions, whose use is enabled through the Cloud.

The software should solve several problems:

- the availability and reliability of information
- ease of monitoring more activities that are performed at the same time
- document management, and just as importantly, organized and safely stored business information which can be used to analyze previous business results and allow making better business decisions



Picture 2: Infrastructure of the collaboration software

Table 4, shows some of the possible alternative solutions, which feature separation by categories.

Table 4: Comparison of the possible solutions

software name	price	multiple users in the same time	capacity	supported file formats	mobile access	technical knowledge	security
wiki	free	editing	without limit	/	available	minimal	weak
Google Docs or Google Apps	free	share open edit	5GB for storage	.doc,.docx .xls,.xlsx .ppt,.pptx .odt,.pdf ...	available	very low	password protected
Microsoft Skydrive	free	share open edit	7GB for storage	Microsoft Office, OneNote	available	very low	password protected
Facebook group	free	editing	/	.doc,.docx jpeg,...	available	very low	strong
Teamwork hosted	2500euros per year	comfortable environment	without limit	many	available	low	password protected

We will start the analysis with the commercial software. Their common feature is that they are of comfortable graphic design and provide a range of additional tools for communication and collaboration (for example, software support for the whiteboard). For this analysis, we chose Teamwork, as representative of medium expensive software. Teamwork is a proven, reliable and friendly web based project management solutions for handling work in any field. Teamwork is often chosen by universities as supporting application for project management courses. It is mainly a tool for collecting work data in real time, while the projects are running. It also provides several tools to estimate work to be done. This type of software would completely satisfy all the requirements of "collaboration software", previously exposed, and even provide greater functionality for convenient work of the employees.

Wiki pages have two very good features - unlimited capacity and minimal technical knowledge required for using the service; however three of the seven extracted features are not good enough. Multiple users cannot use the service at the same time, users enter data in a given environment, which means that the solution does not support multiple file formats and there is no data protection against unauthorized alteration, in this case it is only possible to restore the previous version, but this feature excludes the possibility of selective allocation of rights to specific users, which we have singled out as an important feature in consideration of general characteristics of "collaboration software".

The formation of groups on the social network Facebook is certainly a kind of solution, but it introduces the problem of socio-psychological nature in terms of its use, so it will not be specifically commented on here. SkyDrive and Google services are quite similar in their characteristics; the only difference is the capacity for data storage. SkyDrive is more preferable there. The good sides of both of these services are that they provide all basic functions that we have selected as important for "collaboration software", and that they are free. They do not give such comfortable graphical interface, nor additional features, but we must say they are satisfactory option for free services.

6. DISCUSSION OF THE SOLUTION

The school has approached the process of organizational changes comprehensively and with consideration of all relevant parameters. Of course, it was taken into account that, in our conditions, this is a pioneer attempt and that the solutions adopted would significantly influence needs to change the existing practices in our education process.

Generally, school's requirements are such that it is necessary to meet the terms of the following parameters:

1. The rate, since the school budget is very limited and buying software would certainly not have been identified as a priority
2. The possibility that multiple users work simultaneously on the same document, because this option saves time needed for meeting
3. Document capacity
4. Number of supported file formats, depending on the needs especially in the field of vocational subjects where number of current file formats can be rather big and demanding
5. The possibility to access documents and information by mobile devices, as the percentage of employees with those requirements increases
6. Technical knowledge required to use the software service is an important parameter because there are employees who have lower level of skills in the use of information technology, especially among the older members
7. Data security is important in terms of unauthorized access and permission of access to a specific set of information and documents.

The school was to assess which parameters are most important to it and make choices accordingly, being sure that any of the solutions would result in more or less higher level of communication than the present one, and thus increase the effectiveness of teams, including the sector. Normally, free software was considered first. Wiki pages were rejected because of the weak security, which is not acceptable for most of the files, and because the environment for file formats is not comfortable. The formation of groups on the social network Facebook was rejected because of the reasons of socio-psychological nature, previously mentioned. The choice was on Google services or Microsoft SkyDrive. Features of these two solutions, as previously mentioned, are very similar. Technical school Uzice chose the solution SkyDrive. The possibility of

integration with some of the Microsoft educational software later on and better help support determined the choice. The decision was made shortly before writing this paper, so the effects of the implementation can be the subject of another analysis.

However, the necessary requirements will be met by introducing SkyDrive based collaboration software. The possibilities that this software offers, are defined through the next several paths.

What does this collaboration software bring in relation to the previous solutions for the communication of the teams members? What does this collaboration software bring in relation to the previous solutions for monitoring and controlling the process of performing the tasks and aims done by team leaders? The team is working on a task, all are granted certain rights, which control the visibility of information and documents. Team leader establishes rights for the team members. The information is also placed on the "wall" of the document, and in accordance with the rules of conduct, co-workers are able to see it immediately and respond to it. If someone is a member of several teams, all relevant information will be shown on his/her wall. Another gain in relation to e-mail is that it is easy to track changes. Suppose that a team member wrote a document and put it on the portal of his/her team. All team members can look at it and possibly make amendments or changes. The new version, but also any old one, will still be available to everyone, and it will be known who changed it, when and what was changed. So if a team member wants to look at the document after a while, he/she will not be in a dilemma whether the electronic mail attachment, which he found is indeed the final version or at some point someone may have forgotten to send it to him. Team leader can monitor the level of performance of each team member. With this software that employees use at school or home, the problems numbered from 1 to 6 are overcome.

What does this collaboration software bring in relation to the existing solutions in monitoring and controlling the effectiveness of teams' work for the sector managers? Team managers and the sector manager may form a new communication group, which would work on similar principles as described above. The sector manager defines access rights.

What does this collaboration software bring in relation to the existing solutions in monitoring and controlling the processes that are ongoing in the school for the school director? The Director and the sector managers may make the highest hierarchy group in the collaboration software. Problems given in numbers from 7 to 9 will be moderated by these solutions.

7. CONCLUSION

The new organizational structure in the management system, strategically established and organized teams and set 'core values' for each employee have led to increased efficiency and productivity of the school in carrying out its activities. The implementation of software solutions aimed at optimizing the processes occurring within the teams and especially within the sectors will raise the accomplished levels of efficiency and productivity further more; at the same time the employee satisfaction will also be raised. The employees will be able to perform part of their obligations anytime and anywhere; they will be able to establish communication and cooperation with other team members in an easy and reliable way.

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PROFITABILITY EVALUATIONS OF INVESTMENTS IN REGIONAL LANDFILLS IN REPUBLIC OF SERBIA

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1. INTRODUCTION

Investments in environmental protection are the obligation of each country. Proper removal, disposal and recycling of waste must be established as a practice, primarily because of environmental reasons, that is to create a better and healthier environment for living. Adequate disposal of various wastes directly improves living conditions in the region in which to build the landfill because the waste is passed directly to the sanitary area which is designed in a way that prevents any negative impacts on local soil, groundwater, rivers etc. In addition, construction of a sanitary landfill at the same time includes removing all illegal dumpsites in the region and divert their waste into one location. Investment in environmental protection, and in that context, in the construction of regional landfills is one of the main conditions for joining the European Union. All laws, acts, measures adopted must be harmonized with EU directives, in accordance with this, all objects that are used in environment management must be built according to European standards.

Investments in regional sanitary landfills require large resources to be invested in infrastructural facilities at the landfill and equipment used for collecting and recycling waste. Raising the necessary funds, especially in transition countries such as Serbia is not easy. Because there are multiple interests in the improvement of living environment, and for the construction of landfills, the structure of investors in construction is often varied. Apart from local and state Governments, investments often include foreign donors and private creditors. Some are primarily interested in the improvement the environment, local government and donors, where as creditors are primarily interested in making profit, that is maximizing return on the investment. No matter what the goal is, all investors are interested in landfills ability, either as an independent, private enterprise, and either as part of local government, to operate positively, to exert its own income, which will be sufficient for the smooth functioning in the lifetime, which is extremely long.

Precisely because there is more potential investors, before entering into the financing and construction of the landfill future business and financial analysis must be conducted. The essence is to make adequate financial structure so that local authorities can hold on the burden of the investment, then to attract donors and in the end to make private investors satisfied with the achieved interest rate. To approve the financing of such a large project cost effectiveness analysis of the investment should be carried out. The most widely used methods for this purpose is the calculation of Net Present Value of the project and the calculation of Internal Rate of Return.

The aim of this study is to show that investment in the regional landfills in addition to being good for the local community and state in terms of environmental improvements, it is also economically profitable for all participants in the project, because modern landfills, as private or public companies, may independently collect revenue and thus operate independently realizing profits for its founders. To support this view, the study will present financial analysis of future functioning of two regional sanitary landfills in Serbia, whose construction is in progress. These are: Regional Landfill in Northbacka-region (Regional Landfill Subotica) and the regional landfill in the eastern part of Serbia (Regional Landfill Zajecar). All data presented in the study come from preliminary designs which are made for the construction of the landfills. Company Hidrozavod DTD ad Novi Sad was engaged in designing these projects and their managers allowed us access to data published further in the text.

2. WASTE MANAGEMENT STATUS IN SERBIA

Waste management in Serbia is inadequate and it possesses public health and environmental hazards. Only about 60 % of produced municipal waste is collected in Serbia (around 2.4 million tonnes per year). The collection is organized in urban areas mainly, and organized collection is missing in rural areas, except in AP

Vojvodina. Up to now, land filling was the only waste treatment method. Last years, and from year to year more and more, several other waste treatment methods are implemented, like recycling, waste combustion in cement kilns, composting, producing energy from biomass, etc. The existing disposal sites generally do not meet the technical requirements of sanitary landfills and their capacity in most municipalities is already exhausted. In addition to the registered landfills there are 4,481 illegal dumpsites of different size in rural areas. Dumpsites present a potential risk for ground and surface water and soil, due to the high concentration of organic matter and heavy metals.

The Government of the Republic of Serbia adopted first National Waste Management Strategy (NSWM) in 2003, and adopted new revised version, foreseen for period 2010-2019, in april 2010. NSWM 2010 follow the same approach as previous NSWM, but give updated list of the waste management regions and more detailed scheme for different waste streams. According to the NSWM 2010, 26 waste management regions are envisaged to be established. The NSWM also includes Action plan for its implementation with precise administrative and technical measures and deadlines for their realization. Regarding progress made in terms of policy and legislation harmonisation with the EU, waste management is one of the Government of Serbia priorities.

According to short-term objectives of the Strategy on Waste Management 14 regional landfills have to be constructed up to 2014. The considered study covers financial aspects of two of 26 SWM regions, foreseen by Strategy on Waste Management 2010: the city of Subotica region and (Bačka Topola, Kanjiža, Mali Iđoš, Senta, Čoka and Novi Kneževac). Total number of the population in this region is 280,025, census 2002. And the city of Zajecar region and six municipalities (Knjazevac, Boljevac, Bor, Kladovo, Majdanpek and Negotin). Total number of the population in this region is 265.541 censuses 2002.

3. DYNAMIC METHODS AS AN INSTRUMENT FOR RATING COST-EFFECTIVENESS OF PROJECTS

The sum of discounted net cash flows (Net present value) represents a principle indicator of profitability. A positive NPV shows that a project will bring profit to its investors and that it is justifiable. And the opposite, a negative NPV points that a project will generate losses and that it is not justifiable to consider it for realization. In that sense the NPV can be considered as elimination criteria in the project evaluation process. The formula for calculating NPV is (Mikerevic, 2005 p. 168):

$$NPV = \frac{FV}{(1+k)^n} \quad (1)$$

NPV- Net Present Value

FV-Future Value

k-discount rate

n-number of periods

If the cash flows have different annual amounts, as is the case with the projects presented, summarizing the discounted annual cash flows must be conducted in order to obtain a net present value at the end of the project. This is done by the formula (Mikerevic, 2005 p. 171):

$$NPV = \sum_{t=1}^n YA_t \left(\frac{1}{1+k} \right)^t \quad (2)$$

YA-Year amount

t-current year

k-discount rate

The Internal Rate Return, on the other hand, represents a relative indicator measuring a project's average profit rate of return. The more IRR ends up above the discount factor, or a referent acceptable threshold of the rate of return, the more acceptable and the more attractive project becomes. In principle, if the IRR is below the discount factor the project is not financially acceptable and the other way around, if it is above it, the project is financially acceptable. Since the IRR may be set at different levels depending on investor's preferences and their readiness to accept a particular rate of return, these criteria is considered selection criteria. Its basic purpose is to help investors make the right decision in terms of alternative uses of available

capital. IRR is the discount factor that reduces NPV to zero and is calculated by the formula (Krasulja, 2000 p. 303):

$$C = \sum_{t=1}^n \frac{R}{1 + IRR^t} \quad (3)$$

C-Present value

R-Yearly net cash flow

IRR- Internal rate of return

n-Number of periods

IRR formula is almost identical as the NPV formula, but the difference is that, in NPV calculation discount factor (k) is pre determined, whereas in IRR calculation NPV is reduced to zero value, in order to find the discount factor or the IRR. Finding IRR can only be done as a result of higher or lower number of attempts. The IRR can only be approximated couple of times and then found.

4. IMPORTANT ISSUES FOR THE ANALYSIS

The financial analysis aimed at the calculation of the adequate net return indicators, has the following basic steps to elaborate the financial analysis:

- calculation of the investment cost,
- calculation of the operation cost,
- calculation of the estimated revenues,
- calculation of the discounted cash flow as the base for calculation of IRR (Internal Rate of Return) and NPV (Net Present Value).

In order to evaluate acceptability of the project a projection of its annual cash flow has been made and then used to calculate the Net Present Value of the project (NPV) and its Internal Rate of Return (IRR). Future costs and revenues flow have been discounted by applying a discounting factor which reflects opportunity costs. Financial analysis and evaluations of the projects are based on several key assumptions, amongst which the most important are as follows:

Time horizon

A time horizon of a project, its expected life cycle duration, is an important part of any analysis and evaluation of the project. It often impacts a final judgment about the project: longer duration of the project means longer cash flows and due to discounting effects a higher Net Present Value.

The logic behind the project's time horizon is based on its assumed economic life cycle, that is, the period in which it can create economic benefits to its investors and/or the community. In this sense, the end of a life cycle is, in theory, defined as the moment when all invested resources would be depreciated and financial liabilities finally covered. In real life, this moment is defined as a moment in time when it is possible to sum up all project's effects (all financial inflows and outflow) and reach the final judgment about whether the investment has been justifiable or not.

Guide to Cost Benefit Analysis of Investment Projects prepared by the Directorate General of Regional Policy of the European Commission based on the OECD's analysis from 1993 – suggests that the time horizon for a project of construction of the regional landfill is 30 years (p.100). For projections of cash flows and their discounting and calculation of the most important indicators of the project acceptability: NPV and IRR we will use period of 33 years for regional landfill in Subotica and 24 years for regional landfill in Zajecar. Also in the study, because of the page limitations, will not be shown every year of the landfills life, thus only the data from several years are shown.

Prices used in the calculation

Financial analysis is based on tariffs expressed in Euros as fixed prices from 2011. as the base line year for the calculation of all indicators. This is a usual approach in financial analyses and it is not used only in situation when changes in relative relations between prices of particular inputs (raw materials, reproduction materials, services, etc.), or outputs (products/services) are expected with certainty for instance due to administrative control of tariffs and the like.

Given the character of investments and the structure of planned inputs and outputs we may accept the assumption of fixed prices and the fact that it will correctly reflect the relations between the mentioned inputs and outputs. On the other hand, fixed prices enable avoiding general fluctuation of prices and exchange rates (frequent oscillations and weakening of the dinar against euro during a long period of time) which pose a real risk due to the current macroeconomic situation in Serbia.

Exchange rate used in the calculation

When the work on the projects began the official exchange rate was 1 euro to 103 dinars therefore we kept the same rate until the end of the work. Using the same exchange rate in calculations of financial indicators enabled consistency and comparability of all indicators and results in the study.

Discount factor in financial evaluation

Discount rate or factor which is going to be used in this financial analysis is 5%, which is also suggested by the above mentioned „Guide to Cost Benefit Analysis of Investment Projects“ of the European Commission. Such discount rate is appropriate for infrastructural projects whose primary goal is not achieving high financial effects but, primarily, creating conditions for the improvement of surrounding community.

5. FINANCIAL ASPECTS OF PROJECTS

Before we determine the Net Present Value and Internal Rate of Return, it is necessary to recognize the individual components that have an impact on the profitability of projects. In that sense we should analyze investments in a landfill, especially in the first phase related to the construction of the largest part of the landfills. In addition to successfully determine the Net Present Value we must carry out a projection of costs and revenues for the prescribed life of the landfills and examine their structure and dynamics. Especially important for assessing the cost-effectiveness is an overview of sources of financing projects. Here we must make a difference between borrowed and own funds of the municipals, also the calculation of the NPV and IRR has to be conducted from investments point of view and from municipals point of view. Characteristics of investments in environmental projects are grants awarded by various funds in the EU and funds of the Government of Serbia, which if excluded from the NPV and IRR analysis greatly increase the profitability of projects.

Investments projection

Investments in the regional landfills consist predominantly of investments in fixed assets. The major activity of the future landfill companies will refer dominantly to services, so it will not need large stocks (if any) of raw materials, inventories, etc. At the same time the nature of the operations is such that it will not assume many and frequent payments to the suppliers and other partners as well as large payables, and based on that, frequent financial outflows. Because of these reasons, the future companies generally will not need large working capital. Simply recapitulation of the investments without the list of specific fixed asset items and for the purpose of the financial analysis structures them into the four following categories:

- Land;
- Buildings and infrastructure;
- Equipment;
- Other (including interest).

Table 1: Investments in fixed assets, in 000 Euros Subotica

No	ITEMS	Phase I, 2012-13	Phase II, 2020	Phase III, 2027	Phase IV, 2034-35	Phase V, 2034-36	Phase VI, 2034-37	Total
1	Land	0	0	0	0	0	0	0
2	Building	1,019	20	20	20	20	0	1,098
3	Infrastructure	18,898	3,704	3,740	3,545	3,566	1,087	34,540
4	Equipment	9,247	0	0	0	0	0	9,247
5	Other	3,216	1,155	1,166	1,106	1,095	331	8,070
	TOTAL	32,380	4,879	4,926	4,671	4,681	1,418	52,956

Table 2: Investments in fixed assets, in 000 Euros Zajecar

No	ITEMS	Phase I, 2014	Phase II, 2018	Phase III, 2022	Phase IV, 2027	Phase V, 2032	Phase VI, 2038	Total
1	Land	0	0	0	0	0	0	0
2	Building	1,133	9	9	9	9	0	1,171
3	Infrastructure	12,901	545	463	2,186	585	1,184	17,865
4	Equipment	7,884	0	0	0	0	0	7,884
5	Other	5,149	168	144	657	180	353	6,650
	TOTAL	27,067	722	616	2,853	775	1,537	33,571

Expenses projection

Operating costs have been classified into three groups:

- Material costs
- Salaries
- Non-material costs
- Interest

Table 3: Total operative costs of regional landfills

No	ITEMS/YEAR	Subotica				Zajecar			
		1	2	16	33	1	2	12	24
1	Material costs	2,910.4	2,910.4	1,785.2	1,945.0	2,618	2,618	858	907
1.1.	Fuel	301.2	301.2	301.2	301.2	181	181	181	181
1.2.	Energy	66.7	66.7	66.7	66.7	40	40	40	40
1.3.	Sanitary water	16.0	16.0	16.0	16.0	11	11	11	11
1.4.	Services	20.0	20.0	20.0	20.0	12	12	12	12
1.5.	Other material costs	11.0	11.0	11.0	11.0	6	6	6	6
1.6.	Maintenance	569.1	569.1	643.9	678.2	298	298	308	336
1.7.	Depreciation	1,926.4	1,926.4	726.4	840.9	2,071	2,071	300	321
2	Gross salaries	605.1	605.1	605.1	605.1	604	604	604	604
3	Non-material costs	36.8	36.8	36.8	36.8	22	22	22	22
4.	Interest	0.0	0.0	114.9	0.0	0	0	131	0
	TOTAL (1+2+3+4)	3,552.2	3,552.2	2,542.0	2,575.9	3,244	3,244	1,615	1,533

Income projection

The Landfill companies are going to generate revenues from the two main groups of activities:

- Collecting solid waste and charging the existing (or maybe extended) group of clients for the service; and
- Selecting and recycling collected SW and selling it to different buyers.

The initial, somewhat, simplified but yet realistic assumption has been that around 50% of the so-called recyclable waste will be processed at the local level, therefore this part will never end up on the regional landfills. In other words, total amounts of waste will be reduced for this part. The other half of the recyclable waste will be received and recycled at the regional landfills.

Table 4. show revenue calculation based on revenues from receiving and land filling the solid waste coming from municipalities in the regions. The calculation has been done based on estimated movement of total

amounts of MSW generated in the Regions. The other source of revenues will be revenue from recycling of the waste which will be received at the landfills.

Table 4: Calculation of total revenues of regional landfills

ITEMS/YEAR	Subotica					Zajecar				
	1	2	16	32	33	1	2	12	23	24
Tipping fee	1,974.5	1,973.9	2,170.4	2,763.4	2,807.6	950	950	724	764	764
Recycling	901.5	915.9	2,475.2	4,647.4	4,721.7	1,436	1,436	3,869	4,084	4,084
TOTAL	2,876.0	2,889.8	4,645.6	7,410.7	7,529.3	2,386	2,386	4,593	4,848	4,848

Sources of finance

Sources of financing the construction of regional landfills in Serbia are generally structured from several sources, domestic and foreign. Since this is a large amount of investment that the municipality can not finance by themselves and bearing in mind that this is an investment in environmental protection, EU usually approve grants for this kind of projects. The rest of the funds is collected from municipal revenues, the Serbian Government, foreign and domestic loans.

The success of the first investment phase, out of six, is crucial for the final implementation of the Project. This is the phase where, practically, the whole sanitary landfill will be built and serviced with equipment, while investments in the phases that follow will pertain, primarily, to additional construction, expansion and maintenance.

Table 5: Sources of finance, Subotica

No	ITEMS	Phase I	Phase II	Phase III	Phase IV	Phase V	Phase VI	Total	Structure in %
1.	International (EU) grant	12,948						12,948	24.8%
2.	Eco fund	7,823						7,823	15.0%
3.	Ino-credit	6,258						6,258	12.0%
4.	Municipalities	4,643	4,879	4,926	4,671	4,681	1,418	25,219	48.3%
	TOTAL	31,672	4,879	4,926	4,671	4,681	1,418	52,248	100.0%

Table 6: Sources of finance, Zajecar

No	ITEMS	Phase I	Phase II	Phase III	Phase IV	Phase V	Phase VI	Total	Structure in %
1.	International (EU) grant	12,027	0	0	0	0	0	12,027	36.6%
2.	Eco fund	6,469	0	0	0	0	0	6,469	19.7%
3.	Ino-credit	6,426	0	0	0	0	0	6,426	19.6%
4.	Municipalities	1,419	722	616	2,853	775	1,537	7,923	24.1%
	TOTAL	26,341	722	616	2,853	775	1,537	32,844	100.0%

Cash flow for calculating NPV and IRR

Cash flow used to calculate the Net Present Value – NPV and the Internal Rate of Return – IRR (Economic Flow of the Project) has been formed with the basic goal to evaluate acceptability of the projects from the viewpoint of invested resources.

Table 7: Project cash flow for NPV and IRR calculation, Subotica

No	ITEMS/YEARS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
I	INFLOW	0	2,876	2,890	2,903	2,917	2,929	2,942	4,120	4,186	4,229	4,297	4,341	4,410	4,455	4,526	4,572	4,646	5,841
1.	Revenues		2,876	2,890	2,903	2,917	2,929	2,942	4,120	4,186	4,229	4,297	4,341	4,410	4,455	4,526	4,572	4,646	5,841
2.	Liquidation value		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
II	OUTFLOW	32,380	1,566	1,568	1,536	1,539	1,542	1,603	6,589	1,725	1,731	1,739	1,827	1,835	1,862	6,797	1,883	1,891	2,001
1.	Investments	32,380	0	0	0	0	0	0	4,879	0	0	0	0	0	0	4,926	0	0	0
2.	Material costs		984	984	984	984	984	984	984	1,021	1,021	1,021	1,021	1,021	1,021	1,021	1,059	1,059	1,059
3.	Non-material costs		37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
4.	Gross salaries		605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605
5.	Tax on profit		-59	-58	-90	-87	-84	-23	85	62	68	75	164	172	199	207	182	191	300
III	NET INFLOW (I-II)	-32,380	1,310	1,322	1,367	1,378	1,388	1,339	-2,469	2,461	2,498	2,558	2,513	2,575	2,593	-2,270	2,689	2,754	3,840

Table 7: (Continuation)

No	ITEMS/YEARS	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
I	INFLOW	5,934	6,029	6,125	6,223	6,323	6,424	6,527	6,631	6,737	6,845	6,955	7,066	7,179	7,294	7,411	26,193
1.	Revenues	5,934	6,029	6,125	6,223	6,323	6,424	6,527	6,631	6,737	6,845	6,955	7,066	7,179	7,294	7,411	7,529
2.	Liquidation value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,664
II	OUTFLOW	2,011	1,987	2,019	2,029	6,747	2,085	2,094	2,103	2,113	2,123	6,814	2,178	2,188	2,199	2,209	3,638
1.	Investments	0	0	0	0	4,671	0	0	0	0	0	4,681	0	0	0	0	1,418
2.	Material costs	1,059	1,022	1,022	1,022	1,057	1,057	1,057	1,057	1,057	1,057	1,057	1,093	1,093	1,093	1,093	1,093
3.	Non-material costs	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
4.	Gross salaries	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605
5.	Tax on profit	310	324	355	366	376	386	395	404	414	423	433	443	453	464	474	485
III	NET INFLOW (I-II)	3,923	4,042	4,107	4,194	-424	4,340	4,433	4,528	4,625	4,723	141	4,888	4,991	5,095	5,201	22,555

Table 8: Project cash flow for NPV and IRR calculation, Zajecar

No	ITEMS/YEARS	0	1	2	3	4	5	6	7	8	9	10	11	12
I	INFLOWS	0	2,386	2,386	2,386	2,386	2,386	3,226	3,226	3,226	3,226	3,226	4,593	4,593
1.	Revenues		2,386	2,386	2,386	2,386	2,386	3,226	3,226	3,226	3,226	3,226	4,593	4,593
2.	Liquidation value		0	0	0	0	0	0	0	0	0	0	0	0
II	OOUTFLOWS	27,067	1,097	1,097	1,064	1,790	1,070	1,241	1,243	1,863	1,252	1,254	1,451	1,453
1.	Investments	27,067	0	0	0	722	0	0	0	616	0	0	0	0
2.	Material costs		547	547	547	553	553	553	553	558	558	558	558	558
3.	Non-material		22	22	22	22	22	22	22	22	22	22	22	22
4.	Gross salaries		604	604	604	604	604	604	604	604	604	604	604	604
5.	Tax on profit		-76	-76	-109	-111	-109	62	64	63	68	70	267	269
III	NET INFLOW (I-II)	-27,067	1,289	1,289	1,322	596	1,316	1,985	1,982	1,363	1,974	1,971	3,143	3,140

Table 8: (Continuation)

Rb	ITEMS/YEARS	13	14	15	16	17	18	19	20	21	22	23	24
I	INFLOWS	4,593	4,593	4,593	4,848	4,848	4,848	4,848	4,848	4,848	4,848	4,848	4,848
1.	Revenues	4,593	4,593	4,593	4,848	4,848	4,848	4,848	4,848	4,848	4,848	4,848	4,848
2.	Liquidation value	0	0	0	0	0	0	0	0	0	0	0	14,494
II	OOUTFLOWS	4,315	1,465	1,467	1,493	1,495	2,283	1,508	1,508	1,508	1,508	1,508	1,508
1.	Investments	2,853	0	0	0	0	775	0	0	0	0	0	1,537
2.	Material costs without	580	580	580	580	580	586	586	586	586	586	586	586
3.	Non-material costs	22	22	22	22	22	22	22	22	22	22	22	22
4.	Gross salaries	604	604	604	604	604	604	604	604	604	604	604	604
5.	Tax on profit	257	259	261	287	289	296	296	296	296	296	296	296
III	NET INFLOW (I-II)	278	3,128	3,126	3,356	3,353	2,565	3,340	3,340	3,340	3,340	3,340	3,340

6. RESULTS AND CONCLUSION

Net Present Value/Internal Rate of Return on total investments in project

Based on the discounted net cash flow the basic indicators of financial effectiveness: net present value, internal rate of return and net present value rate have been calculated and presented below:

Table 9: NPV, IRR and NPV ratio on total investment

ITEMS	Subotica	Zajecar
Net Present Value of the Project (NPV)	6,524.616 Euros	2,111.433 euros
Internal Rate of Return of the Project (IRR)	6,1%	5,7%
Net Present Value (NPV) Ratio	20,2%	130.6%

Indicators are positive and thus showing that the project are, under given circumstances, acceptable from the viewpoint of the investor (Regional Landfill Company):

- Positive Net Present Values shows that the projects will enable invested funds to be returned;
- Internal Rate of Return is 6.1% and 5.7% which are above the threshold defined by the discount rate of 5% also confirms acceptability of the projects from the viewpoint of the investor. Obtained rate of return is favorable, particularly since this is an infrastructure project which, as any project of its kind, does not yield high direct returns but, as a rule produces high social effects.
- Net Present Value Rate compares invested funds and discounted cash flow of the project during its life cycle. This ratio for the investment into the regional landfill Subotica is 20,2% which points that the invested fund will be returned as 20,2% higher. This ratio for the investment into the regional landfill Zajecar is 130.6% which points that the invested fund will be returned as 130.6% higher.

Net Present Value/Internal Rate of Return on Shareholder's Equity or Funded Capital (public/private)

Capital effectiveness analysis has as its goal to show effectiveness of the analyzed project from the viewpoint of the investor's equity/capital. The logic of such analysis and evaluation is based on the fact that projects with a wider community support due to their external social effects do not always have to be fully acceptable in terms of sources of funds.

The above mentioned methodological guide emphasizes that such projects are supported by special funds of the EU and their grants which reduce investor's risks and thus make return on their investment easier. With this many financially unacceptable projects from the viewpoint of investors become acceptable and many socially desirable projects, which would not be funded without the EU support, come to life.

The Capital effectiveness in the projects for the regional landfills in Subotica and Zajecar have been evaluated based on the corrected cash flow presented in Table 7. and 8.

Table 10: NPV, IRR NPV ratio for Equity

ITEMS	Subotica	Zajecar
Capital Net Present Value	32,940.211 Euros	17,199.192 euros
Capital Internal Rate of Return	28,8%	11.9%%
Capital Net Present Value (NPV) ratio	709,4%	287.7%

The correction pertains to changed amount of „Investments“ where all grants have been excluded (expected international and domestic donations) allowing obtained Net Present Values and Internal Rates of Return to reflect equity effectiveness– in this particular case those are local governments which founded the regional landfill. As the above presented table shows, the key indicators of the equity effectiveness are more favorable compared to the indicators of the project effectiveness.

Since all calculated indicators of profitability have a positive value, as the study had showed, the conclusion is that investing in building regional landfills in Serbia is profitable from every point of view, especially municipals due to grants and loans from the EU funds.

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THE LEGO GROUP AND NEW CHALLENGES: INNOVATIVE MARKETING STRATEGY BY 2015

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Abstract: LEGO is one of the leading brands in the global toy industry nowadays. This case study provides information about current marketing strategies of the LEGO Group. In addition, primary and secondary target groups are described, as well as the key differences among them. Furthermore, three alternatives for innovative marketing strategy by 2015 are presented. The first marketing strategy considers product innovation, the second strategy discusses the export strategy to Latin America countries and the third strategy refers to interactive marketing strategy for The LEGO Group. Eventually, this case study should help students to better understand strategic marketing decisions by using innovation as creative dimension on one side, and results considering the marketing investments of all marketing campaigns until 2015 on the other side of the approach.

Keywords: The LEGO Group, toy industry, product innovation, export marketing strategy, interactive marketing strategy.

1. INTRODUCTION

The LEGO Group is engaged in the development of children's creativity through playing and learning. Based on the world-famous building block, LEGO brick, the company today provides toys, experiences and teaching materials, organized in 25 product lines, in more than 130 countries. The LEGO Group has approximately 10,000 employees, and it is the world's third largest manufacturer of play materials. (11)

Everything started in Denmark in 1916 when Ole Kirk Christiansen opened a carpentry shop, and in 1932 began making carved wooden toys. Two years later the company was named LEGO (a combination of two Danish words, "leg" and "godt," meaning "play well"). In time, plastic materials were steadily replacing wooden ones. The ancestor to the common LEGO block was invented in 1949. After hearing criticism that no company made a comprehensive toy system, in 1954 Ole's son Godtfred assembled a list of 10 product criteria for LEGO's toys, including that they have lots of compatible components. The company launched the first LEGO play set in 1955, and soon afterwards LEGO became one of the most popular toys in Europe. After the fire in LEGO's warehouse in 1960, the company completely ceased production of wooden items in favor of plastics.

Luggage-maker Samsonite began manufacturing and distributing LEGOs in the US in 1961 under license. LEGO's first LEGOLAND park was opened in Billund, Denmark, in 1968. The company introduced the more complex LEGO Technic model sets in 1977 and the popular LEGOLAND Space play set in 1979. The first LEGO Imagination Center was opened in Minneapolis in 1992, and the second followed in Walt Disney World five years later.

In the 1990s growth of the video game industry far outpaced the growth of the construction toys market, and LEGO suffered. With profits reductions, in 1998 the company sealed an agreement to start the production of building kits and figures based on the popular Star Wars movies and Walt Disney's Winnie the Pooh. In 2001, LEGO started cooperation with software company Microsoft Corporation in creation of children's online games. In 2003, LEGO entered into the arts and crafts market with the introduction of CLIKITS: a fashion design system made up of a variety of kits allowing girls to design room decor, picture frames, jewelry, and fashion and hair accessories.

Nowadays, LEGO is actively engaged in online video game business. In early 2010 LEGO extended its licensing agreement with Warner Bros. Home Entertainment Group through 2016. The deal related to LEGO video games being played across multiple platforms, gives traction to titles LEGO Star Wars, LEGO Batman, and LEGO Indiana Jones. Collectively, LEGO has sold nearly 50 million units of the games worldwide so far. (12)

As mentioned before, LEGO already produces TV shows, educational materials, and merchandise including books, video games, and computer game software. Fears in the industry concerning toys made in China, which have had an unusually high number of recalls in recent years, could boost LEGO's bottom line further. However, LEGO only has a part of its production operating in China.

2. INDUSTRY OVERVIEW

According to Global Toy Market Estimates: 2011 Edition, global toy sales grew by nearly 5% (4.7%) in 2010 to US\$83.3 billion. While the growth was driven by strong performance in the Asia region, which increased at a rate nearly double the average (9.2%), the U.S. market remains the largest market with sales of nearly \$22 billion, followed by Japan, China, the UK and France. The toy market remains very concentrated within these top five countries, which captured just over 50% of total global sales. Additionally, strong growth exists in emerging markets, with the BRIC countries (Brazil, Russia, India, China) showing growth of 13%.(10)

The toys and games industry is a veritable playground for a select group of global players. The industry is dominated by two US toy makers: Mattel (Barbie, Hot Wheels, Fisher-Price) and Hasbro (G.I. Joe, Tonka, Playskool). Further, other large companies, such as Japan's Bandai Co. (Digimon) and Sanrio (Hello Kitty), as well as Denmark's The LEGO Group, generally generate revenues in the US\$1 billion-and-up range annually. Most of these companies have achieved success in the industry by creating cross-culturally appealing brands that are supported by marketing campaigns to market products to a vast number of countries.

US chains also lead the global toy retail market, with discount retailers such as Wal-Mart Stores (the nation's #1 toy seller), Kmart, and Target, as well as Toys "R" Us. Some specialty toy sellers have fallen prey to big box discount stores (who now begin their holiday volume discounting much earlier in the season). Most toy retailers also have an online presence, although many toy e-tailers, did not survive the dot-com fallout.

The advent of the "tween" market (kids from 7 to 14 years of age) has shortened the life span of some toys like Barbie, while setting up online communities where kids can interact with other peers through characters. Nevertheless, retro toys are making a comeback. Adults who once played with the originals are now introducing these toys to their children, exposing a whole new generation to these brands.

The Internet has opened up a new realm of interaction between kids and their toys. Action figures and dolls have their own web sites that feature story lines, bios, screen savers, message boards, and games.

Some industry suppliers aim for the mega hit through licensing deals. However, licensing has become an option to approach with caution. Hasbro paid some US\$600 million and a 20% royalty for rights to the second series of Star Wars movies, only to be stuck with unsold inventory after some of the releases. Moreover, Mattel's deal for Harry Potter books and movies was a much more modest US\$20 million guarantee and 15% royalty. Companies have since been more conservative when shelling out licensing money.

Beyond licensing, companies are looking for growth in untapped markets. Large opportunity exists in the considerable number of children who have not yet heard from the likes of Mattel, Hasbro, and their kin. Toy makers have historically targeted American children, who on average acquire about US\$400 worth of toys each year. The average for children outside the US is US\$34. However, companies cannot ignore the facts. There are some 60 million children in the US. India, for example, has 400 million potential toy consumers and China has 300 million children. In the future, successful suppliers to the toy industry may have to attract the attention of children around the world if they hope to sustain growth.

Nevertheless, governments are shining a spotlight on the industry and have created new legislation aimed at better policing consumer product safety.

While keeping their sales outlets current, toy companies must constantly seek to score the next big hit. The toy makers continue to vie for consumer attention by churning out more interactive toys. Companies have also been looking to make a splash with creative or educational toys. (3, 14, 9, 19)

3. MAIN COMPETITORS OVERVIEW

Main LEGO's competitors on the global level are US toy companies, Mattel and Hasbro.

Mattel was founded by the Handlers and Matson in 1945 in Southern California, US. The company tends to focus on its core brands and licensing deals. The most famous and best-selling brand in the Mattel family is certainly Barbie. Since the appearance in 1959, Barbie has dressed up Mattel's portfolio and has spawned countless accessories. The platinum blond remains the most popular doll worldwide, as one is sold every two seconds somewhere in the world. Mattel's reported net sales in FY 2011 were US\$6,2 billion, with an increase of 7% in comparison to FY 2010. (15)

Hasbro was founded by the Hassenfeld Family in 1923 in Rhode Island, US. The maker of Milton Bradley (Candy Land, Scrabble) and Parker Brothers (Monopoly, Trivial Pursuit) games, trading cards ("Pokemon", "Harry Potter", and "Magic: The Gathering"), and action figures. In 2011, Hasbro generated net revenue of US\$4,3 billion, with an increase of 7% comparing to net revenue in 2010. (6)

4. TARGET GROUP PROFILE

The LEGO Group often insists it is not childish. That means that children are not their one and only target group. Their goal is to encourage the child in all of us. *The motive behind the word Lego bringing out the inner child is a serious one: look how many great inventions were conceived in the spirit of play.* It can be concluded that LEGO has opened up a whole new universe of potential for the humble plastic brick and its components for very wide target groups, which are described below:

Generation C kids (born 1995-2012)

Gen C kids will grow up with a highly sophisticated media and computer environment and will be more Internet savvy and expert than Gen Y members. These generations read books from Kindle and iPad, and value friendships through Facebook and Twitter. How to address them? The interesting aspects that describe Gen C are content, creation, connection and choice of the products. They want to create and control content, since they are interested in storytelling the company is ready to offer. They need to hear a brand story. Furthermore, they want an openhanded approach, including involvement in brand creation and offer of a variety of toys (e.g. Nurse Barbie, Hollywood Barbie, etc.). For example, the toy manufacturer LEGO has successfully used customer comments and conversations from the LEGO Club website to design new products. Survey results prove that beside overwhelming Internet effect, children still appreciate family and friends the most, following by pets and all kinds of toys, respectively. Children are already emotionally connected to toys, thus the task is to sustain such close relationship. (5)

Decision Makers (Parents)

Parents are the ones who decide about the purchases of toys. However, the fact is that children have influence on them, although different shopping goals of both sides should be considered. On one side, kids want to have interesting and popular toys, while on the other side, parents are interested in educational and creative value of the toys. Another important trend that can be identified is that moms are especially concerned about safety and quality of the toys. Consequently, environmental and health issues are aspects that toy companies should consider closely nowadays. (5)

AFOLs - Adult Fans of Lego

As mentioned previously, Lego is not only observed as a childish toy. The fact is that Lego is an intellectual and creative construction toy dedicated to people of all ages. Because of that, there is this specific niche group of customers. What is special about them is that they understand the functional and educational dimension of LEGO bricks. AFOLs are nostalgic about the childhood, and their LEGO collections keep their inner child awake. Finally, it has been proven that AFOLs are the most loyal customers, and in that sense there is a need for strategic thinking about their needs and wishes. (1)

5. MARKETING STRATEGY ALTERNATIVES

How LEGO organizes innovation?

The LEGO Group's mission is "Inspire and develop the builders of tomorrow." Its vision is "Inventing the future of play." LEGO organizes innovation through three large areas:

1. Functional groups
2. Concept lab and product and marketing development
3. Community, education and direct communication

Functional groups deal with core business processes that enable innovation in other processes. Core processes include sales, operations and financial planning, while consequently enhanced processes are forecasting and marketing planning.

On one side, concept lab department develops completely new products and play experiences. On the other side, product and marketing development department develops the next generation of existing products and existing play themes, packaging and campaigns. Areas of innovation can be defined as messaging (advertising campaigns and websites), offerings (products and packaging) and platforms (toys' technology elements).

Community, education and direct communication support customer communities and gathers ideas from them. Moreover, this department manages LEGO retail chain and online store, while offering improved educational and playing experiences. Areas of innovation can be divided into customer interaction (communities and customer services), sales channels (retail and direct selling) and business model (evaluated through pricing and revenue).

On the product side, the LEGO Group focuses on creating innovative new products from concepts developed under the title "Obviously LEGO, never seen before." The company plans to come up with such concepts every two to three years. The latest example is LEGO Games System, which is family board game (a new way of playing with LEGO bricks) with a LEGO attitude of changeability. The company also intends to expand LEGO Education, its division that works with schools and kindergartens. It will also develop its digital business as the difference between the physical world and the digital world becomes more and more blurred and less and less relevant for children. (18, 20, 17)

Export Strategy

The LEGO Group has chosen a strategy that is based on a number of growth drivers. One is to increase the market share in the United States. Many Americans may think they buy a lot of LEGO products, but they buy only about a third of what Germans buy, for example. Thus, there are potential growth opportunities in the U.S. market.

The LEGO Group also wants to increase market share in Eastern Europe, where the toy market is growing very rapidly. In addition, it wants to invest in emerging markets, but cautiously. The toy industry is not the first one to move in new, emerging markets, so the LEGO Group will invest at appropriate levels and be ready for when those markets do move.

Latin America is a "promised" market for toy makers. Most of the countries in Latin America are recording growth in the middle-class segment. Accordingly, rapid rise in spending per child is creating new opportunities for the toy makers looking to expand in emerging markets. For instance, in 2011, Brazil's middle-class, if defined as households with an annual disposable income of over US\$15,000, numbered 32.4 million households, a figure which puts Brazil in fifth place globally in terms of number of middle-class households, ahead of France and the UK. Similar situation has been reported in households in other parts of Latin America. (4)

Moreover, LEGO's biggest competitor Mattel has indicated that Brazil and Mexico are being their second and third largest foreign markets in 2011, respectively. The overall revenue of nearly US\$1 billion has been coming from Latin America. Based on macroeconomic indicators presented in Table 1, it can be concluded that disposable income in all countries in this region is rising. Besides, CAGR is significantly high for all

countries, especially for Argentina, Brazil and Uruguay. This indicator can be attractive for other toy makers in the world.

What kinds of toys are particularly popular in Latin America? Mattel has the leading position in Brazil, holding robust 30% of market share, following by Hasbro and local toy makers. Adapting to local cultural habits and trends has proven to be a great move. Regarding this fact, Mattel's investment in localized toys like Dora La Explorada, paid off. Unsurpassed favorites like action figures and model vehicles will continue rising in sales, because they are desired by the children who watch television. Nevertheless, construction toys are expected to enjoy strong growth until 2015, due to larger number of working mums and hectic life they are living in.

Yet, what is very surprising is the absence of massive chained international retailers, such as Toys "R" Us in most of the Latin's countries. For example, toy retailing is more fragmented in Brazil compared to the US or Europe. The largest toy stores include Ri Happy and PBKIDS, both of which expanded aggressively over 2005-2010. However, sales through traditional toy stores accounted for only 32% of all toys sold in Brazil in 2010. A significant 13% share of toy retailing is represented by department stores and a further 11% by variety stores, such as Americanas or Leader. Similar case is with other previously mentioned markets. Finally, online retailing is growing, and this is definitely an open space for innovations and new players. (4)

Table 1: Disposable Income in Latin America, 2008-2011 (4)

US\$ per capita, fixed 2011 exchange rates					
Country	2008	2009	2010	2011	CAGR (2006-2010)
Uruguay	7,040.3	7,256.0	8,341.4	9,341.3	12%
Brazil	5,892.0	6,478.4	7,308.5	8,058.4	11%
Chile	6,705.8	6,886.9	7,363.1	8,039.6	8%
Mexico	6,450.0	6,267.3	6,795.6	7,257.5	5%
Costa Rica	4,904.9	5,125.9	5,578.2	5,997.0	10%
Argentina	3,670.3	4,078.8	5,008.2	5,892.1	19%
Venezuela	2,758.8	3,481.8	4,375.3	5,661.1	31%
Colombia	3,950.6	4,109.5	4,314.2	4,608.4	7%
Peru	3,004.9	3,121.7	3,324.2	3,599.3	8%

The LEGO Group will also expand direct-to-consumer activities (sales through LEGO-owned retail stores), online sales, and online activities (such as online games for children).

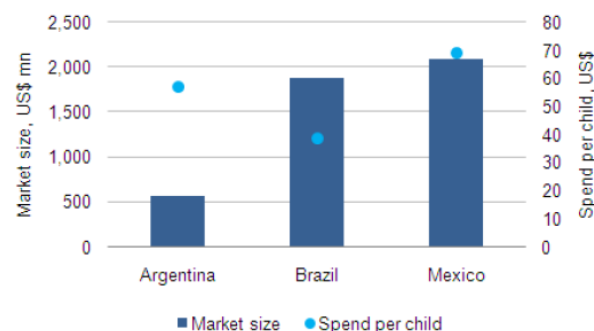


Chart 1: Market size in 2010 and spend per child (0-14-year-old) (4)

Interactive LEGO's approach

Defining successful digital presence is extremely important part of Lego's marketing strategy. There are many integrated interactive marketing campaigns delivered by The LEGO Group. Table 2 shows some of the crucial Lego's on line activities ranking by establishment date.

Table 2: The LEGO Group' on line activities (from 1998 to 2011) (7,8)

Year	On line action introducing by The LEGO Group	
1998	LEGO MINDSTORMS - a series of kits containing software and hardware to create small, customizable and programmable robots	http://mindstorms.lego.com
2000	LEGO STUDIO PRODUCT – was developed by The LEGO Group and partners with Steven Spielberg which allowed users to create stop-motion animation using their LEGO bricks.	http://www.lego.com/studios/
2000-2001	LEGO BIONICLE – leading by innovation it was the first truly TRANSMEDIA APPROACH undertaken by the company. The BIONICLE.com site was the digital hub for all IMC communication activities. Connected product, print, video, in-store and packaging in ways never before seen in the toy industry.	http://www.bionicle.lego.com
2004	LEGO DIGITAL DESIGNER – a computer program that allows users to build models using virtual LEGO bricks.	http://ldd.lego.com/
2005	LEGO Factory (later DesignByMe) - a service allowing people upload the models built in LDD to the LEGO website, design their own box design, and order them for actual delivery	http://designbyme.lego.com
2005	LEGO Star Wars: The Video Game Named “ Game of the Year ” from Kidzworld.com, was developed by The LEGO Group teams and Travelers Tales Games	http://starwars.lego.com
2007	LEGO co-creation with kids - Kids who submitted good ideas were given credits in gaming and videos. The result was a dramatic increase in traffic, time on site and NPS numbers	/
2007	LEGO Mars Mission: Crystalien Conflict – the flash-based Command and Conquer style game.	http://www.toybrixandblox.com/games/lego-mars-mission-crystalien-conflict-game/
2008	LEGO Star Wars Movie Making Contest Users - create a stop-motion animation featuring LEGO SW characters more than 1000 entries in three categories	http://www.legostarwarsmoviemakingcontest.com
2009-2010	LEGO Unity platform for creating online games and 3d interactive content on the Web, PC, Mac, Wii™ and iPhone	http://unity3d.com/
2009	LEGO Power Miners- it's new underground theme. They decide to embrace kids' love of “potty humor” to create affinity with the brand. Good example of viral marketing.	http://www.youtube.com/watch?v=6RK1xHiglfs
2010	LEGO Universe- a massively multiplayer online game developed by NetDevil. The servers were shut down permanently on January 30, 2012.	http://universe.lego.com
2010	LEGO augmented reality application - to show users what is inside the box	http://www.youtube.com/watch?v=nYNkVKKOxW4&feature=player_embedded
2010	LEGO Atlantis - it's new underwater theme. An extensive teaser allowed boys to explore the bottom of the ocean and discover various items. Backed by a 45-minute movie, there was plenty of content to play with.	http://atlantis.lego.com
2011	LEGO Build Together - a website that offers fathers and sons ideas on how they can enjoy LEGO bricks together.	http://buildtogether.com/
2011	LEGO Spinjitzu Scavenger Hunt for iOS devices Game Goals: Create buzz Take Ninjago to go; Incentivize interacting with physical products. Slogan: Ninjago goes mobile!	http://www.148apps.com/tag/lego-ninjago-spinjitzu-savenger-hunt/
2011	LEGO Life of George Combine an iOS app + bricks to recreate items that George finds on his travels	http://www.youtube.com/watch?v=1DHZwSOVKBY

Many of these actions were successful for the LEGO Group. LEGO Mars Mission had more than 40 levels and discussing the performance 66% return rate, with play time higher than 17 minutes in comparison to the average one. It is considered as the most successful flash game in LEGO.com history. Also, LEGO mobile performance showed highest rank in App store: #4 total installs to date: 8+ million in 2011.(7) On the other hand, LEGO Universe did not succeed because LEGO's management has not been able to build revenue model for their target group, and therefore, has decided to close the game.(2)

6. WHAT IS NEXT?

Despite a downturn in the economy, LEGO has logged revenue increases while its traditional toy rivals saw sales slide. The company points to the success of its classic toy lines - LEGO City, LEGO Creator, LEGO Technic, and LEGO Star Wars - for the rise in revenue. Geographically, LEGO expects moderate sales increases in its North American and Western Europe markets. As for the lowering production costs, LEGO implemented strategy related to moving production operations from Denmark, Switzerland, and the US to mostly lower-cost countries, such as the Czech Republic, Hungary, and Mexico.

Having in mind LEGO's current innovative activities, future steps in this field should be defined. As mentioned previously, both product and communication sides have room for further improvements and innovations and thus, proper analyses should be conducted in order to make the best possible choices.

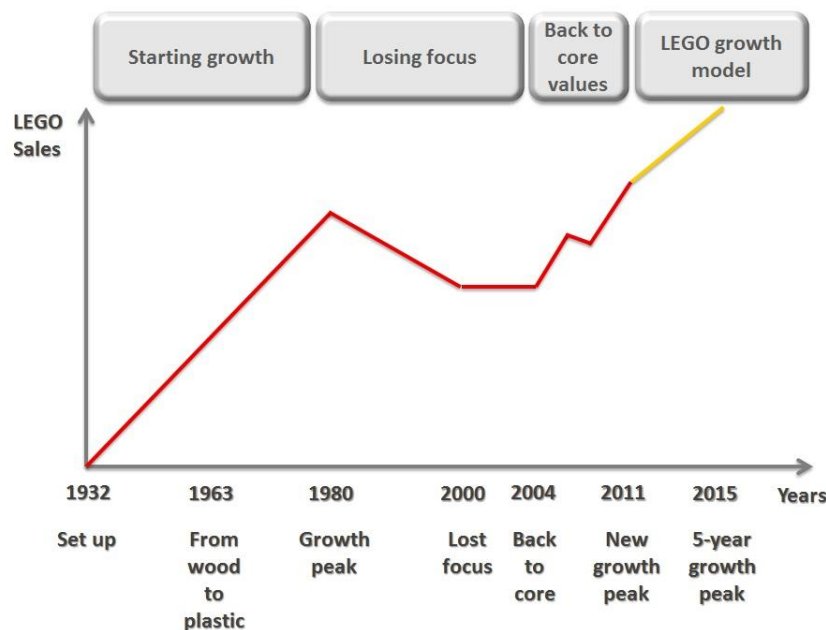


Chart 2: LEGO Growth Model

Digital experts from the LEGO Group are thinking about future steps in defining interactive marketing strategy. They have many possibilities but they should think about the priority until 2015: dynamic digital objects, interactive display, stronger application integration, stronger presence in social media, more engagement with parents or even more interactive campaign.

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MILITARY SUPPLY CHAIN MANAGEMENT

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Abstract: Military industry in Serbia is made up of several enterprises that are mainly oriented to the production of lightweight, semiheavy and heavy artillery. The most interesting products are infantry ammunition, anti-tank ammunition, ballistic equipment, automatic and hunting rifles and grenades. Although there is a demand for all products named above only two products are intended for export. Those are grenade launchers and automatic rifles.

Export of arms is in the jurisdiction of the Ministry of Foreign Affairs, Ministry of Finance with the approval of the Ministry of Defense. Only after fulfillment of appropriate standards, rules and collect the permit requirement, the specific company or factory-supplier, can export produced weapons, where for the transport of these products vehicles available to the Army of Serbia are used.

Limitations that exist in this problem are related to amount of grenade launcher and rifles that can be transported from the factories. Additional limitations are the amount of products that has to be delivered to specific buyer and transportation vehicles provided by the Army.

The goal of this case study is to help Ministry of Foreign Affairs to find optimal number vehicles needed for transporting selected products which will reduce cost of transport, by applying the linear and nonlinear programming.

Key words: Linear programming, integer programming, military supply chain management, military logistics, operational research

1. INTRODUCTION
Operational research or management science originated during World War II as a formal discipline. At that time it was used for coordination and deployment of the radars. The results were surprisingly successful, which led to application in other military departments such as navy, aviation and land forces. After the war methods and models of operational research were developed not only for military but also for use in other areas of human activity mainly for business use. [6 p.18]

One of the major sub disciplines in modern operational research is supply chain management and logistics. But there are some differences between Corporate and Military supply chain management (SCM).

Differences between corporate and military scm

The main goal of corporate SCM is to adapt overall business process to enable the profitable transformation of materials or products into finished goods and their distribution to meet demands (Figure 1: Corporate SCM).

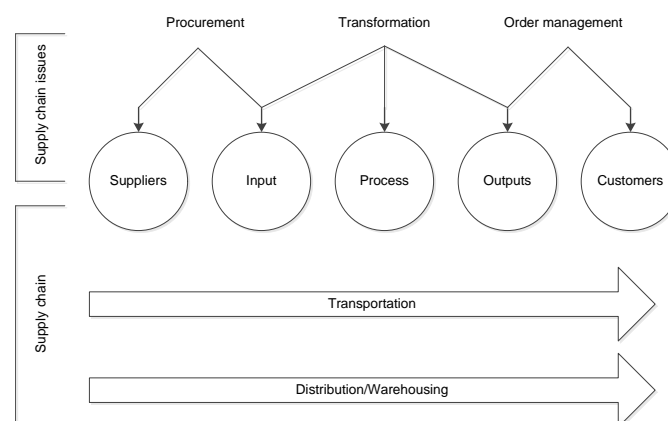


Figure 1: Corporate SCM

Also there are some external factors such as globalization, government regulations, environment, competition etc.

Military SCM, on the other hand, does not adapt to make profit. It is results-oriented in that sense that it integrates supply, maintenance and transportation functions with the physical, financial, information and communication networks to satisfy military requirements in shortest possible time with shortest expenses. There are, also, differences in external factors. Soldiers (Customers) needs are priority, Ministry of Defense regulations, environment, deployment, mission requirements etc. (Figure 2: Military SCM).

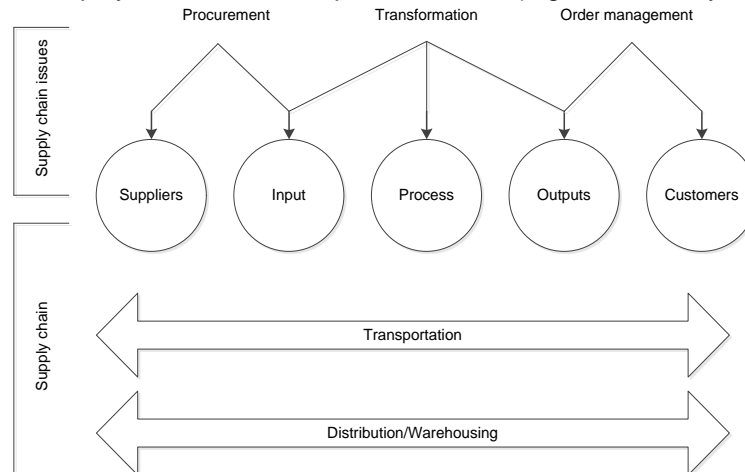


Figure 2: Military SCM

Another significant difference is relates to the number of intermediaries. Corporate SCM consists of several one way communication steps Manufactures -> Wholesalers or Distribution Centers -> Specific Distributor -> Retailer -> Customer, while Military SCM have two way communication and no intermediaries. From factory or specialized enterprise product goes to warehouse or depot and from that point directly to military unit.

Nevertheless, both military and corporate SCM are using for same problem. That is, optimization of available resources to operate in planned or unplanned events.[8, 9,10, 11 pp.253-257]

2. PROBLEM

Six Serbian enterprises has the permit for producing military equipment from Ministry of Defense . Those are:

- „Zastava oružje“ from Kragujevac;
- „Sloboda“ from Čačak;
- „Krušik“ from Valjevo;
- „Prvi Partizan“ from Užice;
- „Milan Blagojević“ from Lučani;
- „Prva Iskra“ from Barič.

About companies

All of these enterprises are oriented on developing and production of lightweight, semiheavy and heavy artillery. Among the most interesting products are infantry ammunition, anti-tank ammunition, ballistic equipment, automatic and hunting rifles and grenades. Although there is a demand for all products named above automated rifles and grenade launchers are of interest.

„Zastava oružje“ is joint stock company that employs over 2000 workers. They developed a wide range of products that are exported to over 40 countries in the world. It is 95% autonomous in production (only 5% are imported resources). Quality of their products is ensured with SRPS ISO 9001:2008 and SNO 9000/05 certificates. Beside military weapons, they have civilian program which includes: sporting rifles, pistols, air rifles and small-bore rifles. „Zastava oružje“ is focused on export which is proven by fact that export makes 95% of the product placement. By decision of the Ministry of Defense of the Government of the Republic of Serbia, they became a part of Defense Industry of Serbia in 2003.[\[4\]](#)

„Sloboda“ is ordnance founded in 1948. Their focus is on quality control and continuous investments in materials. Beside producing arms and ordnance, „Sloboda“ possesses its own laboratories specialized in

various kinds of measurements such as length, pressure and angle measuring, and in these laboratories all mechanical and chemical properties of materials are tested. The received certificate ISO 9001:2000 is the best indication of the high standards and quality of their products and services.[\[3\]](#)

„Krušik“ is producer of hunting ammunition which have about 60 employees. They have 58 machines and units for production at its disposal. It also has an organised Test Station as a function of research, development and quality assurance. The market potential of the FR Yugoslavia and its neighbours, as well as the competition, make „Krušik“ stand firmly in the position of the leader among the ammunition producers in this area, which means that 50% of its production satisfies the domestic market, and the remainder is directed to export and defense production.[\[7\]](#)

„Prvi Partizan“ is ammunition factory founded in Užice in 1928. They supply Serbian Army and Police, many foreign Armies and it also produces hunting and sporting ammunition, that is being sold all over the world. The factory has four production facilities, employs more than 600 workers and it takes important part in economy of its region. Today, „Prvi Partizan“ is modern factory, competitive with the most known world manufacturers, which in its production program has wide range of commercial and military calibers, pistol and revolver ammunition of the highest quality. Following the market requirements, with the strategy of permanent expansion of products range, Prvi Partizan continuously works on Research and Development of new products in this field, on research of new production programs, and on improvement of quality system, which is established in accordance with ISO 9001:2000.[\[5\]](#)

„Milan Blagojević“ is enterprise that belongs to defense industry with modern facilities that produces the products of the highest quality, well known to the world. The Company has 85% of export oriented business and accomplishes a successful cooperation in the field of the export of its products and services, with more than 30 countries around the world. Also, uses very high quality of raw materials from worldwide known suppliers. The main production program includes more than 20 products of special and commercial domain such as single base powder, double base powder etc.[\[1\]](#)

„Prva Iskra“ is company that begun with work in 1946 when started the production of TNT. Since then they developed their production program and today produces explosives DNT, Hexogen, Octogen etc.[\[2\]](#)

Limitations

Ministry of Defense in cooperation with the Ministry of Foreign Affairs and Ministry of Finance has signed an agreement about joint military exercise with the five former Yugoslav republics: Slovenia, Croatia, Bosnia and Herzegovina, Macedonia and Montenegro. Every country that signed agreement has obligations. Republic of Serbia will export automated rifles and grenade launcher to the appropriate military headquarters.

Every country has its own needs for weapons. They are given in Table 1.

Table 1: Demand for military equipment (in units)

Country Product	Slovenia (Ljubljana)	Croatia (Zagreb)	Macedonia (Skopje)	Montenegro (Podgorica)	Bosnia and Herzegovina (Sarajevo)
M21	840	1250	910	750	1000
BGA30	390	530	220	100	320

These products are produced in the „Zastava oružje“ enterprise but, for security reasons they are distributed in warehouses of the other companies.

Automated rifle M21 has caliber of 5.56 mm and it is basically a „Kalashnikov“ system, which is made only in one version. Whole industry can produce annually 5000 units intended for export. 54% of the total production capacity (2700 pieces) are in the warehouse of the factory „Zastava oružje“, 1200 pieces are in a factory „Prva iskra“, 800 pieces of stock are in the factory „Prvi Partizan“ and the remaining 300 rifles are stored in the factory „Krušik“. Price of one rifle is 1000\$ and its volume is 0.06 m³.

Grenade launcher is made as infantry weapon which also can be produced only in one version. The total production is allocated in the following manner: 800 pieces are stored in the factory „Sloboda“, 400 pieces in a factory „Prvi Partizan“, 300 pieces in a factory „Krušik“ and the remaining 100 pieces stored in the factory „Milan Blagojević“. Price of one grenade launcher is 2728\$ and its volume is 0.2 m³.

Ministry of Foreign Affairs, in cooperation with Ministry of Finance and Ministry of Defense, is responsible for every kind of export of military equipment. Regulation by Ministry are strict and only after fulfilment of those regulations the specific company or factory-supplier can export their products. According to the agreement, one of the companies' obligation is to pay costs of transportation. On the other hand, the obligation of the military is to provide, due to economic reasons, train wagons. Military can provide three types of train wagons, 5 closed wagons, 5 opened wagons and 3 platform wagons. All of train wagons are located in Belgrade. Closed wagons are of type Hbills-z (227), opened wagons are Eas-z (595) and both have effective volume of 65 m³. Platform wagons are of type Rs-z (390) and their effective volume is 120 m³.

Having the wagon capacities in mind, we can calculate how much weapon can fit in each type of wagon (Table 2).

Table 2: Maximum number of weapons that can fit in appropriate wagon

Wagons Product	Closed wagons (Hbills-z 227)	Opened wagons (Eas-z 595)	Platform (Rs-z 390)
M21	1083	1083	2000
BGA30	325	325	600

Cost of transportation is different from factory to factory because of destinations distance. Cost per kilometer is variable and depends of total transported weight. In this case, maximum capacity of available wagons is 10 t. Price per kilometer is 15 RSD. When we multiply distance with 15 RSD we get total cost of transportation from factory to specific military headquarters. Some of prices are omitted because they are too high, i.e. there is at least one better transportation path. Because „Milan Blagojević“ from Lučani is nearest to „Prvi Partizan“ every transportation will go through Užice, not directly from Lučani (Table 3).

Table 3: Cost of transportation from factory to military headquarters (in RSD)

Country Product	Slovenia (Ljubljana)	Croatia (Zagreb)	Macedonia (Skopje)	Montenegro (Podgorica)	Bosnia and Herzegovina (Sarajevo)
Barič	4410	3330	3765	3480	2865
Užice	5130	4410	3765	2355	1785
Lučani	/	/	/	/	/
Valjevo	4770	3615	/	/	1860
Kragujevac	5490	4410	3045	/	/
Čačak	5490	4410	3330	/	/

When train delivers military equipment, it has to return to the start location (factory). However, cost of returning empty train are lower than transportation costs. Price of returning are given in table 4, and they are calculated by multiplying distance with 8 RSD. Before returning to Belgrade wagons need to be examined and cleaned, which cost 1000 RSD.

Table 4: Cost of transportation from military headquarters to factories (in RSD)

Country Product	Slovenia (Ljubljana)	Croatia (Zagreb)	Macedonia (Skopje)	Montenegro (Podgorica)	Bosnia and Herzegovina (Sarajevo)
Barič	2352	1776	2008	1856	1528
Užice	2736	2352	2008	1256	952
Lučani	/	/	/	/	/
Valjevo	2544	1928	/	/	992
Kragujevac	2928	2352	3045	/	/
Čačak	2928	2352	1776	/	/

Since all train wagons are located in Belgrade, there are cost of arrival of train wagon from Belgrade to appropriate factory. Those cost are calculated by multiplying distance (number of kilometers) and 8 RSD (table 5).

Table 5: Cost of transportation trains from Belgrade to factories (in RSD)

From \ To	Barič	Užice	Lučani	Valjevo	Kragujevac	Čačak
Belgrade	0	1264	1264	736	1096	1080

Since Barič is part of Belgrade, there are no costs of transportation from Belgrade to Barič. Also, since Lučani are close to Užice, costs for Užice and Lučani are the same. Costs of returning wagons from factories to Belgrade are the same as from Belgrade to factories.

Since the Ministry of Finance of the Republic of Serbia accepted to cover the costs of transportation, it is necessary to determine the number of wagons of all three types, in order to minimize that the total transportation costs is minimal.

3. ALTERNATIVES

The main performance in military SCM is time of delivery. Delays in transportation can lead to tragic consequences. Because of that and the fact that railway traffic in Serbia tends to be late, the Army should analyze the alternative ways of transportation.

One option is road traffic. Advantages of road transport compared to rail transport are flexibility in the choice of the roads and the vehicles for transportations as well as the possibility of transporting weapons without going to Belgrade. However, there are some disadvantages. The main disadvantage is the fact that road transportation costs more since it is necessary to provide a large number of people and vehicles for one shipment. Another problem that may occur is the determination of the best road for transportation. Factors that should be considered are road conditions, traffic jams etc.

Second option is air traffic. This kind would definitely be the fastest, but the most expensive one. The main problem in this kind of transportation is number of airports in Serbia and the distance from factories to the airports. Airports that should be considered are "Nikola Tesla" in Belgrade which is international civil airport, "Ponikve" in Užice and airport "Lađevci" near Kraljevo which are military airports. Other airports are either too far or unequipped.

Water traffic should not be considered, because most of the factories don't have exit to wide enough rivers and there are no direct ways to destinations.

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REVIVING OF AGRICULTURAL COOPERATIVE USING LINEAR PROGRAMMING

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Abstract: *Marijana Knezević, engineer of organizational sciences, and Vasa Despotović, agricultural engineer, spent their entire childhood playing in the dusty Kajmakčalanska Street in Bakčine, the hamlet of Ramnice. Ramnice is a large village near Belgrade. Like all other parts of Serbia, their village is affected by apathy, a disease that misleads people and gives them false appearance of a bleak situation. In order to regain control of their lives and to improve life of their fellow citizens, Marijana and Vasa decided to focus their skills on the development of their community. Soon, the idea of reviving, once successful agricultural cooperative was formed.*

Unused farms should be converted into orchards. Problem of dividing available farmland into agricultural cultures should be solved using linear programming. The goal is to maximize profit. After the harvest, it is necessary to find a way to keep the products fresh, until they reach customers. There are two options. The first one is the construction of warehouses for the products. The second option considers purchasing or renting trucks, which will transport products to the customers. Closed transport model should be used in the analysis. Usage of Vogel method (method of least differences) is recommended for the determination of the initial solution and Modi method (potential method) for verification of optimality.

Keywords: *linear programming, operational research, agriculture, transport model*

1. DESCRIPTION OF THE PROBLEM

"Now, when we have won them over, everything else is a piece of cake!" Marijana sighed and looked at her associate Vasa. They were coming out of the meeting with representatives of Ramnice, a large village near Belgrade. The meeting was about reviving the largest agricultural cooperative of Belgrade's suburbs.

Marijana Knezević, engineer of organizational sciences and Vasa Despotović, agricultural engineer, who spent their entire childhood playing in the dusty streets in Kajmakčalanska in Bakčine, the hamlet of Ramnice. Neither one of them had an opportunity to apply their knowledge, although some time has passed since they graduated. Like all other parts of Serbia, their village too is affected by apathy, a disease that misleads people and gives them a false appearance of a bleak situation. Unemployed or low income, with no hope that it will get better, people feel helpless and listless. In order to regain control of their lives and improve life of their fellow citizens, Marijana and Vasa decided to focus their skills on the development of their community.

The idea of reviving the once successful agricultural cooperative was formed. Marijana and Vasa made the necessary soil analysis, feasibility study and made plans for planting fruit. It is necessary to obtain the consent of farmers and provide their assistance in achieving these plans. All farmers must participate and be ready to follow directions of agricultural engineer. The problem is the farmer's mentality. They are not receptive to new ideas and their general attitude is "I don't care if he's got a degree, no kid is going to tell me what to do!". Their stubbornness is hard to overcome and that is why Marijana and Vasa felt nervous about exposing their ideas at the meeting.

However, faced with the impossibility of product placement on the market and huge losses due to lack of organization, the farmers were more than willing to accept any proposal that would provide them gains. The new agricultural cooperative would provide customers, like food factories, with large quantities of fruit, flour and corn. The plan is to plant fruit on unused farmland. Each farm must comply with the plan presented by agricultural engineers, who are employees of the agricultural cooperative. The plan is designed based on a soil analysis.

Ramnica is one of the largest villages of the district. It has 9000 inhabitants, of which 6000 are working age population, and 2000 of them are unemployed. Unemployed workers have different qualifications and 1000 of them can be employed in the processing of agricultural land.

Farmers decided to give an opportunity to young enthusiastic people, hoping that they will succeed in bringing new jobs and increasing gains. Marijana and Vasa agreed with the farmers to present a final plan at the next meeting. Content of the final plan consists of list of cultures that need to be sown, number of employees, amount of total costs and methods of storage or transportation of products after harvest. If the results of the analysis are satisfying, execution of the plan will commence.

2. THE CURRENT SITUATION

Ramnica's area covers 5918 ha. The agricultural area occupies 3418 ha of the total area.

Table 4: Distribution of cultures on occupied agricultural area

Name	Area [ha]
Orchards + strawberry plantations	140
Wheat	900
Corn	710
Soybean	24
Vineyards	100
Animal husbandry + forest	1000
The total agricultural area occupied	2874

Free or unused farms need to be converted into orchards. Cultures that will be planted are plums, cherries, sweet cherries, peaches, apples and pears. The relief is characterized by the variety of forms, alternation of mountain and lowland areas. There are different types of soil – chernozem, smonitsa, eutric, cambisol, clays and sand. These types of land are suitable for growing all 6 cultures. Distributions of cultures need to be determined regarding the benefits and characteristics of soil types. The rolling hilly and mountainous areas, even steeper slopes, are perfect for growing plum orchards. That is why it was decided to plant plums on at least 60 ha of suitable land. Slopes and gentle slopes, facing south, southeast and east are best for growing cherries, so these are the areas where cherries will be planted. Cherry should be planted on at least 80 ha. Sweet cherries need a lot of light and open space, so suitable soil needs to be provided and sweet cherries will be planted on at least 70 ha. Since early spring frosts are a normal occurrence in these parts, peaches should be planted on the north side. Trees will be slightly longer in the rest period, but the majority of the buds will remain in a good, vital state. Therefore it is possible to plant peaches on maximum 150 ha and they should be planted on at least 50 ha. In order to develop the production of apples, a decision has been made to plant apples on at least 90 ha. Chernozem and brown forest soil are important for growing pears, so pear orchards should be planted on at least 70 ha.

In the spring, all orchards require pruning and upkeep, painting and sprinkling trees with fungicides and insecticides. It is also necessary to maintain the health and productivity of the trees. Peaches, cherries and sweet cherries are being harvested in the spring. Plums, apples and pears are being harvested in the fall when it is also necessary to prune fruit. In order to ensure the highest yield orchards require 7 days work per week (30 working days per month; no work during winter). The daily working rate is 800 dinars.

For protection of the fruit from pests it is necessary to use different types of fungicides and insecticides. Some of the fungicides and insecticides that are being used are BOTRYSTOCK, PRESING, VITRA WP, RIZA 250EW, WIZZZAARD, CYREN 480EC and PYRINEX SUPER 420EC. It is also necessary to use different products for plant nutrition during the year, all in order to ensure the highest yield. Plant nutrition products are VERASOL and HERBAGREEN. The average cost of products for nutrition and protection is 800 dinars per 1 ha area.

Table 2: Price of products and average yield of cultures

Name	Price [din / kg]	Yield [t / ha]
Plum	45	3375
Cherry	45	132.35
Sweet cherry	135	34
Peach	54	375
Apple	50	450
Pear	126	476.47

After the harvest, the main problem is finding a way to keep the products fresh, until they reach customers. This can be achieved with adequate storage or with transportation to the customer immediately after harvest. The Fund for development of the Republic of Serbia has awarded grants totaling 150 million dinars for the development of agricultural cooperative and therefore the whole village. Those funds can be used in 2 ways. First one is the construction of warehouses for the products. The second option considers purchasing or renting trucks, which will transport products to the customers.

Option 1: Building a warehouse

The amount of fruit after the harvest will exceed current accommodation capacity of the village. It is essential to find a solution for this accommodation problem, because the nature of fruit is very sensitive and the period of time it can stay fresh is short. Good storage will preserve the quality of fruit as long as possible. A modern type of storing fruit is controlled atmosphere (CA) storage, which corresponds to international standards. Building this kind of a warehouse is more expensive, but it would provide cooperation with foreign food factories.

Only one type of fruit can be stored in each chamber of this storage. The storage period significantly depends on the biological specificity of the fruit. Therefore tangible differences occur in the durability of sorts. CA storage uses changed atmosphere within the chamber that consists of lowering the proportion of O₂ and increasing the share of CO₂. The following table shows the time of storage for certain types of fruit in their chambers.

Table 3: Time of storage of fruits in CA chamber

Name	Time of storage
Apple	3 – 8 months
Pear	2 – 6 months
Peach	2 – 4 weeks
Sweet cherry	2 – 3 weeks
Cherry	3 – 7 days
Plum	2 – 5 weeks

In order to store fruit after the harvest, it is necessary to build four warehouses. The price of building a warehouse is 21.000.000 dinars. The following table presents the costs associated with operation of the warehouse.

Table 4: Costs associated with operation of the warehouse

Cost	The amount of the cost (din / month)
Warehouse maintenance	40000
Insurance	16000
Worker's salary	200000
Electricity and water	60000
Other	30000
Total	346000

To cover the cost of storing the goods and ensuring the normal functions of the warehouse and cooperative, the plan is to increase the price of products by 1%. Farmers will be paid for their products by previously determined price and the agricultural cooperative will retain the difference in price (1%).

Option 2: Transporting the goods

When it comes to transportation and sales of grains, farmers already have established procedures, so young, hard working and ambitious graduates did not want to interfere. Therefore, it is envisioned that transportation will be managed through agricultural cooperative.

In previous years, plums were grown on 8.6 ha, cherries on 5.7 ha, sweet cherries on 18.5 ha, peaches on 1.2 ha, with apples and pears on 2 ha and 14 ha, respectively. Based on the yield that was mentioned before, it is possible to calculate the predicted amount of fruit for the following year, expressed in tons. Certainly, it is necessary to include these amounts in the total transport, including products of new orchards.

It is known that certain fruits have been harvested at different times of the year, mostly in the summer and autumn months. Therefore, Marijana and Vasa, prepared the following table, which shows when certain fruits are harvested and transported.

Only apples and pears can be preserved during winter, so they are transported throughout the entire year.

Cherries and sweet cherries are very sensitive, so these fruits must be transported as soon as they are harvested. Harvesting and transportation are done every third day throughout the month.

Because there are large quantities of plums and they are easy to harvest, plums are harvested and transported three times per day, during September and October.

Peaches are present during summer, and their transport is performed 10 times per month.

Table 5: Period of harvesting and transportation of fruit

	January	February	March	April	May	June	July	August	September	October	November	December
Plum												
Cherry												
Sweet cherry												
Peach												
Apple												

The farmers usually deliver their fruit, after harvest, to one of five large farms, which are owned by the most famous and the wealthiest families in the village, Matijević, Mihailović, Teofilović, Mišić and Todorović. The same amount of fruit can be placed on every farm. Picked fruit is going to be sold to the most famous producers of fruit juices, Fruvita, Nectar, Coca-Cola Hellenic and Rauch. If agricultural cooperative takes responsibility of transportation, it will have to provide trucks, drivers and perform transportation from farms to factories, which produce juice. After hard work, Marijana and Vasa succeeded in defining the transportation costs per ton of transported fruits. These costs are calculated taking into account the distance from factories to farms, the price of fuel and driver's wages and are valid for any time of year.

Table 6: Transportation costs from farms to factory

	Fruvita	Nectar	Coca - Cola Hellenic	Rauch
Matijević farm	350 din./t	500 din./t	200 din./t	400 din./t
Mihailović farm	200 din./t	250 din./t	200 din./t	300 din./t
Teofilović farm	100 din./t	150 din./t	350 din./t	200 din./t
Mišić farm	300 din./t	400 din./t	100 din./t	450 din./t
Todorović farm	150 din./t	200 din./t	300 din./t	250 din./t

Considering different types of fruit that will be harvested, transported and sold at different times of the year, Marijana and Vasa divided the year into three periods:

1. November-May

2. June-August
3. September-October

In agreement with the producers of fruit juices, young graduates have obtained the following data on the overall demand for the upcoming year, according to the periods.

Table 7: Juice factory demand per year

Demand	Fruvita	Nectar	Coca-Cola Hellenic	Rauch
November – May	10000 t	7500 t	12000 t	18000 t
June – August	12000 t	8500 t	15000 t	22350 t
September - October	140000 t	115000 t	150000 t	258600 t

It is essential to determine the number of trucks necessary to realize the transportation needs of products. Funds raised from the Fund for development of the Republic of Serbia will be used for this purpose. The need for trucks will vary during the year and that has to be considered when deciding on the number of trucks needed. There are two options – buying new trucks and cooperation with Sa&Qu Sped, a transportation company.

Regarding purchase of new trucks, the ones in consideration are those of 30 t and 50 t capacity and their prices are 4.500.000 din and 7.500.000 din, respectively. If the company chooses to do business with Sa&Qu Sped, their service cost will be 9.000 dinar per tour.

To cover the cost of transportation products, truck maintenance costs and to ensure the normal functioning of the agricultural cooperative, the plan is to increase the price of products by 1.2%. Farmers will be paid for their products by previously determined price and agricultural cooperative will retain the difference in price (1.2%).

3. PREPARING FOR THE MEETING

The meeting with representatives of Ramnice was approaching and it was necessary to prepare the results of the analysis in the form of reports that are understandable to everyone. After "putting all the numbers on paper", Marijana started compiling the required analysis and reports.

The first thing that needs to be done is to make optimal distribution of agricultural cultures on arable land using software for linear programming (recommended software is Lindo). After implementing that distribution of cultures, yield and profit per culture should be calculated.

Once the yield is known, it is necessary to decide on the method of utilization of funds received from the Development Fund of the Republic of Serbia.

Regarding warehouse, total costs of construction and maintenance of the warehouse should be calculated. It is also necessary to determine whether the increase in sale price by 1% is enough to cover the costs of maintaining the warehouse.

Funds may also be used for the purchase of trucks. In this option total costs of transporting products and the number of trucks you need to buy or engage via Sa&Qu Sped company should be calculated. Determine if a better option is to buy a certain number of trucks, and engage the rest when needed. It is also necessary to determine whether the increase in sale price by 1.2% is enough to cover transportation costs.

(Values of fruit quantities should be rounded up to the next whole number; closed transport model is used in analysis. Usage of Vogel method (method of least differences) and MoDi method (potential method) is recommended for the determination of the initial solution for verification of optimality)

Once you get the costs for both options, it is necessary to compare them and choose the one that is more productive and profitable.

Consider different ways of investing generated profit in the further development of village and community. Give some suggestions and explain why it is important to invest that way.

AM.PM. – OVERCOMING CONSERVATIVE PURCHASING BEHAVIOR IN FOREIGN MARKET

Marko Krsmanović

1. INTRODUCTION

Established in 1873 in France, La Redoute is today the leading company in mail order and online shopping, as well as in the women ready-to-wear market. For a long time, La Redoute has been successfully operating in many countries worldwide. Their specialized furniture catalogue AM.PM. has been introduced in several countries and continues operating in a same line of success as La Redoute. However, Spain wasn't in a list of countries in which AM.PM. operates, so Spanish subsidiary of La Redoute decided to launch AM.PM. brand in Spain.

Based on in-depth analysis of internal and external factors, the opportunity gap in the market was found in which AM.PM. can be positioned. Further marketing research conducted on customers that are found in this gap revealed that there is a tremendous difference between purchasing behavior of French and Spanish customers. In order to move closer to Spanish customers, the company had to adjust its current distribution channels.

This study is based on authors research and strategic marketing plan prepared for the company La Redoute for the purpose of entering the Spanish market with their furniture brand AM.PM.

2. THE COMPANY

The company was founded by Joseph Pollet in 1873 under the name of "Les Filatures La Redoute". The first catalogue, consisting of only 16 pages, was printed in 1928. It took almost 30 years until the first exclusive furniture catalogue was printed in 1956. Ten years later, the company opened the first La Redoute store in France. With the gradual increase of the popularity and prevalence of the Internet, the company established its website in 1998. As of 2005, La Redoute serves more than 12 million customers worldwide.

La Redoute is not only the leading mail order trade company in France, but also the leader in the woman ready-to-wear market and in the e-commerce. La Redoute is the flagship brand inside the PPR Group, Pinault Printemps Redoute, which generated a turnover of €4.377 billion in 2005. The company is a part of the Redcats (Redoute Catalogue), which is the retail division of PPR.

Operating all over the world, including France, United Kingdom, Switzerland, Sweden, Portugal, Germany in Europe, United States and Russia (the latest entry in July 2006), La Redoute is offering its customers a service of proximity through catalogues and Internet: Clothes collection for women, men, babies and children, interior decoration, linen and furniture (depending on the country). They publish two catalogues per year, autumn/winter and spring/summer seasons, with 7.3 million copies globally sent to the customers. La Redoute served 12 million customers in 2006 worldwide.

In its home country, France, La Redoute enjoys massive brand awareness. With an existence of over a hundred years, La Redoute succeeded in integrating its business model perfectly in the minds of the customers. La Redoute has opened the office in Spain in 1992.

3. AM.PM. BRAND

AM.PM. is one of the specialized catalogues, which are sent to the customers under the brand La Redoute. The AM.PM. catalogue offers a collection of furniture for home under different themes: Campagne, Rustique and Modern.

The catalogue aims to offer the kind of furniture corresponding to the needs and expectations of La Redoute customers, and to the potential customers which are not La Redoute customers yet, a wide range of furniture, trendy and with different styles, appealing to different kinds of taste and preference.

This catalog emphasizes the company's wish to reach different customers by offering a complete collection of items with different styles, corresponding to different kind of interiors.

4. SPECIFIC PROBLEM

The greatest challenge in the Spanish market for any company that is doing distance selling, based on marketing research, is a conservative purchasing behavior of Spanish customers. This conservatism of Spanish customers is seen in their resistance toward distance shopping, because they are ready to buy only products that they can see and touch before purchasing. In order to overcome this challenge, the company had to find the new model of distribution that will allow customers to see and touch a product before they decide to buy it. Based on surveys conducted in Barcelona metropolitan area, 85% of potential customers have never bought furniture via distance shopping distance shopping distribution channel, but in the same time, 80% of them would consider buying furniture over catalogue and/or internet if they have a chance of seeing it in a store before making a purchasing decision.

5. WHY IS DISTANCE SHOPPING UNPOPULAR AMONG SPANISH CUSTOMERS?

The distance shopping business is not popular in Spain due to historic reasons. The Kingdom of Spain preferred to remain neutral to both World War I and II and this choice excluded the country of the massive damages of the post-war periods and kept it apart from the misery, through which all the countries involved in the war had to go for a long time. The post-war period is the time when all mail order companies became so popular in whole Europe, since the rest of the trade was suffering. _Since countries like Germany and France were highly destructed in terms of economy, only the mail order companies were available to offer goods to customers. During the 20th century, although all these countries already recovered their economies, mail order shopping remained popular and it still is, although all kinds of goods were available in the market by now. Therefore, mail order shopping is already included in their shopping culture and is a part of their shopping attitude.

Nevertheless, this is not the case in Spain. In spite of all the efforts to improve e-commerce in Spain, Spanish people are gradually getting used to shopping from catalogues or mail order companies by now. (Euroresidentes, 2007)

Although online shopping is improving recently in the last years, Spaniards still have complaints and concerns about it. Most of them complain of the low availability of articles and state that they want to go out and buy these personally. They also find the quality of Internet service in Spain annoying, due to low connection speed. In addition to these, Spaniards are still not very comfortable with providing their credit card numbers when shopping online. Due to such drawbacks, the increased public investments in the e-commerce can only improve the sector very slowly.

6. CONSUMER ANALYSIS

Primary consumer analysis was based on the marketing research done in December 2001 and September 2003 in Barcelona by Instituto DYM and on the analysis of statistical data provided by Ajuntament de Barcelona and Generalitat de Catalunya. The aim of this consumer analysis was to discover possible target customers for further marketing research that will narrow AM.PM.'s product offer to one core target group. (Instituto DYM, 2001, 2003)

Second stage of consumer analysis was based on the results of the marketing research conducted in Barcelona metropolitan area by the author of this case study in a period from January to April 2007. The second stage contained three survey researches, each on a sample of 1000 potential customers. The results of the first survey led to the definition of AM.PM.'s core target group. Results have shown that women are decision makers most of the time. They choose the products for the whole family or for themselves. 80% of women respondents mentioned that they are the ones who choose what to buy. On the other hand, 70% of the men respondents mentioned that they choose which product to buy with their wives. So, the results

showed that women are more involved in decision-making process for furniture, which resulted in the decision to focus on women as the target group. Other characteristics of core target group based on marketing research are:

Age:	25-45
Gender:	Female
Income:	1500 EUR – 4000 EUR
Occupation:	White-collar, Office worker involved with internet usage
Choice Criteria:	Design & Quality for a fair price with ease of purchase
Lifestyle:	Hard-working, economically independent, limited time for shopping, high internet usage, visiting gym in a free time
Purchasing Structure:	Open to new models that make her save on time such as Internet
Purchasing Process:	Decision maker for herself and her family Buyer-herself User- herself or the family if married or has children

Second and third surveys have revealed that the Spanish customers are very conservative when it comes to the usage of distance shopping and that they do not feel comfortable if they cannot see and touch the product before making purchasing decision.

7. CURRENT DISTRIBUTION MODEL

AM.PM. has two sales channels; the first one is the catalogue, which the customers receive to their homes, and they have the possibility to order through telephone, Internet or by mail with the paper forms they receive with the catalogue.

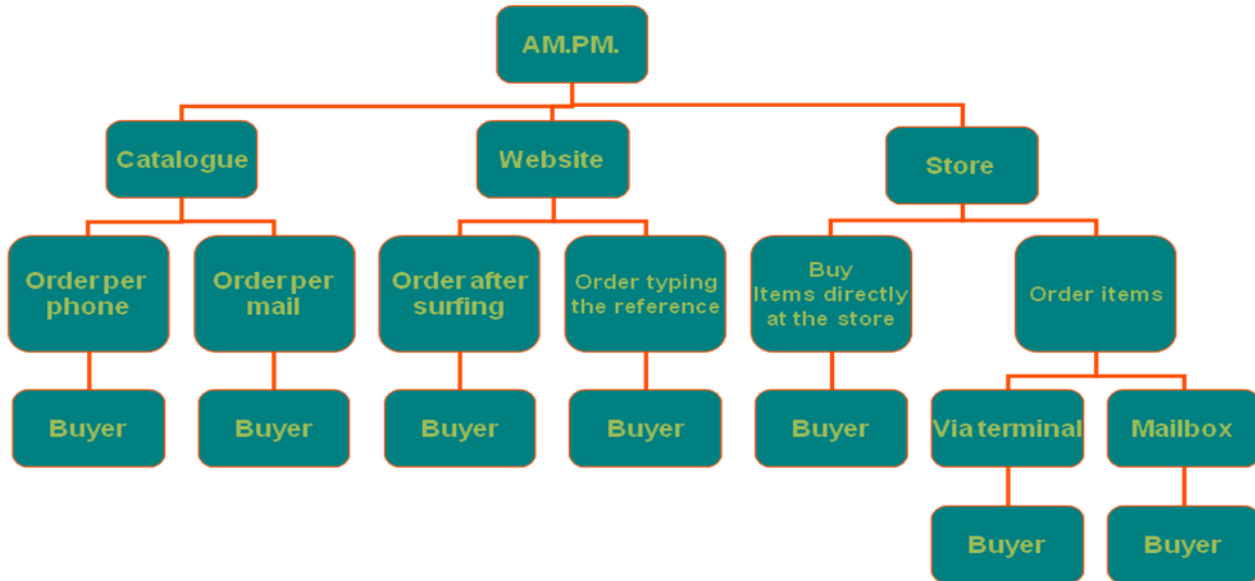
The second channel is the Internet. Through the web site of La Redoute, where customers can find all the articles classified according to their segment and function (women, men, children, interior decoration, brands).

8. THE NEW CHANNEL: AM.PM. FLAGSHIP STORE

Results of the research conducted for the Spanish market has showed that the Spanish consumer wants to see and touch the product before buying it. Based on this information, the decision to open the flagship store as a new distribution model was made. The objectives to reach with the AM.PM flagship store are to:

- Give the customers the opportunity to see the products of the company
- Create brand awareness
- Support the existing channels such as e-mail, phone and internet

9. MODEL OF DISTRIBUTION CHANNELS OF AM.PM. WITH THE FLAGSHIP STORE CONCEPT:



10. ISSUES WITH FLAGSHIP STORE OPENING

As stated before, the concept of flagship store will help company to overcome the challenge imposed by conservative purchasing behavior of Spanish customers. However, when costs of opening and running a flagship store are added to profit and loss account, we get the situation in which AM.PM. will have operational loss in the first two years of almost 700.000 and 250.000 Euros respectively, while without the flagship store concept it is profitable from year one in the amount of approximately 150.000 Euros. Should company continue with opening of flagship store and plan operational loss for next two years or go without the flagship store and be profitable from year one but with the risk of losing potential customers who are too conservative to buy furniture through catalog or over the internet?

11. CONCLUSION

After a detailed analysis of both alternatives, the management has decided to go with the flagship store concept because even though the company would run operational loss for two years, during the third, fourth and first half of the fifth year, it will be able to generate enough profit to cover the loss from the initial two years. From the second half of year five and during year six, it will increase its profit to the amount much larger than it would be able to generate cumulatively for six years without flagship store. The reason for this is the fact that only with the flagship store, the company would be able to get closer to its potential customers and to offer them a unique shopping experience by combining traditional and modern way of furniture shopping.

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ANALYSIS OF E-GOVERNMENT IMPLEMENTATION IN SERBIA AND COMPARISON WITH SUCCESSFUL PRACTICES IN FORMER YUGOSLAVIAN COUNTRIES

Žarko Čolović

Abstract: This case study deals with the concept, types and characteristics of E-Government and describes the way in which this modern form of public administration is applied in Serbia, as well as in surrounding countries. The paper contains a theoretical framework that explains the concept, characteristics, and types of E-Government. Also it defines the criteria for monitoring the level of development and summarizes the most important services of the E-Government. The research part provides access to the legal basis on which and through which E-Government functions. It describes the international law, documents and acts of the European Union. The third part of the paper defines the purpose and methodology for the research and establishes a working hypothesis, which is being further researched. In the following sections this paper deals with the study of E-Government in Serbia, as well as countries in the region, and through analysis of its most important service for citizens, businesses and public administration itself. The paper, apart from Serbia described e-government in Slovenia, Croatia, Macedonia, and Bosnia and Herzegovina. Based on the available & collected secondary data it has been made direct comparison between the levels of development of these countries. Also it examines the survey and analysis of available information and summarized the results in order to successfully respond to the previously established working hypothesis.

1. INTRODUCTION

Field of research of this case was the level of successfulness in implementation of electronic government in Serbia and benchmarking with the former Yugoslavian countries (ex-Yu). Before analyzing the subject, the author set theoretical ground in this subject by defining the E-Government, its definition, characteristics, development, and legal framework. Further on with comparative analysis of practices in Serbia and the countries in the region, author provided, from secondary available data, quantitative performance indicators E-government in ex-Yu countries to reflect the true picture of progress in implementation.

2. E-GOVERNMENT IN GENERAL

E-Government is changing the way that the public service is functioning. The model of communication which has previously been a clerk intermediary between the state and the citizen shall be replaced by direct communication. To bring a service offered over the Internet it is necessary to integrate all municipalities, databases, organizational units – a rather complex project whose implementation must be done from a clearly developed strategic approach. Only with successful implementation, E-Government can coordinate the work of public services, improving their organization and providing overall higher quality of services. This technology, in its all, has the potential to redefine and revitalize the relationship between citizens and government.

It is hard to determine the crucial dates when the breakthrough in development was made. In December of 1999, EU Commission started the e-Europe initiative called "Information Society for all" with main goal to connect all the advantages of IT Society with all European citizens. The initiative has set the three main goals:

1. *To establish the online connection for all citizens, households, schools, businesses and governments;*
2. *To create IT educated Europe, supported with entrepreneur spirit, ready for financing and developing new ideas and technologies;*
3. *To enable that the whole process be transparent and social-inclusive, to establish the trust of users and empower social cohesion.*

First official step in Europe was made in March of 2001. in Naples, on the Third Global Forum under name "Fostering Democracy and Development Through e-Government" when the project of creation, implementation and development of e-Government was created.

There are numerous definitions of e-Government nowadays. But, one of the most practical probably is that e-Government presents online exchange of information and service between citizens, business and public municipalities. Also, for the need of this case, author use definition that the e-Government is a most efficient way on which Governments are using information technologies in order to provide its information and services to their citizens. Common thing to these two definitions probably is that e-Government involves the optimization and computerization of existing procedures which will requires in the future new ways of managing, negotiating, strategic decision-making, new ways of businesses and new ways in communications (Rogers, 2002). At the end, e-Government has as its goal to improve access and delivery of government services & benefits to the citizens. In his research Bretschneider (2003) has highlighted the creation of Internet as a best technological breakthrough which is affecting the telecommunications, technologies and overall progress of computer technologies, resulting with the more efficient support for development of e-Government.

Implementation process

Briefly, successful implementation of e-Government, proved by best practice experience is done systematic with strategic approach. From real life practice, it means that Country that is aiming to implement such model of governance needs to arrange:

1. Legal framework that will support and protect to functioning of e-Government
2. Adequate ICT infrastructure, implemented in all parts of governmental bodies (institutions, municipalities, ministries) from the lowest to the highest level of hierarchy
3. Important strategic documents and plans:
 - *National strategy for development of Information society (for next five years at least)*
 - *National plan for development of Information society*
 - *National plan for implementation of e-Government, with coordination on local authorities and municipalities and the highest governing bodies in the country*

European Union with EU Commission provides help to all of its countries in implementation processes. But all these are only the ground documents and plans. If the process of implementation of e-Government is started without clear strategy, it can lead to a numerous problems. For example, in Serbia in the first years of development (2001-2003), instead of having the national strategy in development of e-Government supported from the highest governmental levels, local municipalities were the initiators of implementation process, focused on local level only, with out clear vision for the future and any possibilities for integration on regional and national level.

Hiller and Belanger (2001) identified five stages in implementation of electronic government: (1) information, (2) two way communication, (3) transaction, (4) integration and (5) participation. Modernizing the Hiller and Belanger's model, Moon developed (2002) similar model (despite some minor differences in phrasing): (1) Simple information dissemination (one way communication), (2) Two-way communication (request and response), (3) Service and financial transaction, (4) Vertical and horizontal integration, (5) Political participation.

United Nation Public Administration Online network (UNPAN) presents five stages of e-Government as (1) emerging web presence, (2) enhanced web presence, (3) interactive web presence, (4) transactional web presence and (5) fully integrated web presence.

Importance of the legal framework

Government activities are heavily regulated and initiated in legal frameworks including national legislation and other related laws and regulations and international legislation which deals with this area. Thus, the E-Government should first be supported by local laws and regulations for its legitimacy and legality. Then, when the E-government launch the passive provision of information in an interactive phase (where the electronic services is provided, or State begins to provide services and / or goods on the Internet), e-government is the equivalent form of electronic commerce. Successful e-government is sustainable in an environment free of legal barriers and, therefore, legal reforms are made to support, not interference to electronic administration.

When it comes to international models and laws governing the E-Government, faced with a broad list of subjects treated with such laws and regulations, such as e-contracts, delivery terms and guarantee the provision of online services, data protection and privacy, security and reliability, electronic signatures, electronic payments, consumer protection, intellectual property rights, cyber crime, taxes, and so adopted a legal infrastructure to enable e-Government to achieve its objectives, with no legal barriers and obstacles, and will essentially focus on the following:

1. *Legitimacy*
2. *The recognition of electronic documents and transactions*
3. *Authorization*
4. *Privacy Policy*
5. *Freedom of information*
6. *Cyber Crime (Mohamed, 2009)*

A very important part of information society as a whole, and especially E-Government is the legislation. The EU countries have harmonized legislation in the E-Government, and it is mainly divided into two groups:

- *primary legislation (E-Government in the strictest sense, freedom of information, data protection and privacy) and*
- *Legislation for services and infrastructure*

Most European countries, according to e-Government initiatives that are mainly related to the improvement of governance are at the national level. Significant activities of e-Government take place at the European Commission (EC). In addition to the many laws, the Commission adopted an action plan the "eEurope 2005" that has brought many changes and progresses in the field of e-Government. One of the key action points for achieving goals-convergence of public administration to citizens and businesses by providing modern public services via the Internet (e-Government). Also, EC adopted the document entitled "i2010 - A European Information Society for Growth and Employment", as well as the Ministerial Declaration and guidance from the Ministerial Conference "Transforming Public Services, 24 November 2005, Manchester, UK." At the EU level are defined by common goals and principles and the provision of resources by the financial support programs and professional development of information society, especially in the candidate countries for membership.

3. METHODOLOGICAL FRAMEWORK OF THE RESEARCH

Purpose of research

The purpose of the research results to the quantitative indicators E-government in ex-Yu countries is to reflect the true picture of progress in implementation of the e-Government. The ranking of countries according to any basis, including the results of the E-Government is established on the secondary data of the United Nations on the basis of indicators: e-readiness, Web index and index of infrastructure. The aforementioned indices will serve as a tool for understanding the strengths and weaknesses of implementation. Evaluation of the public sector is tracking a set of technical characteristics: accessibility, adaptability and reliability of service, or organization, such as efficiency, productivity, motivation, and the like. Such data may be particularly challenged when it comes to ranking countries in certain areas, and the ranking results can be inaccurate.

Research Hypotheses

H1: Serbia does not lag behind in developing E - government in the countries ex-YU;

H2: Compared to 2005, Serbia has made progress in the development of E-Government;

Methods of research

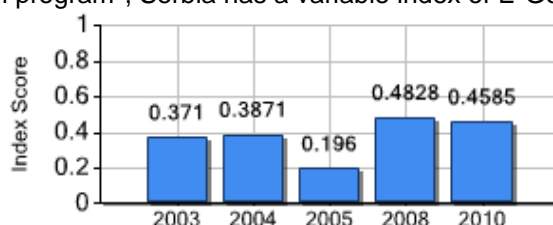
The study will use a method of comparative analysis of quantitative indicators of development of electronic government in the period 2005-2010. Based on comparative analysis will be drawn concluding observations and to check the truth of the hypothesis. Indicators should be a balance of influence and contribution of E-Government. Reports and rankings are viewed as tools with which you can access the current status of certain areas and further development of electronic services. As one of such tools can also serve as a UN report, which provides quantitative data on the willingness of member countries for e-government. Generally, the ranking of countries in relation to e-readiness is performed by Economist Intelligence Unit. However, their data do not apply to all countries, and will, in this paper, data will be used for UN.

4. RESEARCH

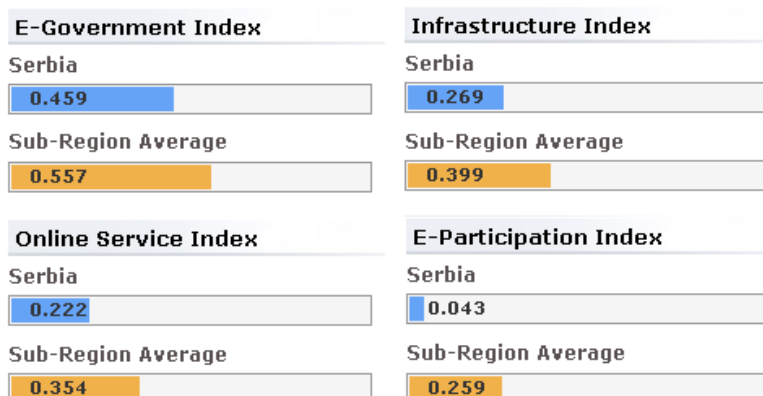
E-Government analysis in Serbia

The total level of sophistication of e-Government in the Republic of Serbia in 2009. amounted to 51% (in 2008. amounted to 47%). Comparing to that it is relevant to mention that according to recent data (RZS, 2011¹) 52,1% of households poses computer and 41,2% of households have the installed internet connection. Rapid sophistication of modernizing the internet connection in households was noted in 2009. (RZS, 2009) when for the first time percentage of households having the ADSL connection was higher then the percentage of the households with dial-up connection.

The sophistication of the basic set of 20 services according to Capgemini², the EU set of 27 + countries for 2007-2009 amounts to - 76% in year 2007. and 83% in year 2009. The overall sophistication of e-Government in the Serbia, when the same group of services is compared (Capgemini, 2011), is 38% in 2007. and 46% in 2009. These data clearly show that Serbia is significantly behind the EU and the countries in the region (Croatia, Slovenia) in the overall level of sophistication of electronic services. While the results of the UN Public Administration program³, Serbia has a variable index of E-Government services (Picture 1).



Picture 1: E-Government index development in Serbia (UNPAN, 2011)



Picture 2: Comparison of E-Government indexes (UNPAN, 2011) compared with region averages

Also, according to a UN E-Government database, compared to countries in the region, all measurable indexes (Picture 2): E-Government index, Infrastructure index, E-Participation index and Online index, are below region averages (UNPAN, 2011).

E-Government analysis in Bosnia

Public administration in Bosnia and Herzegovina (BiH) provides public services in 146 municipalities, 10 cantons, two entities, Brčko District and the level of Bosnia and Herzegovina. Obstacles and barriers to the introduction of e-government in BiH are classified into three categories: people, technology and organization. Objective problems are serious, and above all lack of funds and human resources, social pressures, lack of coordination and a common systematic approach with external parties, etc. BiH was for the first time included in the World Economic Forum (WEF) report from 2004/2005⁴, where it was ranked as 89. from 104 countries, sorted according to level of successfulness of compared web, infrastructure and e-readiness

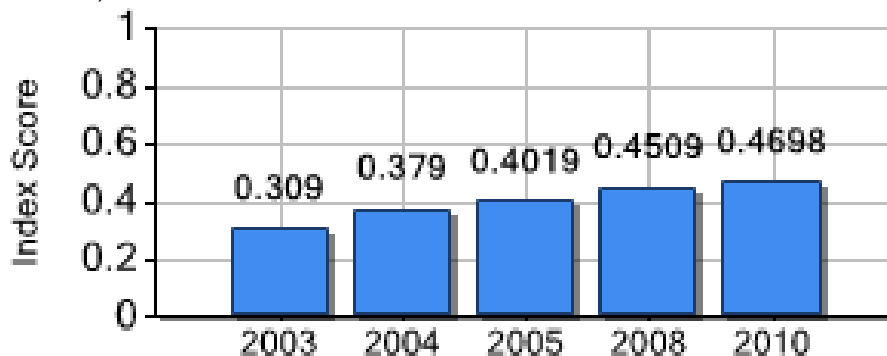
¹ Republički zavod za statistiku, Srbije | www.stat.gov.rs

² Capgemini - global consulting & research company, with headquarters in Paris, <http://www.capgemini.com>

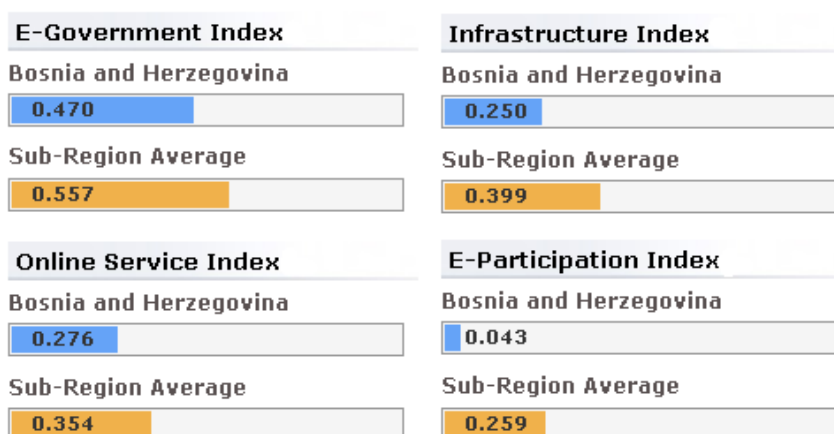
³ UN Public administration program, UN E-Government database <http://www2.unpan.org/>

⁴ World Economic Forum, Global Information Technology Report 2004-2005.

indexes. From the series of these WEF reports in period from 2004. to 2009. Bosnia and Herzegovina had rather slow progress in implantation and development of e-Government, according to measured indexes. According to measured data taken from portal UN E-Government portal database⁵, although the index of e-government services in the BiH has a growing trend (Picture 3), it is still below the level below the average for that region (Picture 4).



Picture 3: E-Government index development in BiH (UNPAN, 2011)



Picture 4: Comparison of E-Government indexes (UNPAN, 2011) for BiH, compared with region averages

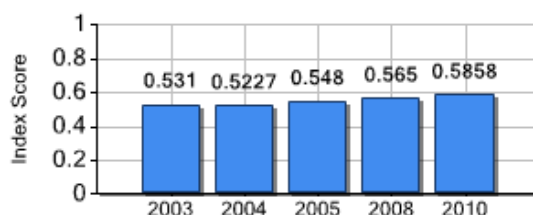
E-Government analysis in Croatia

The Croatian Parliament adopted the Strategy for Development of Information and Communication Technology – Croatia for the 21th century and introduced general measures of information society development in Croatia in January 2002. At the end of 2003. Croatian government adopted a program of e-Croatia 2007, which was the policy of the action plan e-Europe 2005, to improve and modernize the electronic government, improved with the "E-Government beyond 2005" and eventually incorporated into the plan "i2010 Initiative". Program e-Croatia has gone over the years through major changes and expansion in all segments through support programs such as "Operation plan implementation of e-Croatia 2007 Program" and the "e-Croatia program for 2006." They have extended the project e-Croatia 2007, particularly in the areas of IT education e-Learning, training information then e-Judiciary and Judicial IT training program through the Health e-Health.

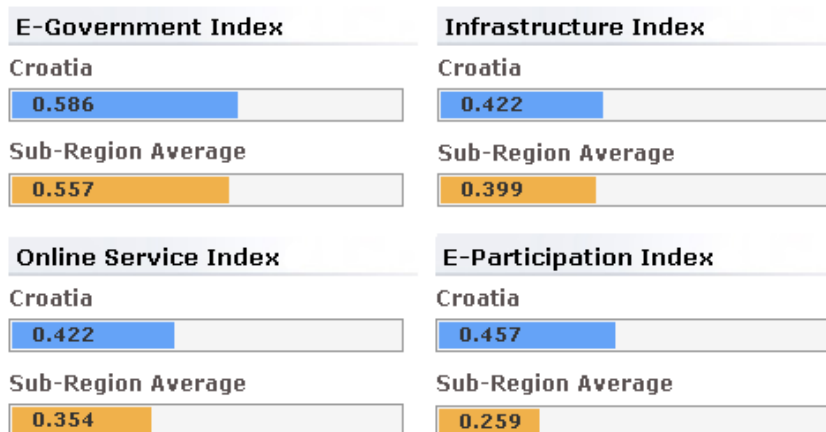
The current situation in Croatia, according to data that can be downloaded from the United Nations E-Government Data base⁶ shows that the E-Government Index is a slow upward trend which is certainly good sign (Picture 5).

⁵ UN Public administration program, UN E-Government database <http://www2.unpan.org/>

⁶ UNPAN Database - <http://www2.unpan.org/>



Picture 5: E-Government index development in Croatia (UNPAN, 2011)

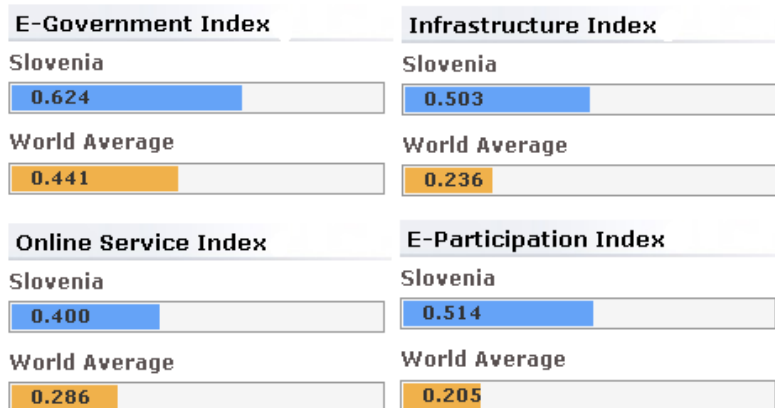


Picture 6: Comparison of E-Government indexes (UNPAN, 2011) for Croatia, compared with region averages

The progress made so far in the availability of public services online, as measured with the EU standards, shows that Croatia has made significant strides in implementing E-Government systems and is one of the leading countries in the region. What data and prove the condition index of E-Government in comparison with the countries of the region (Picture 6).

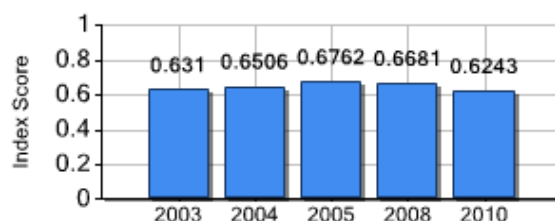
E-Government analysis in Slovenia

In Slovenia, as well as anywhere in the European Union, E-Government is one of the benefits of modern designed in public administration. Other amenities include a reduction of administrative barriers, improvement of services by public administration (a time of growth and customer satisfaction), the introduction of tools for quality management and human resource management. Public administration in Slovenia has implemented several organizational changes in the range since 2001. to 2006. Development of E-Government is implemented in parallel with these structural and organizational changes.



Picture 7: Comparison of E-Government indexes (UNPAN, 2011⁷) for Slovenia, compared with world averages

⁷ UN Public administration program, UN eGovernment database - <http://www2.unpan.org>

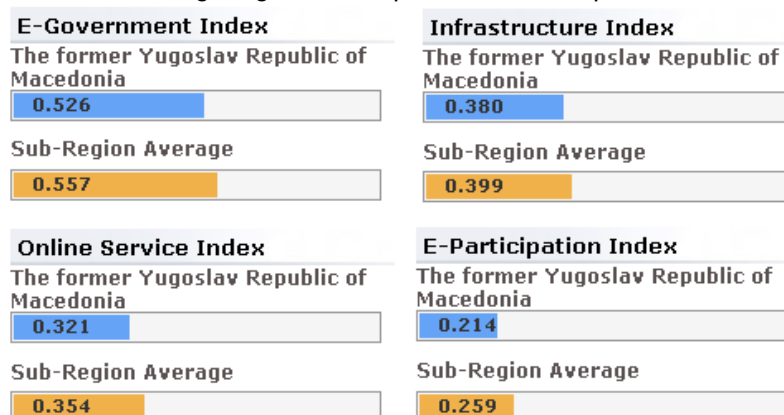


Picture 8: E-Government index development in Slovenia (UNPAN, 2011¹¹)

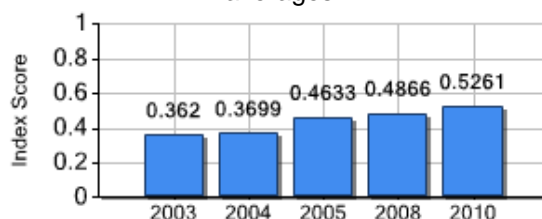
Current situation in Slovenia, according to data that can be downloaded from the United Nations E-Government Data Base show that E-Government index is having strong growing positive trend (Picture 8). Compared with the average e-Government index of growth at the global level (Picture 7) Slovenia has achieved remarkable results. General Growth Index E-Government services is higher than average, as other segments of the development of E-Government (infrastructure indices, the index of the equity index of online service availability).

E-Government analysis in Macedonia

The project to develop e-government in Macedonia began with the development in 2004. under the help of USAID⁸. The projected period for the development and implementation of the project was in Macedonia since 2004. by 2011. year. The main aim of the project's objective was to implement a modern solution that delivers e-Government in Public Administration of Macedonia, which are aimed at increasing efficiency and greater transparency in the management and operation of the public sector. Project E-government in Macedonia received the recognition by the New York Times magazine which characterized it as very successful in the article titled: *"The fight against corruption with the help of E-Government"*⁹.



Picture 9: Comparison of E-Government indexes (UNPAN, 2011) for Slovenia, compared with region averages



Picture 10: E-Government index development in Macedonia (UNPAN, 2011)

Based on progress shown on UN Public administration network survey, that monitors E-Government development¹⁰, author can clearly confirm that Macedonia successfully implemented the introduction of E-Government System and the National Strategy for Information Society development well designed.

⁸ USAID – United States Agency for International Development, www.usaid.gov

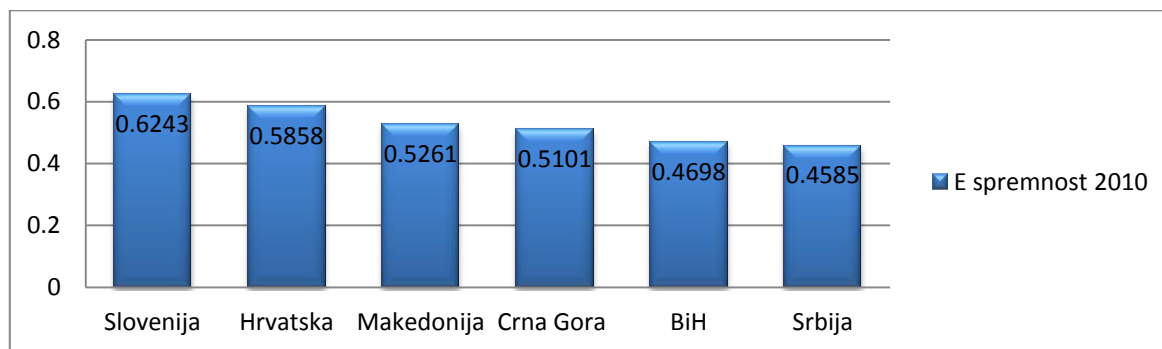
⁹ New York Times magazine, 02.10.2008. http://www.nytimes.com/2008/11/03/business/worldbusiness/03iht-EGOV03.1.17420751.html?_r=1

¹⁰ UN Public administration program, UN eGovernment database - <http://www2.unpan.org>

5. COMPARATIVE ANALYSIS OF SUMMARIZED DATA

Research preparedness for electronic government (e-readiness)

United Nations e-Government report for year 2010, presents a comparative review of 192 responses to requests from Member States of their citizens and businesses. It is also the attempt of the UN member states to provide quantitative indicators, to be able to see areas show weakness, and good results. Assessing readiness for e-government is focused on services that are primarily related to citizens' needs.

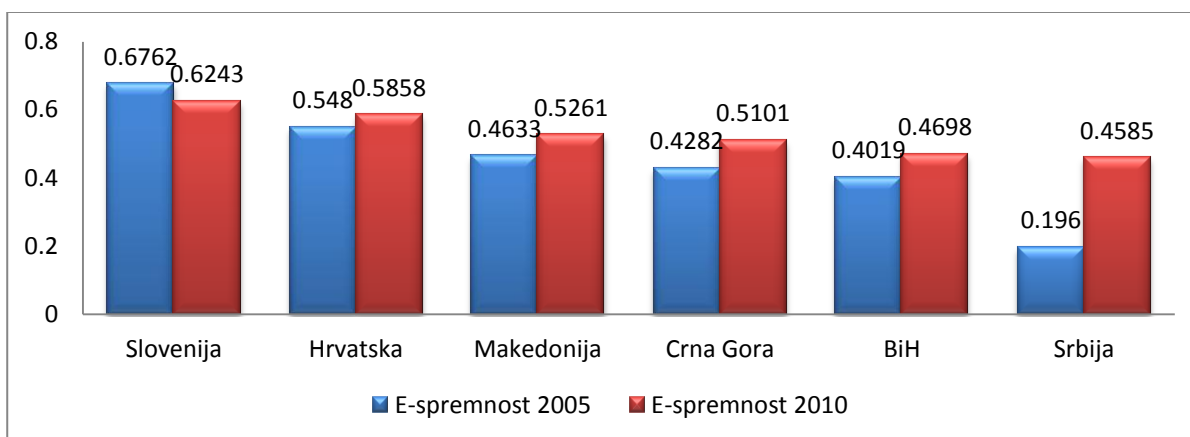


Graph 1: E-Readiness for 2010 of Former Yugoslavian Countries¹¹

E-readiness index is a measure of the quality of information and communication infrastructure of the country and the ability of citizens, businesses and authorities to use its advantages. The concept of measuring this indicator is based on an overall examination of the development, including human resources, infrastructure development and access to information.

Table 1: E-Readiness indexes for 2010, of Former Yugoslavian Countries¹²

Country	E-Readiness	
	2005	2010
Slovenia	0,6762	0,6243
Croatia	0,548	0,5858
Macedonia	0,4633	0,5261
Montenegro	0,4282	0,5101
BiH	0,4019	0,4698
Serbia	0,196	0,4585



¹¹ Based on data: United Nations E-Government Survey Leveraging e-government at a time of financial and economic crisis 2010

¹² Based on data: United Nations E-Government Survey Leveraging e-government at a time of financial and economic crisis 2010 and OECD: e-Government for Better Government, 2005.

Graph 2: Compare of E-Readiness indexes results during 2005-2010, for of Former Yugoslavian Countries

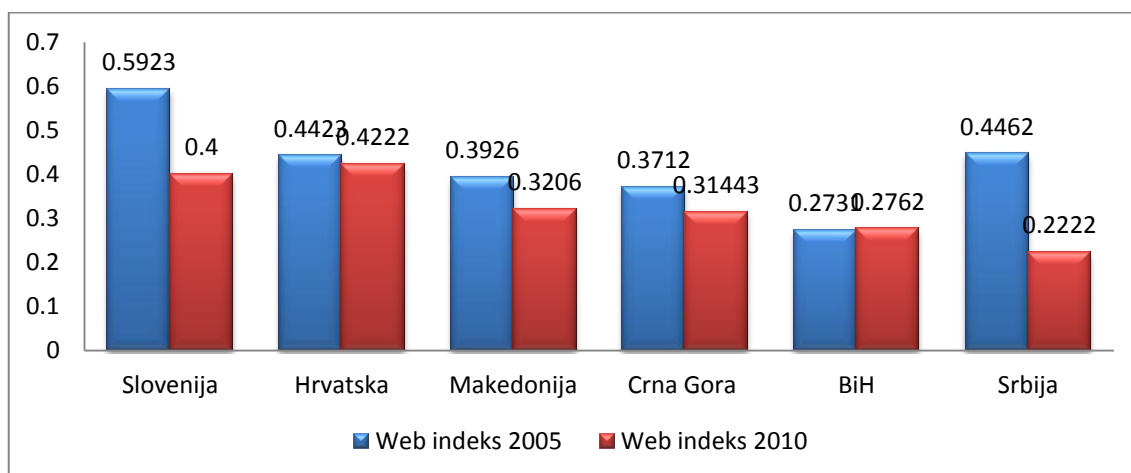
E-readiness index results show a trend of stagnation in our first graphics Some of the indexes are repaired, but many at a lower level than in previous years (Table 1 and Graph 2). Slovenia is the leading with the observed countries with 0.6762, followed by Croatia Macedonia. Although the region above the world average, it should be noted that the lagging behind developed countries significantly. The region ahead of a lot, mostly on infrastructure and development of new services, closer to European standards in e-government.

Research Web Index (Web measure index)

Web Index is based on five phases of the E-Government development (the presence in its infancy, increased presence, interaction, transaction, integration) and reflects the sophistication of online presence management. Depending on how does the management of a country reaches a certain stage, so it gets on the scale of this index. On line presence of government of each country is measured by the availability of services and web sites of ministries of health, education, social welfare, labor and finance, as it is considered that the administrative bodies to which citizens often pay. Each of the sites mentioned ministries were contacted several times with the same set of questions. Therefore, web index gives countries a comparative analysis of their ability to deliver public services to citizens.

Table 2: Web index results for of Former Yugoslavian Countries¹³

Country	Web index	
	2005	2010
Slovenia	0,5923	0,4
Croatia	0,4423	0,4222
Macedonia	0,3926	0,3206
Montenegro	0,3712	0,3143
BiH	0,2731	0,2762
Serbia	0,4462	0,2222



Graph 3: Compare of Web index results during 2005-2010, for of Former Yugoslavian Countries

Web index (Table 2) from all the study countries is declining, except in Bosnia where stagnant. It talks about significantly weaker investment in software solutions and inadequate maintenance of existing web sites. Very few services in the transaction and integration phase. The Board communicates with the public mainly through the information and statements on websites and e-mail.

A closer look at the web index, respectively, from which the data was performed (Graph 3) shows that Serbia does not have any application in transactional and integration phase of E-Government. The main reason is

¹³ Based on data: United Nations E-Government Survey Leveraging e-government at a time of financial and economic crisis 2010 and OECD: e-Government for Better Government, 2005.

probably the lack of services for electronic payment. This cause must be removed as soon as possible and start developing applications that would facilitate the daily life of citizens.

Research Infrastructure Index (Telco infrastructure index)

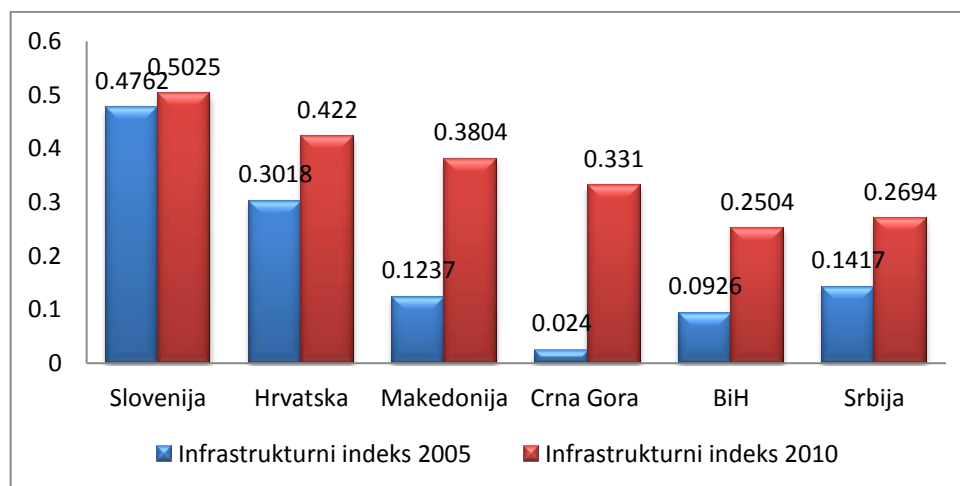
Telecommunication infrastructure index is a composite index, consisting of five primary indicators related to the E-Government Services:

- The number of Internet users per 100 inhabitants;
- The number of PCs per 100 inhabitants;
- The number of telephone lines per 100 inhabitants;
- The number of mobile phones per 100 inhabitants;
- The number of broadband connections per 100 inhabitants.

Each of these five indicators is one fifth of the infrastructure index. Source of data in this area is the International Telecommunication Union (ITU).

Table 3: Infrastructure index results for Former Yugoslavian countries¹⁴

Country	Infrastructure index	
	2005	2010
Slovenia	0,4762	0,5025
Croatia	0,3018	0,422
Macedonia	0,1237	0,3804
Montenegro	0,024	0,331
BiH	0,0926	0,2504
Serbia	0,1417	0,2694



Graph 4: Compare of Infrastructure index results during 2005-2010, for of ExYugoslavian Countries

Infrastructure Index (Table 3) indicates an increase in investment in telecommunications infrastructure. All Ex-Yu countries have improved this index compared to 2005. Further development should be based on building a solid broadband infrastructure and the liberalization of telecommunications and computer equipment.

UN data show that Serbia is far behind in the development of telecommunications infrastructure and electronic services in developed countries. With Bosnia and Herzegovina and Montenegro is located at the far end of Europe, by almost all indicators.

Further liberalization of telecommunications (increased competition from providers) would help reduce the cost of services, build more broadband connections and, thus, increase the use of the Internet and its services.

¹⁴ Based on data: United Nations E-Government Survey Leveraging e-government at a time of financial and economic crisis 2010 and OECD: e-Government for Better Government, 2005.

6. CONCLUSIONS & RECOMMENDATIONS

Pressure created from the citizens and businesses leading to launch an initiative to build a modern, efficient and affordable administration. Resistance to these changes is strong and comes mainly from the government, the ossified, legacy systems, which tend to retain their existing status. This resistance must be overcome, but with a big dose of caution, because the administration can not transformed quickly and efficiently as a profitable business organization.

Quantitative performance indicators E-government can be used as a tool for understanding the strengths and weaknesses of implementation. Currently there is no standardized method for monitoring and measuring indicators E-government, and therefore these results have their limitations. Often show only the relationship between input and output parameters, regardless of the processes within the administration. For this purpose, they must be carefully selected or composed (if composite), to reflect the true picture of progress in these areas. The ranking of countries according to any basis, including the results of the E-Government is a very thankless job. Results of the United Nations, however, for several years, provide a picture of e-government in the world, based on two composite indicators: e-readiness and e-participation.

The first hypothesis (H1) is rejected. Based on comparative analyzes have shown that at the moment Serbian delays in the development of E-Government for Ex-Yu, and Europe.. The priority task in overcoming the delays would be expected to develop and liberalize the telecommunications infrastructure. Only implemented with advanced telecommunications services E-Government can have a proper meaning. The second hypothesis (H2) adopts a partially compared with 2005 there has been a growth index, E readiness, with 0.196 to 0.4585. There was also an increase in the infrastructure index "from 0.1417 to 0.2694. But there was a drop Web index of 0.2222 to 0.4462

This comparative study clearly shows how countries that had clear strategy and vision from the start of implementation process, have constant growing positive trend in development of eGov services. It additionally highlights the necessity of having national strategy for development of IT Society and E-Government on all levels.

Define or adapt existing standards (domestic or foreign) is an absolute necessity when introducing E-Government. The mutual interoperability of the administrative authority can only be achieved by applying them. Standards, however, we must first develop and legally defined. Some of them already exist, but must be adapted to electronic data processing (Archive, Documentation), while others have been introduced recently and require further elaboration (for example: electronic signature.). Mutual exchange of information between administrative authorities, as well as exchange of information between administrative authorities and users, is also subject to standardization. Standards must be set so that users are in the foreground, to the evolutionary character, simple and uniform, to support multi-channel access and delivery of services and to indirectly support the rapid development of applications.

Orientation toward new technologies should not be just one idea for networking in the public administration, and also the basis for further development of electronic government. Potential opportunities to be recognized and utilized, there is now a large number of successful practices. Today's information together with knowledge of one of the most important resources that guarantees success and led to changes in management in the public sector or to new public management.

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